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Canning et al.

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[54] **RESEALABLE CONTAINER**

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[52] **U.S. Cl.** **220/23.8,** 206/1.9, D9/184

[51] **Int. Cl.** **A47g 19/00**

[58] **Field of Search** 220/23.8, 23.2, 27; 206/1.5, 1.7, 1.8, 72, 1.9; D9/184, 187, 191, 192, 222, 241

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[57] **ABSTRACT**

A resealable container includes a generally planar, integrally formed base such as of vacuum formed styrene having a plurality of depressions therein forming receptacles which extend outwardly from the plane on one side thereof and which have beaded portions extending outwardly on the opposite side of the plane to form the open ends of the receptacles. The container also includes a generally planar, integrally formed cover, also of vacuum formed sytrene or similar material, which is mounted on the base so that a plurality of shallow depressions in the cover extend into the various receptacles of the base. Individual lids defined by die cut scorings in the cover and which include the various shallow depressions therein are preferably sealed to the beaded portions of the receptacles such as by use of an appropriate adhesive to form an air-tight enclosure where they remain as the remainder of the cover is pulled away. Thereafter the lids are peeled away from the various receptacles to provide access thereto, after which the lids can again be inserted into the beaded portions of the receptacles to reseal the receptacles by virtue of an interference fit therewith.

