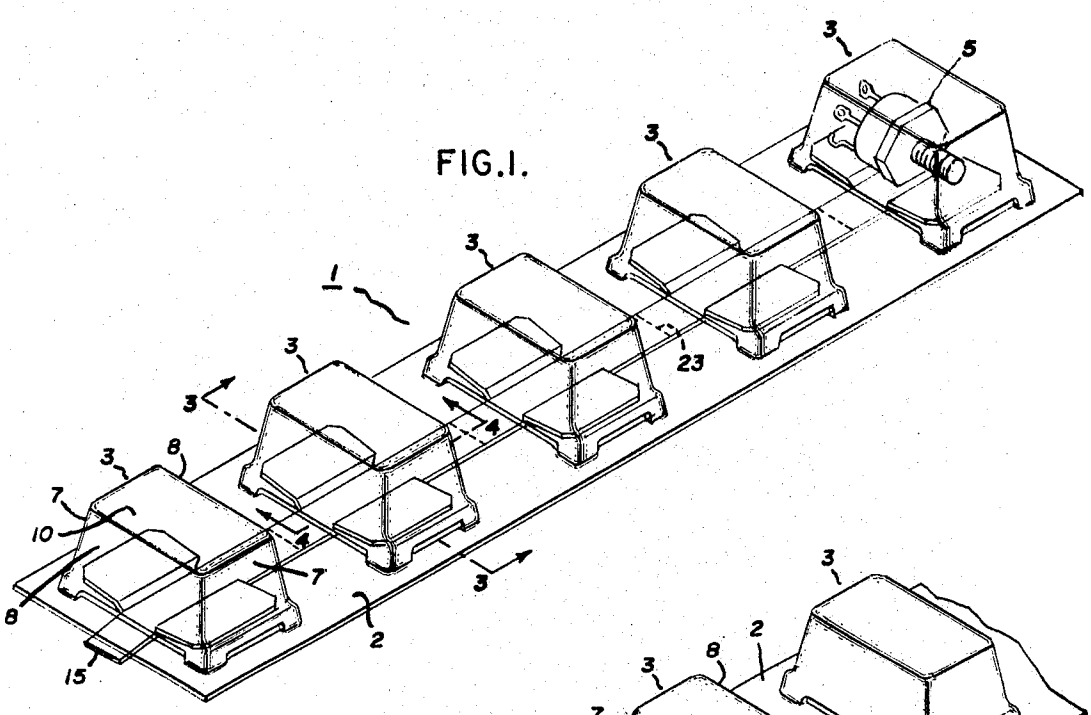
Aug. 11, 1970 D. C. MILLER 3,523,608

FORMED PLASTIC PACKAGE WITH SNAP-IN CLOSURE

Filed May 29, 1969

FIG. 1.



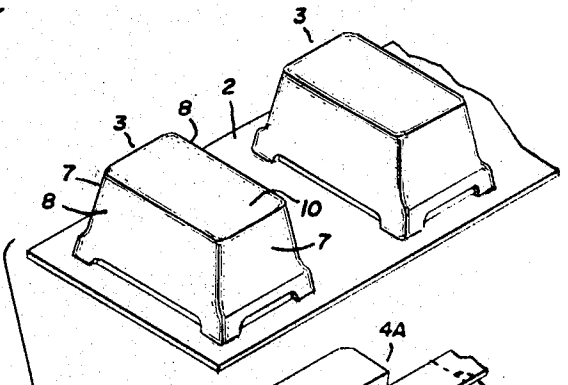


FIG. 2.

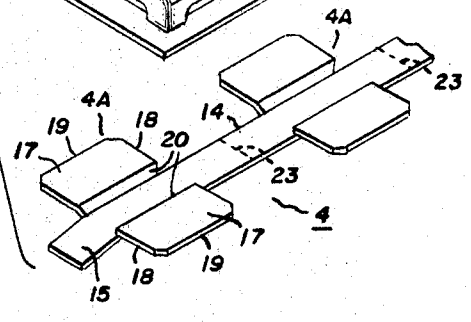


FIG. 3.

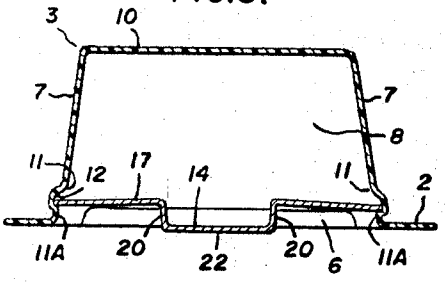


FIG. 4.

