

Feb. 26, 1963

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3,079,037

CONTAINER PROVIDED WITH COVER SEAL AND TRAY-CLOSURE

Filed June 27, 1960

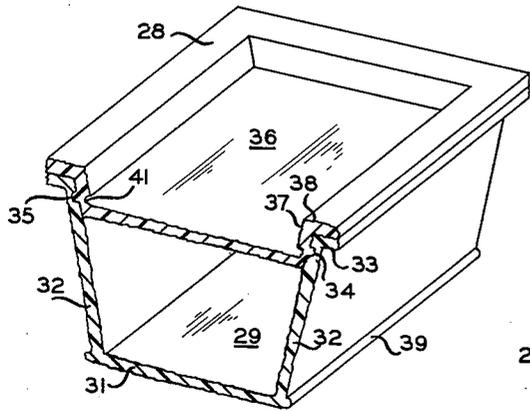


FIG. 3

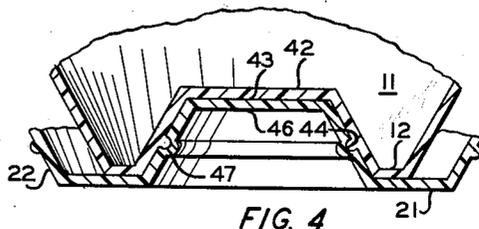


FIG. 4

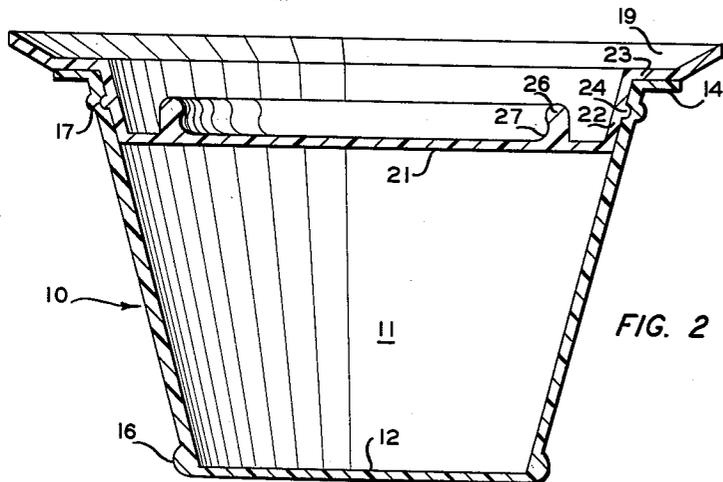


FIG. 2

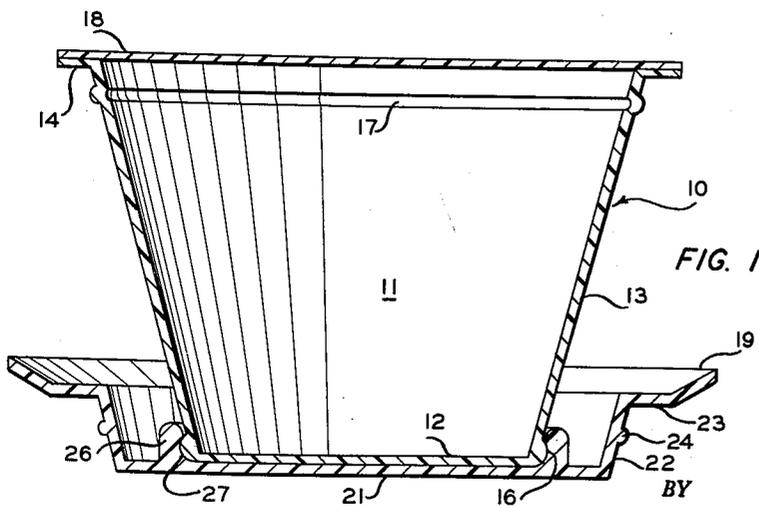


FIG. 1

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3,079,037
**CONTAINER PROVIDED WITH COVER SEAL
 AND TRAY-CLOSURE**

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Filed June 27, 1960, Ser. No. 38,944

7 Claims. (Cl. 220-69)

This invention relates to a container provided with a cover seal and a tray-closure. In one aspect this invention relates to a container which is provided with a cover seal which can be sealed in place to protect the contents of said container when it is initially filled, and which is also provided with a tray-closure which can be employed as a closure for said container after the initial cover seal has been removed, or which can be employed as a tray for supporting said container.