11 Claims, 5 Drawing Figures

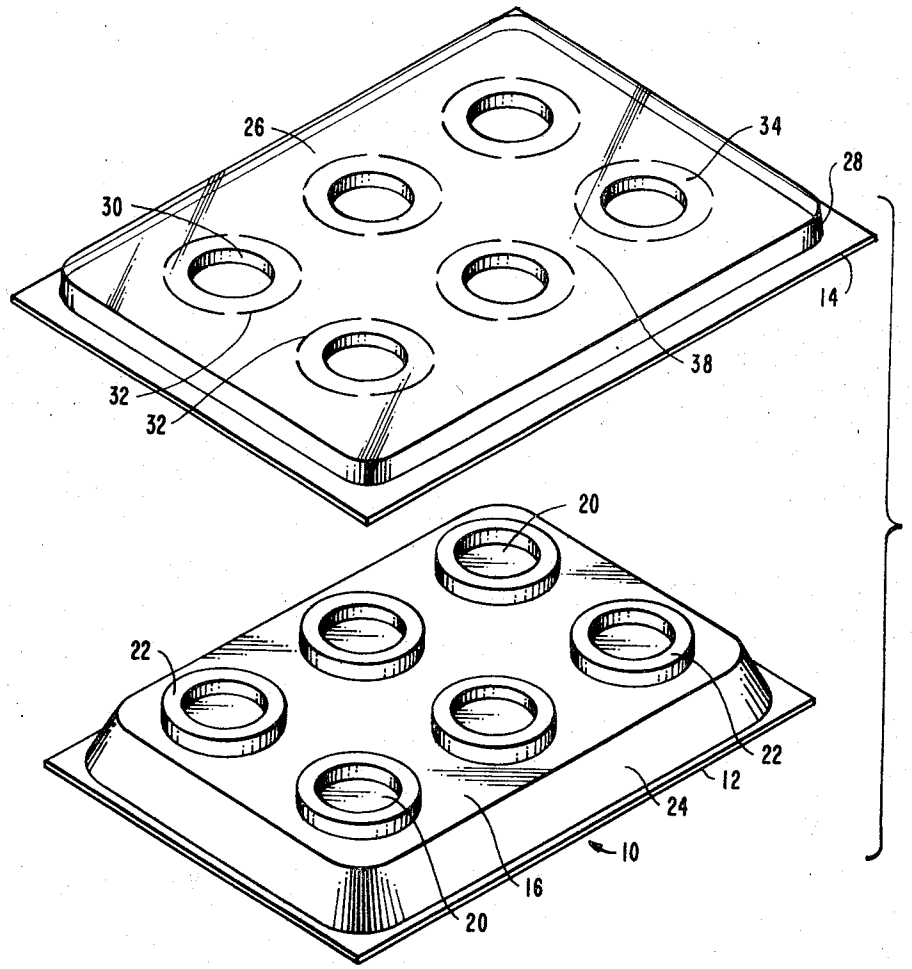
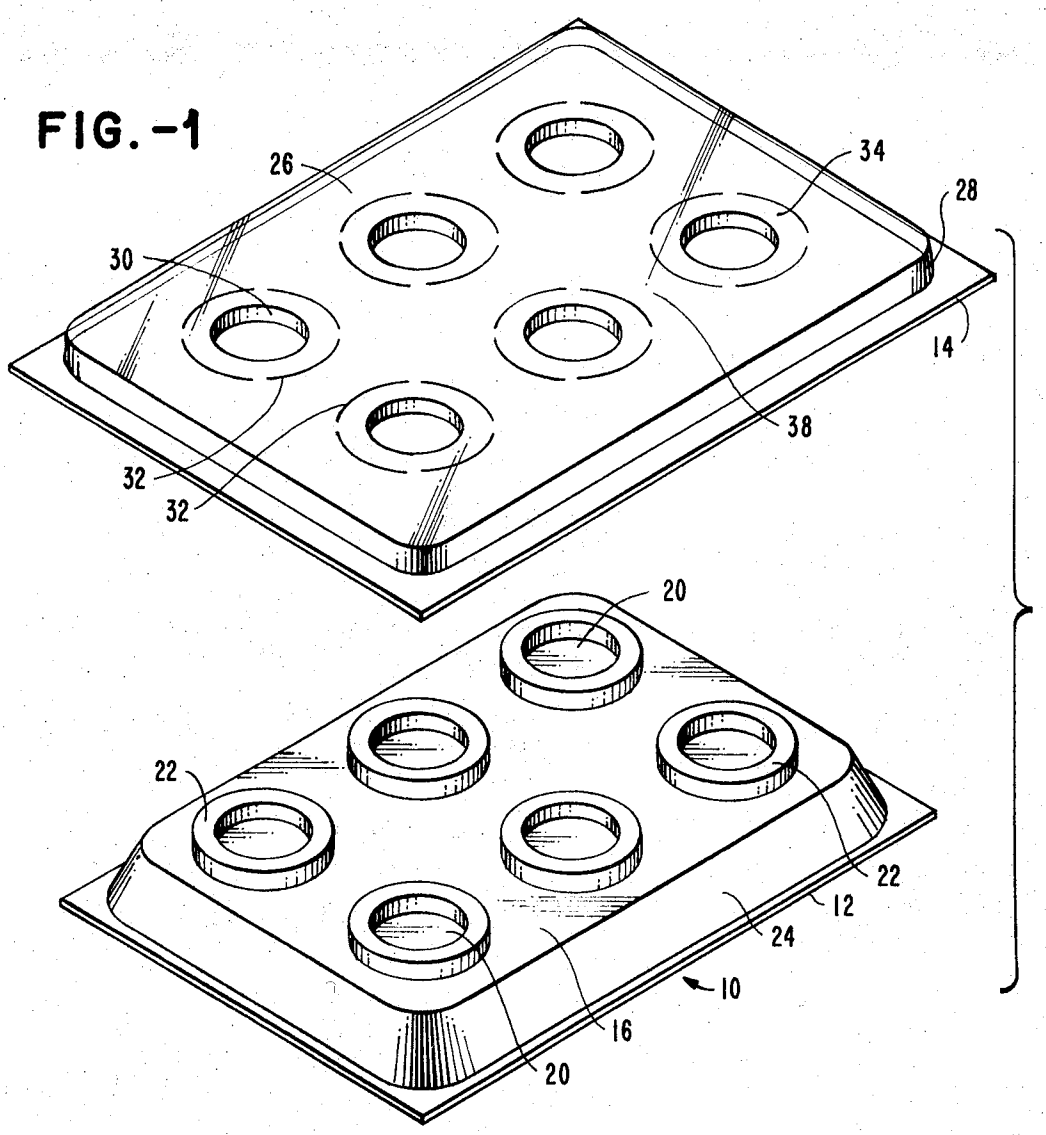