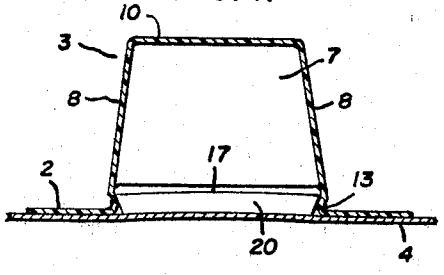
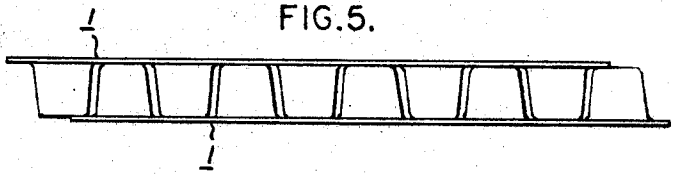


FIG. 5.



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FORMED PLASTIC PACKAGE WITH SNAP-IN CLOSURE

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U.S. Cl. 206—65 9 Claims

ABSTRACT OF THE DISCLOSURE

A multi-compartment see-through package for retaining, protecting, and displaying small devices such as semiconductor rectifiers and transistors. The package includes a strip of material formed to provide a row of receptacles. The package further includes a unitary removable closure, including an elongate central tang having spaced sets of transversely extending flaps, the flaps being positioned and dimensioned to register with and close the respective receptacles. Each set of flaps is retained in snap-in closing relation with a respective receptacle by beads integrally formed in the strip at the mouth of each receptacle. Each of the flaps is connected to the tang by a depending flange or leg, the legs of each pair of flaps cooperating with the central tang between them to form a stiff spine of U-shaped section strengthening and firmly locking the closure into covering relation with each receptacle.

INTRODUCTORY STATEMENT

The present invention relates to openable and reclosable display packages and, more particularly, to the display packaging of small elements, such as semiconductor rectifiers and transistors.

PROBLEMS SOLVED BY THE INVENTION

In the prior packaging art, it has been very difficult or impossible to obtain access to the contents of a selected receptacle in the middle of a line of receptacles without disturbing the other receptacles. In some prior art packages, particularly those having good support capability for the contents, it has been necessary to first remove the selected receptacle entirely from the package before obtaining access to the contents. In other prior art packages, where it has not been necessary to completely remove the selected receptacle before opening, there has been a reduction in support capability so that heavier elements cannot be retained in the receptacles. Even with this reduced support capability, it has been necessary to open all receptacles from one end or the other of a line of receptacles in order to obtain access to the contents of a receptacle in the middle of the line. Thus such access has been possible only by first sequentially opening all prior receptacles adjacent to the selected receptacles. None of the prior art packages have combined the advantage of a sturdy package, which provides reliable support for the contents therein, with the advantage of ease in both sequentially opening a plurality of receptacles and ease in opening a single selected receptacle.

Accordingly, it is the object of the present invention to provide a package which can both support heavy elements and provide for easy removal of either elements contained within a plurality of receptacles or an element contained within a particular receptacle.

It is a further object of the present invention to provide a sturdy package in which small but relatively heavy elements such as semiconductor rectifiers, power transistors, thyristors, and the like may be securely supported and easily removed while still providing an inexpensive construction.

It is still a further object of the present invention to provide a package which is capable of being opened or closed by either mechanical or manual means while at the same time providing a design which maximizes density packaging storage.

SUMMARY STATEMENT

Briefly stated, in accordance with one aspect of my invention, there is provided a package in which a row of compartments or receptacles are integrally formed in a strip of transparent plastic material. The package further includes a unitary removable closure, including an elongate central tang having spaced sets of transversely extending flaps, the flaps being positioned and dimensioned to register with and close the respective receptacles. Each set of flaps is retained in snap-in closing relation with a respective receptacle by beads integrally formed in the strip at the mouth of each receptacle. Each of the flaps is connected to the tang by a depending flange or leg, the legs of each pair of flaps cooperating with the central tang between them to form a stiff spine of U-shaped section strengthening and firmly locking the closure into covering relation with each receptacle.