In recent years it has become increasingly common to package various items in containers molded of plastic or other flexible but relatively rigid materials. The use of such containers is becoming more and more widespread, particularly in the packaging and sale of foodstuffs. In the packaging of foodstuffs particularly, and also with some other items, it is desirable that the container be sealed at the time of filling, and foodstuffs containers provided with a cover seal which is applied when the container is filled are in use. However, one of the drawbacks in the use of such containers is that there is no convenient way to close the container after it has been opened. Thus unless the contents are all used relatively soon after the container has been opened, said contents must be transferred to another container which can be conveniently closed. This is troublesome at best and frequently results in the loss of some of said contents.

The present invention solves this problem by providing a container which can be initially sealed at the time of filling with an easily removable seal, and which is also provided with a tray-closure element which can be employed (1) to close the container after the original seal has been removed or (2) can be employed as a tray to support said container. Thus, broadly speaking, the present invention resides in a container comprising, in combination, a receptacle, a cover seal for said receptacle, and a removable tray-closure for said receptacle; said tray-closure being adapted to be inserted within the open top of said receptacle to close same after the original closure seal has been removed, or attached to the bottom of said receptacle as a tray support.

An object of this invention is to provide an improved container which can be initially sealed when filled and which can also be closed and used as a storage container after said initial seal has been removed. Another object of this invention is to provide an improved container having an original cover seal which is applied when said container is filled, and also having a tray-closure element which can be employed to close said container after said initial seal has been removed or which can be employed as a tray support for said container. Another object of this invention is to provide an improved container having the combined advantages of (1) an easily removable initial seal closure and (2) a snap-in and snap-out closure element for closing said container when said original seal has been removed. Still another object of this invention is to provide an improved container as described above which can be easily fabricated from readily available materials. Other aspects, objects and advantages of the invention will be apparent to those skilled in the art in view of this disclosure.

FIGURE 1 is a view in cross-section of one embodiment of the invention illustrating the initial closure seal

in place at the top of the receptacle and the tray-closure element attached to the bottom of said receptacle.

FIGURE 2 is a view in cross section of the embodiment of the invention illustrated in FIGURE 1 but showing said closure seal removed and the tray-closure element inserted within the open top of the receptacle to close same.

FIGURE 3 is a perspective view, partly in cross section, of another embodiment of the invention wherein the initial closure seal has been removed and the tray-closure element inserted within the open top of the receptacle.

FIGURE 4 is a partial view in cross section of another container in accordance with the invention.

Referring now to said drawings, the invention will be more fully explained. In said drawings, like reference numerals have been employed to denote like elements. In FIGURE 1 a container fabricated in accordance with the invention is designated generally by the reference numeral 10. Said container comprises an open top receptacle 11 having a round bottom 12. An upstanding peripheral side wall 13, tapering smaller from top to bottom, and terminating at its top with an outwardly projecting flange 14 is attached to and surrounds said bottom 12 at its periphery. An externally extending bead 16 is provided around said side wall at the bottom thereof. A groove 17 is provided in and around the inner surface of said side wall, said groove 17 being spaced from but adjacent the top of said side wall 13.

A cover seal 18 is provided for the open top of said receptacle 11, said cover seal comprises a flat sheet or film and is placed in sealed engagement with said outwardly projecting flange 14. As discussed hereinafter, said cover seal can be fabricated from the same or a different material from that employed in fabricating receptacle 11. In many instances, said cover seal is desirably fabricated from a transparent material.