FIG. -1



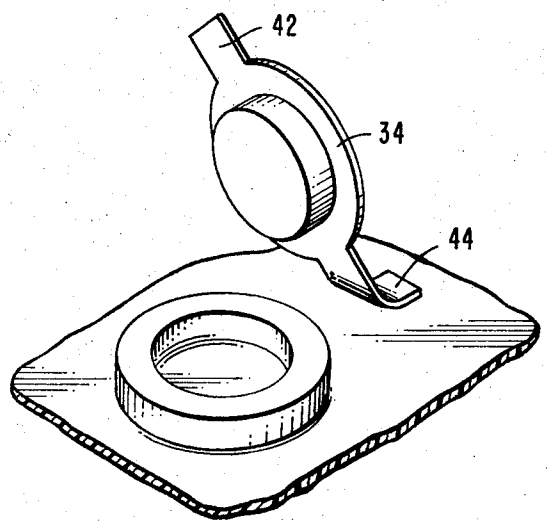


FIG. - 4

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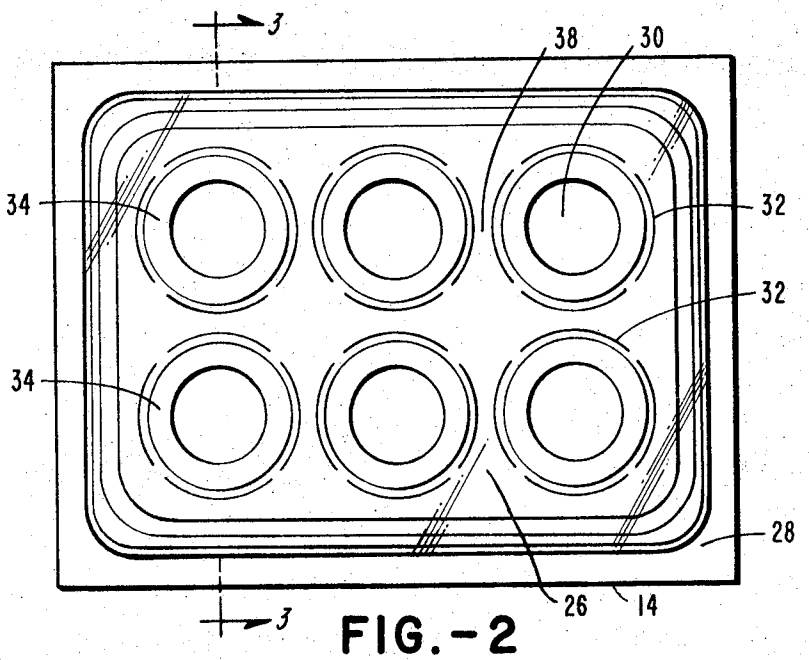


FIG.-2

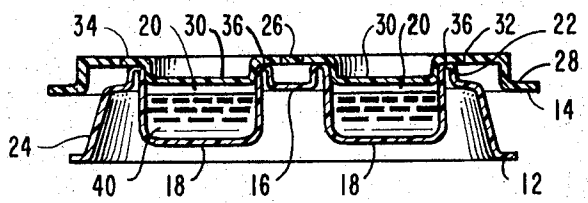


FIG.-3

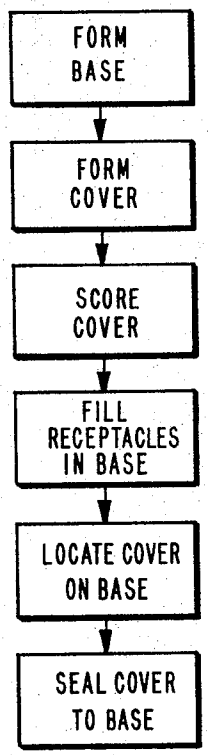


FIG.-5

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RESEALABLE CONTAINER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to containers of the type which form a plurality of encloseable receptacles for the storage of paints, small parts or other materials, and more particularly to containers of this type in which some or all of the various parts are formed of plastic-like materials such as by vacuum forming styrene.