BRIEF DESCRIPTION OF THE DRAWINGS

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which I regard as my invention, it is believed that the invention will be better understand from the following description, taken in connection with the accompanying drawings in which:

FIG. 1 is an isometric view of one embodiment of my invention as applied to the packaging of electronic elements such as transistors;

FIG. 2 is an exploded view of a portion of the package of FIG. 1;

FIG. 3 is an enlarged sectional view of one of the receptacles of the package of FIG. 1, taken along line 3—3 thereof;

FIG. 4 is an enlarged sectional view of one of the receptacles of the package of FIG. 1, taken along line 4—4 thereof;

FIG. 5 is an elevation view, to a diminished scale, showing packages of the type illustrated in FIG. 1, in mating relationship.

DETAILED DESCRIPTION

Referring to FIG. 1, a package 1 constructed in accordance with the present invention comprises a strip of formable material 2, which may be, for example, a thermoplastic, a thermosetting plastic or a ductile metal, in which a row of spaced, parallel cup-like compartments or receptacles 3 are integrally formed, and a unitary, removable closure portion 4 having a plurality of separable, complete and useful single receptacle cover portions 4A. Preferably, material 2 should be transparent for ease of identifying the elements contained in the receptacles. For this reason, transparent thermoformed plastics such as polystyrene, polypropylene, polyvinyl and cellulose acetate are preferred. It is also recognized that printed material such as instructions and/or merchandising copy or art-work may be added to either the base portion 4 or the receptacles 3, or both.

In the preferred embodiment of my invention, the receptacles 3 are formed within a strip of transparent plastic material 2 by any suitable method such as thermoforming or injection molding. The primary considerations in selecting the method of forming the receptacles 3 are the composition of material 2 and the shape of the receptacles 3. The devices to be retained in the receptacles, one of

which is shown at 5, are loaded into the receptacles through the mouth or opening 6 thereof. Although it is within the purview of my invention that the devices to be contained in the receptacles as well as the receptacles themselves may have a variety of different sizes and shapes, each of the receptacles shown has opposing longitudinal sides 7 and transverse sides 8, and terminates in a substantially flat end wall 10. All the sides 7 and 8 are preferably somewhat inclined inwardly so that the width and length of each receptacle at its mouth 6 is larger than the same dimensions near its end wall 10.

The removable closure portion 4 may be made of any reasonably stiff material such as paper, plastic, metal, or a composite of such materials, and includes an elongate central tang 14 which extends between and over all the receptacles 3 and which terminates in pull-tabs 15 at each end. The central tang 14 is provided with integral spaced pairs of transversely extending flaps 17. The flaps are positioned and dimensioned to register with and close the mouths of the respective receptacles. Each of the flaps 17 is connected to the tang 14 by a depending flange or leg 20. The legs 20 of each pair of flaps 17 cooperate with the portion of the central tang 14 between them to form a stiff spine of U-shaped section (best shown in FIGS. 2 and 3) which strengthens and stiffens the portion of the tang between the flaps of each pair.

The preferred retaining means, are best illustrated in FIGS. 3 and 4, and comprise inwardly extending ridges or beads, which are formed in the base of the opposing walls of each of the receptacles 3, directly adjacent the opening therein. On each of the transverse side walls 8 of each of the receptacles 3 are formed a pair of inwardly extending ridges 13, that form a lip upon which a part of the closure portion will be held. On each of the longitudinal side walls 7 of each of the receptacles, if desired, a parallel pair of inwardly extending ridges or beads, 11 and 11A are formed which are so spaced as to provide a recess 12 within which another part of the closure portion may be held.

While the preferred embodiment of the invention includes ridges formed on each of the receptacles, it will be obvious to one skilled in the art that any retaining means provided at the base of the side walls substantially adjacent the opening of each of the receptacles, which permits easy removal of the base portion from one or all of the receptacles, and yet prevents any inadvertent opening of any of the receptacles, would be equally applicable.

In a preferred embodiment (i.e. where a shorter, more rectangular receptacle is used to hold an element having an appreciable weight), the longitudinal edges 19 of each of the flaps 17 are held within the recesses 12 formed by the parallel pair of ridges 11 and 11A on each of the longitudinal sides 7 of the receptacles. The transverse edges 18 of each of the flaps 17 are supported upon the ridges 13 which are formed on each of the transverse sides 8 of the receptacles. If desired, the ridges may be formed only on the transverse sides 8 of the receptacles in order to engage respectively the transverse edges of the flaps. However, the preferred embodiment using the ridges 11 and 11A on the longitudinal sides gives additional support for the elements 5 and more securely holds the cover portions in the assembled position. The ridges 11A hold flaps 17 so that the legs 20 are in U-shaped channel forming relation with tang 14, and thus the cover for each receptacle is automatically self-stiffened by the spine which the channel forms. This means that even though the closure material may be quite thin and inexpensive, reliable retention in the receptacles of relative heavy devices is assured.