In said FIGURE 1 a removable tray-closure element 19 is attached to the bottom of said receptacle 11. Said tray-closure element comprises a platelike base 21 and an upstanding peripheral wall portion 22 surrounding said base at its periphery, and terminating with an outwardly projecting flange 23 at the top thereof. Said base 21 and said peripheral wall portion 22 are of a size and shape to be received within receptacle 11 when said cover seal 18 is not in place and when it is desired to employ said tray-closure element 19 to close said receptacle. Said outwardly projecting flange 23 on said tray-closure element is also of a size and shape to cooperatively contact said outwardly extending flange 14 on said receptacle 11.

An externally extending bead 24 is provided around said peripheral wall portion 22 below said outwardly extending flange 23; said bead being of a size and shape to cooperatively engage said groove 17 provided in the inner surface of said side wall 13 when said tray-closure element 19 is inserted into said receptacle 11 to close same.

A rib 26 extends upwardly from and around said platelike base 21 in spaced apart relationship to said peripheral wall portion 22. A groove 27 is provided in the inner wall of said rib 26 and adjacent said plate-like base 21, said groove 27 being of a size and shape to cooperatively engage said externally extending bead 16 provided around said side wall 13 at the bottom of said receptacle 11. Said groove 27 and said bead 16 thus serve to attach said tray-closure 19 to the bottom of receptacle 11 to provide a tray for supporting said receptacle when said tray-closure is placed against the bottom of said receptacle.

The container illustrated in FIGURE 2 is like that illustrated in FIGURE 1 except that closure seal 18 has been removed and tray-closure element 19 inserted into the open top of receptacle 11 to close same. It will be

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noted that bead 24 on tray-closure element 19 is cooperatively engaging groove 17 in the inner surface of side wall 13. In this manner, receptacle 11 has been effectively closed and can thus be employed as a storage container for any contents which may remain in said receptacle 11 after cover seal 18 has been removed.

In FIGURE 3 the container illustrated is rectangular in shape. Said container can also be provided with a closure seal element similar to closure seal 18 of FIGURE 1. However, in FIGURE 3, said closure seal element has been removed and the tray-closure element 28 inserted into the open top of receptacle 29. Said receptacle 29 comprises a bottom 31 having an upstanding peripheral side wall 32 attached to and extending around the periphery thereof. Said side wall 32 terminates at its top with an outwardly projecting flange 33. A groove 34 is provided in and extends around the inner surface of said wall 32. Said groove 34 is spaced from but adjacent the top of said side wall 32.

Removable tray-closure 28 comprises a plate-like base 36 having an upstanding peripheral wall portion 37 attached to and extending around the periphery thereof. Said peripheral wall portion terminates at its top with an outwardly projecting flange 38. It will be noted that said plate-like base 36 and said peripheral wall portion 37 are of a size and shape to be received within said receptacle 29 so as to close said receptacle. An externally extending bead 35 is provided around said peripheral wall portion 37 below said flange 38 to cooperatively engage said groove 34 when tray-closure element 28 is inserted into receptacle 29.

Similarly as with the embodiment of the invention illustrated in FIGURES 1 and 2, said tray-closure element 28 can also be employed to provide a tray support for said receptacle 29. To accomplish this, an externally extending bead 39 is provided around said side wall 32 at the bottom thereof and a groove 41 is provided in and around the inner surface of said peripheral wall portion 37 adjacent said plate-like base 36. Said groove 41 is of a size and shape to cooperatively engage said bead 39 and thus attach said tray-closure element 28 to the bottom of said receptacle 29 when said tray-closure is placed against the bottom of said receptacle.

Referring now to FIGURE 4, there is illustrated a modification of the container of FIGURES 1 and 2. In this modification, bottom 12 of receptacle 11 has been modified to provide a centrally disposed raised portion 42 forming a recess 43 in the external surface of said bottom 12. An externally extending bead 44 is provided around the wall of said recess. The tray-closure element has also been modified. A centrally disposed projection 46 extends upwardly from plate-like base 21 in spaced apart relationship to peripheral wall portion 22. Said projection 46 is of a size and shape to fit snugly into said centrally disposed recess 43 in bottom 12 of receptacle 11. A groove 47 is provided in and around the wall of said projection. Said groove 47 is of a size and shape to cooperatively engage said bead 44 provided around said recess 43 so that said tray-closure element 19 will be attached to the bottom of receptacle 11 when projection 46 is inserted into said recess 43.