2. History of the Prior Art

There is frequently a need to mass-produce packages of the type having a plurality of receptacles for containing a variety of different items such as paints, small parts or objects and the like. For many such applications as in the case of children's paint sets or paint-by-number kits, the container must be of the type which not only packages the materials for transportation and sale to the ultimate consumer but which continues to serve as an appropriate repository for the materials during use thereafter by the consumer. For still other applications such as in the packaging of foods in freeze dried or other storable form a container having a plurality of different receptacles for the storage of different foods may only be used once or twice, yet must provide an air-tight seal in a container configuration which is readily and inexpensively mass produced. Other requirements may be imposed on the container in such applications such as the ability to meet sanitation standards and to be combustible after use.

The problem of designing containers of the type described is difficult enough when the particular material being stored is not perishable. Thus in the case of water color paint sets, for example, the various paints in solid form are typically placed in receptacles within a metal box. The user then simply mixes water with chosen ones of the paints to form liquid paints when the set is used. With proper care, the solid paints may be continuously exposed to the elements and repeatedly reused before drying out or cracking.

The problem of providing a suitable container is complicated, however, in situations where the stored material must be stored in receptacles which are resealable after each use. For example in the case of paint sets in which the paint is stored in liquid form and is subject to drying out or other deterioration if not properly protected, the receptacles containing such paint should be sealed air-tight during transportation and storage and should be capable of reclosure to form at least a mechanical seal after each use of the paint.

One type of prior art container which has found recent use in conjunction with perishable materials such as paints stored in liquid form utilizes a base of pressed board or other inexpensive construction having holes into which vacuum formed cups are inserted to form receptacles for the paints. Each cup is fitted with a separate cap. Such containers have proven to be needlessly complex and therefore expensive to manufacture, largely because of the need for individual handling of the receptacles. Moreover such containers typically do not provide a seal of the type needed to preserve the paints or other stored material. Furthermore, the receptacle of some containers of this type are recloseable in that the caps can be fitted over the receptacles after they are removed, but the caps typically form a very ineffective seal allowing the paints or other

stored material to rapidly deteriorate once the initial seal is broken by the user.

One alternative approach is to utilize a number of sepparate containers of principally plastic construction such as a plurality of separate blister packs to store the paint, food or other material. However the use of a plurality of such separate containers has proven to be highly impractical for many applications such as in the case of a paint set where relatively small quantities of liquid paint are to be stored together in a complete set. The individual blister packs themselves have been found to provide something far less than a suitable seal when the lids thereof are put back in place after initially opening the packs.

Vacuum formed products are now widely employed for packaging, because of the low cost of the materials used and the low cost and simplicity of the forming technique itself. For full realization of the potential of this technique, manual handling must be kept to a minimum, so that processed component parts should in some manner be handleable repetitively without special fixtures or other equipment. Heretofore, with individual reclosable or non-reclosable vacuum formed containers, this has not been feasible.

Accordingly it is an object of the present invention to provide an improved container.

A more specific object of the invention is to provide a container of the type in which a plurality of different receptacles may be initially sealed and thereafter reclosed or resealed to protect the contents thereof.

A further object of the present invention is to provide a resealable multi-receptacle container of relatively simple and inexpensive construction which is easily and inexpensively fabricated using known techniques.