It may be seen that when the tab 15 is pulled away from the plastic strip 2, by either mechanical or manual means, a plurality of the receptacles 3 may be sequentially opened in order to remove the elements contained therein. Lines of perforations 23 may also be included upon the central portion between each successive pair of flaps 17 in order to more easily dispose of cover portions 4A, which have already been removed from corresponding receptacles, to further facilitate the sequential opening of the plurality of receptacles. Furthermore, when the receptacles are to be reclosed, only a slight force need be exerted in order to snap in each of the cover portions securely within the corresponding receptacle. It is also recognized that lines of perforation may also be placed across both the cover portion 4A and the base portion of the strip 2 between two of the receptacles 3 thus permitting separation of complete, single element packages.

Should one desire to open a particular receptacle without disturbing the receptacles directly adjacent thereto, legs 20 of each of the U-shaped strengthening ribs 22 provide a convenient extension which may be grasped by one's thumb and forefinger, or any appropriate mechanical means, and pulled in order to remove the cover portion from the particular receptacle.

Still a further advantage of the package will be evident from the fact that the plurality of receptacles are positioned in spaced parallel relationship on the plastic strip such that the distance between successive receptacles is equal to the base distance between the transverse sides of one of the receptacles. This receptacle construction enables upwardly and downwardly extending packages to be easily nested in mating relationship as illustrated in FIG. 5. The mating of upwardly and downwardly extending packages not only increases the density of receptacles within the space defined by the two-package unit, but also increases the crushing resistance of the two-package unit when packages are stacked thereon.

While the invention has been described with particular reference to the construction shown in the drawings, it is understood that further modification may be made without departing from the true spirit and scope of my invention, which is defined by the claims appended hereto.

What is claimed is:

1. An openable and reclosable package comprising:
a strip having formed therein a row of integral cup-like receptacles each having side walls and an open mouth;
retaining means including a bead-like ridge integrally formed in the side wall of each receptacle adjacent the mouth thereof;
a unitary removable closure having an elongate central tang, respective spaced pairs of flaps extending transversely relative to said central tang and positioned and dimensioned for registry in closing relation with said respective receptacles, the flaps of each pair extending oppositely relative to said central tang and being joined to said tang by legs, the legs of each pair of flaps cooperating with the central tang between them to form a stiff spine of U-shaped section for the closure when the flaps are engaged with said retaining means.

2. A package as defined in claim 1 wherein each of said flap portions comprises a pair of flaps extending transversely from said central portion, said flaps further having transverse and longitudinal edges capable of engaging said retaining means.

3. A package as defined in claim 2 wherein said central portion has a line of perforations extending thereacross between successive pairs of said flaps throughout the entire length of said central portion.

4. A package as defined in claim 1 wherein said strip is constituted of formable material comprising a transparent thermoformable plastic such as polystyrene, polypropylene, polyvinyl, cellulose or the like, and said stiff material comprises a heavy paper, plastic, metal or composite of these materials.

5. A package as defined in claim 4 where the legs of each of said pairs of flap portions in combination with the part of the central portion adjacent thereto provide an extension which may be pulled to open any selected receptacle.

6. A package as defined in claim 4 wherein said retaining means includes ridges formed upon at least the transverse sides of each of said receptacles upon which the transverse edges of each of said flaps are held.

7. A package as defined in claim 6 wherein said retaining means further includes ridges formed upon each of the longitudinal sides to provide a recess, the longitudinal edges of each of said flaps being received in said recesses.

8. A package as defined in claim 1 wherein said receptacles are formed in said strip in spaced parallel relationship to each other such that the distance between receptacles corresponds to the base distance between the transverse sides of each of said receptacles whereby upwardly and downwardly extending adjacent packages may be easily mated to facilitate stacking.

9. An openable and reclosable closure for a row of cup-like receptacles comprising a central tang for extending across a portion of the open mouth of each receptacles, a plurality of spaced pairs of wing-like flaps of said tang with the flaps of each pair extending transversely from opposite sides of said tang, said pairs of flaps being positioned and dimensioned for registry in

closing relation with the mouths of the respective receptacles, each flap being joined to said tang by a leg, the legs of each pair of flaps cooperating with the portion of the central tang between them to form a stiff spine of U-shaped section when the ends of the flaps are registered with the periphery of the mouth of a receptacle closed thereby.

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U.S. Cl. X.R.

206—56; 220—23.8, 60, 24.5; 229—43