In use, for example in the marketing of foodstuffs in the container of FIGURE 1, the food packer fills the receptacle 11, seals on a closure seal 18, snaps the tray-closure element 19 onto the bottom of the receptacle and ships the assembled and filled container to the store. The housewife purchases the container and contents, takes it home, removes the closure seal 18, and replaces it with tray-closure element 19 which is snapped into the top of the receptacle. If desired, the housewife can leave the tray-closure element on the bottom of the container as a support therefor, place the container on the table, and dispense the foodstuff from said container without removing it from the receptacle. If all the contents of the receptacle 11 are not used, the container can then be closed

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by snapping the tray-closure element into the top of the open receptacle.

The containers of the invention can be fabricated from any suitable material having the required characteristics of strength and flexibility. Strength is, of course, necessary for durability. Some flexibility is required for the snap-in and snap-out action utilized in employing the tray-closure element of the container. Thus, any suitable relatively rigid material possessing a limited flexibility can be employed in fabricating containers according to the invention. Obviously, the choice of materials will depend in some instances upon the contents being packaged, shipping conditions, storage conditions, etc. The containers of the invention can be fabricated by any of the known methods such as injection molding, blow molding and thermo molding.

Examples of materials which can be employed in fabricating the containers of the invention include moldable plastic materials such as normally solid polymers of 1-olefins, e.g., polyethylene, polypropylene, and copolymers of ethylene and propylene; polystyrene; polystyrene mixed with minor amounts of natural or synthetic rubber; condensation products such as phenol-aldehyde resins; vinyl-chloride acetate; so-called tailored resins, examples of which are mixtures of polyethylene and polyisobutylene and mixtures of copolymers of ethylene and propylene with polyisobutylene, and the like. In some instances, depending upon the materials to be packaged, compressed fibers and specially treated paper stocks can be employed.

In some instances, it is desirable to fabricate the receptacle portion of the container from a material possessing a higher strength or rigidity, e.g., polystyrene mixed with minor amounts of rubber, and fabricate the tray-closure element of a material possessing a greater flexibility, e.g., a polyethylene; or vice versa. In other instances, both the receptacle and the tray-closure can be advantageously fabricated of the same materials. In many instances, all three major elements, i.e., the receptacle, the tray-closure, and the cover seal can all be fabricated from the same material.

Transparent film or sheet material is in many instances desired for the cover seal so as to exhibit the contents of the receptacle. Said film or sheet material can be polyethylene, polystyrene, chlorinated rubber, and like materials which are available commercially. Said cover seal is most conveniently applied to the receptacle by heat seal methods which are well known to those skilled in the art. When a relatively low-strength bond between the cover seal element and the flange of the receptacle is desired, this can be accomplished by fabricating the receptacle and the cover seal from materials of different respective compositions which, when heat sealed together, adhere and cohere but do not unite in the sense of being fused or welded. Such cover seals can be peeled off the receptacle very easily. Another method for forming such low-strength bonds, which is particularly useful when the cover seal and the receptacle are fabricated from the same materials, is to coat the area of one of the surfaces which is to be heat sealed with a different plastic material. Such a coating can be applied from a solvent solution and dried before making the joint. The low-strength joint between the two materials may then be made by regular heat sealing.

Presently preferred plastic materials suitable for use in the practice of the invention are the normally solid polymers of 1-olefins having a density within the range of 0.940 to 0.980, preferably 0.950 to 0.963, grams per cubic centimeter, and a molecular weight within the range of about 35,000 to 250,000. As used herein, unless otherwise specified, the term "polymer" includes both homopolymers of said 1-olefins as well as copolymers of one of said 1-olefins with another of said 1-olefins as a comonomer. The 1-olefins having from 2 to 4 carbon atoms per molecule are usually preferred for preparing the polymer plastic materials used in the practice of the invention.