BRIEF DESCRIPTION OF THE INVENTION

Containers in accordance with the invention include a base which is integrally formed so as to provide a plurality of open ended receptacles for storage of material. The container also includes an integrally formed cover having small depressions which fit into and are preferably sealed to the open ends of the receptacles. Scorings in the cover which surround the various shallow depressions therein define lids for the various receptacles which remain in place as the rest of the manually strippable cover is torn away from the base by the user of the container. The seal between the lids thus formed and the various receptacles is such that the lids may be peeled from the associated receptacles to provide access to the contents of the receptacles. Thereafter the individual lids are reinserted with their shallow depressions extending into the open ends of the receptacles to provide a mechanical seal due to an interference fit between the shallow depressions and the mating receptacles.

The base and cover may be formed of any appropriate similar or dissimilar material, with plastic-like materials such as styrene being preferred for ease of manufacture. Thus, in accordance with one preferred method of making a resealable container according to the invention, the base and cover are independently formed of appropriate material such as styrene using well-known vacuum thermoforming techniques. Thereafter, the cover is scored or otherwise perforated so as to define the individual lids using die cutting or other appropriate techniques, after which the various open receptacles are filled with appropriate material to be

stored therein and the various shallow depressions formed in the cover are inserted into the open ends of the receptacles and sealed thereto using an adhesive or other appropriate material or technique.

Such manufacturing techniques in accordance with the invention enable the use of extremely low cost materials in what can be essentially continuous operation involving a minimum of mechanical handling. For example the individual bases and covers may be independently but simultaneously thermoformed from two continuous strips of material with the receptacles in the base being filled as the cover is scored. The bases and covers thus formed can thereafter be matingly engaged with another and sealed where appropriate prior to cutting or otherwise severing the base and cover from adjacent bases and covers to form the individual container.

In one alternative arrangement of a container in accordance with the invention, the scorings in the cover may be such as to define a hinge on each lid, which hinge is thereafter permanently sealed to the base upon installation of the cover over the base. This technique forms a permanent flexible hinge between the base and each of the lids upon removal of that part of the cover surrounding the lids, enabling the lids to be removed from and resealed over the receptacles while at the same time insuring that the lids are not lost or otherwise detached from the base.

In a further alternative arrangement of a container in accordance with the invention, the scorings in the cover are configured so as to define pull tabs which facilitate removal of the lids from the various receptacles during use of the container.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects, features and advantages will be apparent from the following more particular description of preferred embodiments of the invention, as illustrated by the accompanying drawings, in which:

FIG. 1 is a perspective view of one preferred arrangement of a resealable container in accordance with the invention having the cover separated from the base for clarity of illustration;

FIG. 2 is a top view of the container of FIG. 1;

FIG. 3 is a sectional view of the container of FIG. 2 taken along the line 3—3 thereof;

FIG. 4 is a perspective view of mating portions of a base and cover of a container in accordance with the invention showing alternative features in accordance with the invention; and

FIG. 5 is a block diagram describing the successive steps in one preferred method of making a container in accordance with the invention.

DETAILED DESCRIPTION

A resealable container **10** in accordance with the invention as illustrated in FIGS. 1–3 includes an integrally formed base **12** and an integrally formed cover **14** being formed similar to and configured to effect a mating fit with portions of the base **12** as described hereafter. The base **12** includes a generally planar central portion **16** having a plurality of depressions **18** therein, the depressions **18** which are illustrated as six in number for convenience of illustration only extending in a direction away from the central portion **16** on one side thereof so as to form a plurality of generally cylindrical receptacles **20**. The various receptacles **20** have raised or beaded portions **22** which extend away from the central portion **16** on the opposite side of the plane thereof from the depressions **18** to define the open ends of the receptacles **20**. The base **12** includes a surrounding peripheral portion **24** which extends away from the plane of the central portion **16** in the same direction as the depressions **18**. The peripheral portion **24** forms a mounting structure for the base **12**.

The cover **14** also has a generally planar central portion **26** and a surrounding peripheral portion **28**. The cover **14** also includes a plurality of shallow generally cylindrical depressions **30** therein which extend outwardly from the central portion **26** on one side of the plane thereof. Different ones of the shallow depressions **30** are matingly received within the open ends of different ones of the receptacles **20** when the central portion **26** of the cover **14** is brought into contact with the central portion **16** of the base **12**.

A plurality of different scorings or other perforations **32** formed in the central portion **26** of the cover **14** encircle individual ones of the shallow depressions **30** to define lids **34** for the individual receptacles **20**. The lids **34** are individually sealed to the different receptacles **20** such as by using an adhesive which is sensitive to heat or pressure or both. Thus, as seen in FIG. 3, adhesive **36** may be placed between the beaded portions **22** of the various receptacles **20** and the underside of the central portion **26** of the cover **14** surrounding the shallow depressions **30** so as to seal the lids **34** onto the various receptacles **20** when the cover **14** is placed in position over the base **12**.

With the various lids **34** sealed in place over the receptacles **20**, the cover **14** becomes manually strippable such that the central portion **26** of the cover **14** may be torn along the perforations or scorings **32** to separate the various lids **34** from the interconnecting matrix **38** formed by the remaining portion of the central portion **26** of the cover **14**. With the matrix **38** and surrounding peripheral portion **28** of the cover **14** removed and discarded, various lids **34** remain in position over the various mating receptacles **20**. As described in more detail hereafter, the individual lids **34** may be selectively peeled away from the beaded portions **22** of the associated receptacles **20** upon initial access to the contents of the receptacles **20**. The base **12** and the cover **14** are formed such that the outside diameters of the shallow depressions **30** in the cover **14** are slightly larger than the inside diameters of the associated receptacles **20**, providing an interference fit between each lid **34** and its associated receptacle **20**. Accordingly, each receptacle **20** may be mechanically sealed simply by forcing the shallow depression **30** in the lid **34** into the open end of the receptacle **20**.

The base **12** and the cover **14** may be fabricated of any appropriate material which is easily formed, thereafter scored and then sealed together. The base **12** and cover **14** may be made of transparent material or opaque material as desired. Transparent material permits the viewing of the contents of the receptacles **20** and is useful such as where paints of different colors are to be stored in the various receptacles **20**. Where desired, the base **12** and cover **14** may comprise dissimilar materials instead of like materials. Different thicknesses may be chosen for the base **12** and cover **14** as appropriate, and the parts **12** and **14** may assume other

appropriate shapes than that shown in FIGS. 1–3 where desired.

One material which has been found to work well when used to form the base **12** and the cover **14** is styrene. Styrene or other plastic-like materials are generally preferred in accordance with the invention among other reasons due to the ease with which such materials may be formed into the desired shapes using appropriate conventional techniques such as vacuum thermoforming, pressure thermoforming, a combination of vacuum and pressure thermoforming, injection molding or cold forming.

Since the base **12** and the cover **14** are integrally formed, the container **10** is comprised of only two separate parts which can be formed independently and simultaneously. The independent formation of the base **12** and the cover **14** comprises the first three steps of a preferred method of fabricating a container in accordance with the invention as shown in block diagram form in FIG. **5.** The third such step comprises the scoring or perforation of the cover **14** after formation thereof using die cutting or other well known techniques. For convenience only, the various circular scorings **32** are shown in FIGS. **1** and **2** as four separate cuts which together with the very small adjoining portions of the cover **14** therebetween form circles defining the outer peripheries of the lids **34.**

With the base **12** and the cover **14** formed and scored, the next step in the method of FIG. **5** is to fill the various receptacles **20** in the formed base **12** with paint, small parts or any appropriate material which they are to store. Thereafter, as shown in FIG. **5,** the cover **14** is located in mating position on top of the base **12** so that the various shallow depressions **30** may be forced into the receptacles **20** to enclose the receptacles **20.** As shown in FIG. **3** where the materials stored in the receptacles **20** comprise paints **40,** the level of the paints **40** is maintained below the bottom surface of the shallow depressions **30** so as to allow a small clearance therebetween when the depressions **30** are inserted into the open ends of the receptacles **20.**