However, any normally solid polymer of a 1-olefin having the properties set forth herein can be used in the practice of the invention. Methods for preparing and fabricating such normally solid polymers of said 1-olefins are well known to those skilled in the art. A preferred method for preparing said normally solid polymers of 1-olefins is that described and claimed in U.S. Patent 2,825,721 issued March 4, 1958, to J. P. Hogan et al. Polymers prepared in accordance with the method of said patent are available commercially under the trademark Marlex.

A presently preferred plastic material for use in the practice of the invention is a polyethylene prepared in accordance with the method of said patent and having a density of at least 0.940 grams per cc. at 73-78° F., and a molecular weight of at least 35,000. This classification includes, in addition to homopolymers of ethylene, copolymers of ethylene with higher monoolefins and diolefins, e.g., propylene and 1-butene, the higher comonomer generally being incorporated into the copolymer molecule in small proportions as compared with the ethylene monomer. Any desired amount of said comonomer can be utilized to form the copolymers so long as the density of the resulting copolymers is at least 0.940 grams per cc. Preferably, the polyethylene utilized has a density in the range of about 0.950 to 0.963 grams per cc. and a molecular weight in the range of about 35,000 to about 250,000.

Polyethylenes having the characteristics disclosed hereinbefore generally have a flexural modulus (determined at 73° F. in accordance with ASTM Method D790-49T) of at least 100,000, and usually within the range of 160,000 to 240,000 p.s.i. These polyethylenes also have a brittleness temperature (determined according to ASTM Method D746-55T) not greater than -20° F. and generally from -100 to below -180° F. These properties appear to explain, at least in part, the great suitability of the polyethylenes disclosed above for use in fabricating the containers of the invention.

Another property of this type polyethylene which appears to explain partially the suitability for the purposes of this invention is the fact that the impact strength of the polyethylene remains at a desirably high value even at very low temperatures, varying relatively slightly over a broad temperature range. Izod impact strength is measured in accordance with the ASTM Method D256-54T, utilizing a 1/4-inch bar of the tested plastic. One polyethylene which is illustrative of polyethylenes suitable for the purposes of the present invention has a density of approximately 0.960, a molecular weight of about 40,000, a melt index (ASTM Method D-1238-52T) of 0.7 and an Izod impact strength at 70° F. of approximately 3.0 foot-pounds per inch notch. The impact strength at 0° F. of this polyethylene is 2.0, and the impact strength at -100° F. is 1.0 foot-pound per inch notch.

Another property of the polyethylenes specified herein is that they have exceedingly low coefficients of friction as compared with other plastics. The numerical magnitude of the coefficient of friction of a particular material will depend upon the particular method of measurement used; as well as the material against which the tested material is contacted in measuring the coefficient of friction. Thus, in one method of measuring the coefficient of friction, involving rubbing a 1/2-inch diameter moving ball of the tested material against three stationary balls or disks of the plastics to be tested, in the absence of added lubricant, nylon (a polyamide resin) had a coefficient of friction of 0.550 at a 10-kilogram load and 0.218 at a 40-kilogram load, Teflon (a solid polymer of tetrafluoroethylene) had a coefficient of friction of 0.245 at a 10-kilogram load and a coefficient of friction of 0.046 at a 40-kilogram load, and a 0.960-density polyethylene having a molecular weight of 40,000 had a coefficient of friction of 0.100 at a 10-kilogram load and a coefficient of friction of 0.016 at a 40-kilogram load. This test procedure ("Friction and Wear") is more fully disclosed in a pamphlet entitled "Lubricants Test Illustrations," May 1, 1953, United States Steel

Lubricants Testing Laboratory, National Tube Division, 327 Craft Avenue, Pittsburgh 13, Pennsylvania.

While the containers of the invention have been illustrated as having a generally circular or a generally rectangular configuration, and as being provided with tapering side walls, the invention is not so limited. Said containers can be of any suitable shape or size. For example, the receptacle portion can be cylindrical with straight side walls. The receptacle can also be oval in shape. Corresponding modifications would, of course, be made in the tray-closure element. If desired, the tray-closure of FIGURE 1 can be modified to be like that of FIGURE 3, i.e., with the groove 27 therein which cooperatively engages bead 16 on the bottom of the receptacle, placed in the upstanding peripheral wall portion.