Containers in accordance with the invention can be readily fabricated using two continuous rolls of styrene or other appropriate material, in which event various ones of the method steps of FIG. **5** can be performed simultaneously. Thus a continuous succession of bases and covers can be thermoformed in the two continuous rolls with the covers as so formed being thereafter scored using a die cutting punch at the same time as the various receptacles of the formed bases are being filled with material which they are to store. Separate pairs of the bases and covers so formed and prepared are then brought together in mating engagement with sealing being effected as appropriate prior to cutting the joined base and cover from adjacent bases and covers to form the individual and completed container. Alternatively the formed bases and covers may be separated from the adjacent bases and covers prior to assembly, or other techniques can be employed, as desired.

It will be appreciated by those skilled in the art that containers in accordance with the invention can be mass produced employing a repetitive, continuous operation that requires a minimum of handling. Moreover, the materials typically used are extremely low in cost when compared with materials used in most prior art containers.

Although they need not be, the various lids **34** are preferably sealed to the beaded portions **22** of the base **12** as noted in the last step of FIG. **5.** Sealing of the various lids **34** to the base **12** is particularly important in instances where the stored material comprises liquid paint, food or other perishable substances which are ideally stored under air-tight conditions. Such a seal should be strong enough to withstand shipping and other handling of the container **10** prior to use, and should facilitate tearing away of the matrix **38** from the lids **34** without simultaneous removal of the lids from the mating receptacles **20.** At the same time, however, the seal must be peelable to permit removal of the lids **34** without destruction or damage thereto and without destruction or damage to the beaded portions **22** of the base **12.**

As noted earlier, one preferred technique for sealing the lids **34** to the beaded portions **22** of the base **12** is to place an appropriate amount of adhesive **36** between the lids and beaded portions as seen in FIG. **3.** The adhesive **36** may be of the type which responds to heat, to pressure or to both. Alternatively the base **12** and the cover **14** may be selected of materials which will form a seal without the need for the adhesive **36** when a proper amount of heat is applied. Also the cover **14** may comprise a laminate, one of the layers of which is an adhesive or otherwise responds to heat or pressure or both to seal the cover **14** to the base **12** at the desired locations.

As shown in FIG. **4,** the configurations of the scorings **32** may be varied as desired so as to provide either a pull tab **42** or a hinge **44** or both when the matrix **38** is torn away from the lids **34.** The pull tab **42** may be of any appropriate shape and aids in the removal of the lids **34** from the receptacles **20** by providing a convenient place where the lids **34** may be gripped by the user. The hinge **44** provides an alternative to the arrangement of FIGS. **1–3** where the various lids **34** can be removed completely from the vicinity of the container **10.** The hinges **44** are sealed or otherwise affixed to the base **12** upon installation of the cover **14** providing a convenient "living hinge" so as to facilitate the repeated opening and resealing of the various receptacles **20.**

One method in accordance with the invention which provides for hinges **44** on the various lids **34** involves the use of a cover **14** which is coated or otherwise provided with an adhesive that responds to pressure to provide a peelable seal and to a combination of pressure and heat to provide a permanent seal. Where such technique is used, the cover **14** is positioned in place on the base **12** after which pressure is applied around the circumference of the beaded portions **22** and in the vicinity of the hinges **44** to provide peelable seals thereat. Thereafter, heat is applied in the vicinity of the hinges **44** to turn the peelable seals into permanent or non-peelable seals. With the matrix **38** torn away, the various lids **34** form seals with the receptacles **20** which are peelable on initial access to the contents of the receptacles **20.** At the same time the hinges **44** are permanently or non-peelably sealed to the base **12** making it very difficult for the lids **34** to be completely removed from the base **12.**