While certain embodiments of the invention have been described for illustrative purposes the invention obviously is not limited thereto. Various other modifications will be apparent to those skilled in the art in view of this disclosure. Such modifications are within the spirit and scope of the invention.

I claim:

1. An improved container comprising, in combination: an open top receptacle having an upstanding side wall provided with a groove in and around the inner surface of said side wall near the top thereof, an externally extending bead also being provided around said receptacle adjacent the bottom thereof; a cover seal for closing said receptacle in sealed engagement with the top of said side wall; and a removable tray-closure removably attached to the bottom of said receptacle by groove means provided in said tray-closure which cooperatively engages said externally extending bead provided on said receptacle, said tray-closure being of a size and shape to fit into said open top of said receptacle with an externally extending bead provided around said tray-closure in cooperative engagement with said groove in said side wall when said cover seal is not in place.

2. An improved container comprising, in combination: an open top receptacle having a bottom provided with an upstanding peripheral side wall terminating at the top thereof with an outwardly projecting flange; an externally extending bead provided around said receptacle adjacent the bottom thereof; a groove provided in and around the inner surface of said side wall, and spaced from, but adjacent the top thereof; a cover seal for said receptacle, said cover seal comprising a flat sheet for covering the top of said receptacle in sealed engagement with said flange; and a removable tray-closure for said receptacle, said tray-closure comprising: a plate-like base provided with an upstanding peripheral wall portion having an outwardly projecting flange at the top thereof, said base and said peripheral wall portion being of a size and shape to be received within said receptacle when said cover seal is not in place; an externally extending bead provided around said peripheral wall portion below said flange, said bead being of a size and shape to cooperatively engage said groove provided in the inner surface of said side wall when said tray-closure is inserted into said receptacle to close same; and means, internally of said peripheral wall portion, defining a groove of a size and shape to cooperatively engage said externally extending bead provided around said receptacle adjacent its bottom and attach said tray-closure to the bottom of said receptacle to provide a tray for supporting said receptacle when said tray-closure is placed against the bottom of said receptacle.

3. An improved container comprising, in combination: an open top receptacle having a bottom provided with an upstanding peripheral side wall terminating at the top thereof with an outwardly projecting flange; an externally extending bead provided around said side wall at the bottom thereof; a groove provided in and around the inner surface of said side wall, and spaced from, but adjacent the top thereof; a cover seal for said receptacle, said cover

seal comprising a flat sheet for covering the top of said receptacle in sealed engagement with said flange; and a removable tray-closure for said receptacle, said tray-closure comprising: a plate-like base provided with an upstanding peripheral wall portion terminating with an outwardly projecting flange at the top thereof, said base and said peripheral wall portion being of a size and shape to be received within said receptacle when said cover seal is not in place and when it is desired to employ said tray-closure to close said receptacle; an externally extending bead provided around said peripheral wall portion below said outwardly extending flange, said bead being of a size and shape to cooperatively engage said groove provided in the inner surface of said side wall when said tray-closure is inserted into said receptacle to close same; a rib extending upwardly from and around said plate-like base in spaced apart relationship to said peripheral wall portion; and a groove provided in the inner wall of said rib adjacent said plate-like base, said groove being of a size and shape to cooperatively engage said externally extending bead provided around said side wall at the bottom of said receptacle and attach said tray-closure to the bottom of said receptacle to provide a tray for supporting said receptacle when said tray-closure is placed against the bottom of said receptacle.