It will be appreciated by those skilled in the art that containers in accordance with the invention are relatively simple and inexpensive to fabricate and yet provide plural receptacles which may be initially chemi-

cally sealed and thereafter repeatedly mechanically sealed during use of the container. The fabrication of the cover **14** as an integral member which is scored so to be thereafter manually separable into a plurality of lids greatly simplifies the fabrication of the containers, and in any event avoids the necessity for separately and independently fabricating the different lids for the receptacles. The interference fit between the various shallow depressions **30** and the receptacles **20** provides a mechanical seal of the various receptacles each time the lids **34** are used to recover the various receptacles **20.**

While the invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. A container comprising the combination of:

an integrally formed base member having a plurality of depressions therein defining encloseable receptacles; and

an integrally formed cover member adapted to be matingly fitted to and generally coextensive with the base member and having a pattern of perforations therein dividing the cover member into a plurality of lids joined by remaining portions of the cover member, the lids forming covers for and remaining with the receptacles in the base member upon removal of the remaining portions of the cover member therefrom.

2. A container in accordance with claim **1,** wherein the cover member includes a plurality of shallow depressions therein, each of which forms a central part of a different one of the lids and extends into the interior of the associated receptacle with the lid in place over the receptacle.

3. A container in accordance with claim **2,** wherein each of the lids is chemically and peelably sealed to the associated receptacle, and each of the shallow depressions in the cover member is slightly larger in size than the associated receptacle providing an interference fit therewith and a mechanical seal thereof.

4. A multi-receptacle container, having a plurality of individual receptacles which are individually resealable, comprising:

a generally planar, integrally formed base having a plurality of depressions therein extending outwardly from the plane of the base on one side thereof to form the individual receptacles and which extend outwardly from the plane of the base on the other side thereof to form beaded open ends of the receptacles; and

a generally planar, integrally formed cover disposed generally parallel to the base and including a plurality of shallow depressions therein, each of the shallow depressions being configured to and extending into the beaded open end of a different one of the receptacles to form a mechanical seal therewith, the cover being scored in a selected pattern to define a plurality of lids which are separable from the rest of the cover, each of the lids including one of the shallow depressions in the cover and being chemically and peelably sealed to the associated receptacle.

5. A multi-receptacle container in accordance with claim **4,** wherein the base and the cover comprise thermoformed elements of generally plastic composition.

6. A multi-receptacle container in accordance with claim **4,** wherein the chemical seal between each lid and the associated receptacle is provided by an adhesive disposed between the underside of the lid surrounding the shallow depression and the beaded open end of the receptacle.

7. A multi-receptacle container in accordance with claim **4,** wherein the receptacles and the shallow depressions are generally cylindrical in configuration and the outside diameters of the shallow depressions are slightly larger than the inside diameters of the beaded open ends of the receptacles to form the mechanical seal therebetween.

8. A multi-receptacle container in accordance with claim **4,** wherein each of the lids has a tab-like portion facilitating removal thereof from the associated receptacle.

9. A multi-receptacle container in accordance with claim **4,** wherein each of the lids has a portion thereof which is sealed to the base to form a hinge for the lid.

10. A container comprising the combination of:

an integrally formed base member having a plurality of depressions therein defining encloseable receptacles; and

an integrally formed cover member adapted to be fitted to the base member and being readily separable along endless lines which encompass the depressions in the base member and which are separable from an interconnecting matrix comprising the remainder of the cover member to form individual lids for the encloseable receptacles.

11. A container comprising the combination of:

an integrally formed, generally planar base member having a plurality of depressions therein extending outwardly from the plane of the base member on one side thereof to form receptacles and extending outwardly from the plane of the base member on the other side thereof to form raised open ends for the receptacles; and

an integrally formed, generally planar cover member adapted to be disposed in generally parallel relation with and matingly fitted to the base member, said cover member having a pattern of perforations therein which define lids for the individual receptacles of the base member and which are detachable from the cover member.

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