4. An improved container comprising, in combination: an open top receptacle having a bottom provided with an upstanding peripheral side wall terminating at the top thereof with an outwardly projecting flange; an externally extending bead provided around said side wall at the bottom thereof; a groove provided in and around the inner surface of said side wall, and spaced from, but adjacent the top thereof; a cover seal for said receptacle, said cover seal comprising a flat sheet for covering the top of said receptacle in sealed engagement with said flange; and a removable tray-closure for said receptacle, said tray-closure comprising: a plate-like base provided with an upstanding peripheral wall portion terminating with an outwardly projecting flange at the top thereof, said base and said peripheral wall portion thereof being of a size and shape to be received within said receptacle when said cover seal is not in place and when it is desired to employ said tray-closure to close said receptacle; an externally extending bead provided around said peripheral wall portion below said outwardly extending flange, said bead being of a size and shape to cooperatively engage said groove provided in the inner surface of said side wall when said tray-closure is inserted into said receptacle to close same; and a groove provided in the inner surface of said peripheral wall portion adjacent said base, said groove being of a size and shape to cooperatively engage said externally extending bead provided around said side wall at the bottom of said receptacle and attach said tray-closure to the bottom of said receptacle to provide a tray for supporting said receptacle when said tray closure is placed against the bottom of said receptacle.

5. An improved container comprising in combination: an open top receptacle having a bottom provided with an upstanding peripheral side wall terminating at the top thereof with an outwardly projecting flange, said bottom having a centrally disposed raised portion therein forming a recess in the external surface of said bottom; an externally extending bead provided around the wall of said recess; a groove provided in and around the inner surface of said side wall, and spaced from, but adjacent the top thereof; a cover seal for said receptacle, said cover seal comprising a flat sheet for covering the top of said receptacle in sealed engagement with said flange; and a removable tray-closure for said receptacle, said tray-closure

comprising: a plate-like base provided with an upstanding peripheral wall portion terminating with an outwardly projecting flange at the top thereof, said peripheral wall portion being of a size and shape to be received within said receptacle when said cover seal is not in place and when it is desired to employ said tray-closure to close said receptacle; an externally extending bead provided around said peripheral wall portion below said outwardly extending flange, said bead being of a size and shape to cooperatively engage said groove provided in the inner surface of said side wall when said tray-closure is inserted into said receptacle to close same; a centrally disposed projection extending upwardly from said plate-like base in spaced apart relationship to said peripheral wall portion, said projection being of a size and shape to fit snugly into said centrally disposed recess in the bottom of said receptacle; and a groove provided in and around the wall of said projection, said groove being of a size and shape to cooperatively engage said bead provided around said recess in the bottom of said receptacle and attach said tray-closure to the bottom of said receptacle to provide a tray for supporting said receptacle when said tray-closure is placed against the bottom of said receptacle.

6. An improved container comprising, in combination: an open top receptacle having an upstanding side wall provided with a groove in and around the inner surface of said side wall near the top thereof, an externally extending bead also being provided around said receptacle adjacent the bottom thereof; and a removable tray closure of a size and shape to fit into said open top of said receptacle with an externally extending bead provided around said tray closure in cooperative engagement with said groove in the inner surface of said side wall, said tray closure also being provided with groove means therein for cooperatively engaging said externally extending bead provided on said receptacle and removably attaching said tray closure to the bottom of said receptacle.

7. An improved container comprising, in combination: an open top receptacle having a bottom provided with an upstanding peripheral side wall terminating at the top thereof with an outwardly projecting flange; an externally extending bead provided around said receptacle adjacent the bottom thereof; a groove provided in and around the inner surface of said side wall, and spaced from, but adjacent the top thereof; and a removable tray-closure for said receptacle, said tray-closure comprising: a plate-like base provided with an upstanding peripheral wall portion having an outwardly projecting flange at the top thereof, said base and said peripheral wall portion being of a size and shape to be received within said receptacle; an externally extending bead provided around said peripheral wall portion below said flange, said bead being of a size and shape to cooperatively engage said groove provided in the inner surface of said side wall when said tray-closure is inserted into said receptacle to close same; and means, internally of said peripheral wall portion, defining a groove of a size and shape to cooperatively engage said externally extending bead provided around said receptacle adjacent its bottom and attach said tray-closure to the bottom of said receptacle to provide a tray for supporting said receptacle when said tray-closure is placed against the bottom of said receptacle.

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