

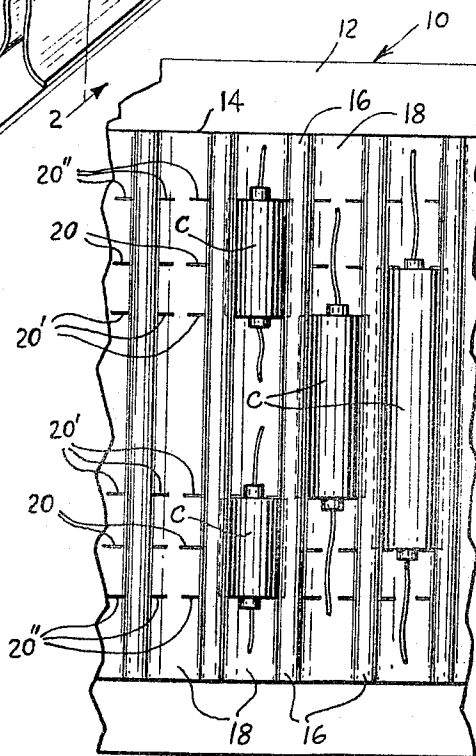
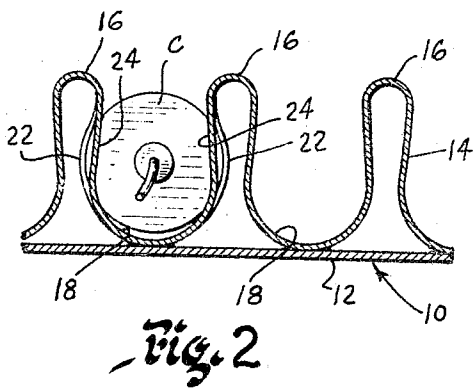
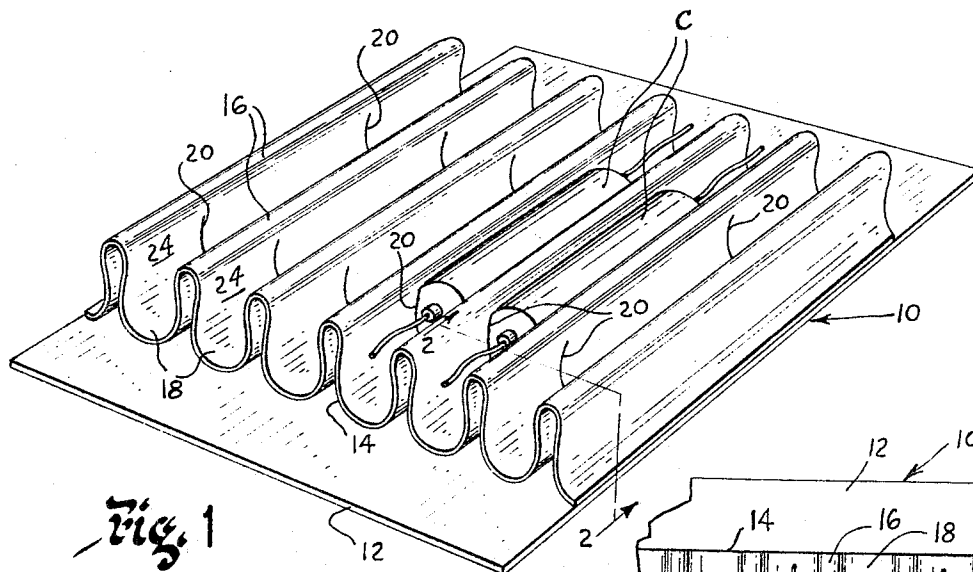
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PACKAGE FOR COLUMNAR ARTICLES

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3,270,877

PACKAGE FOR COLUMNAR ARTICLES

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This invention relates to an article package and more particularly to a package of modular compartmented design for supporting a plurality of generally similar columnar articles individually in regularly spaced rectilinear arrangement.

The package of the invention is particularly suited for the transport and handling of many columnar articles, such as electronic components including capacitors, rectifiers, and tubes; medical supplies such as ampules, vials, and syringes; as well as miscellaneous articles such as pencils, crayons, lipstick cases, drills, taps and similar columnar or tubular items. Included in this are articles which may be stacked to form columnar piles.

The present invention comprises an improvement in a type of package heretofore developed and used extensively in the handling and transport of columnar articles, as disclosed for example in U.S. Patents Nos. 2,767,532, 2,747,787. Packaging devices of this type are designed with two principal objectives in mind; namely, assured safe delivery of fragile articles or the delivery of articles in regularly oriented position to facilitate subsequent handling or processing; and packaging economy, both in respect to materials as well as packaging operations. These general objectives are achieved in the type of package here under consideration through the design of a specially shaped fluted or undulated flexible sheet strip member secured at spaced intervals to a flat backing strip. In general paperboard or possibly sheet plastic is preferred for reasons of economy, although metal or other sheet material of suitable flexibility might be used in special applications. The fluted or undulated contour of the first or article-receiving strip provides a plurality of compartments constituting repetitive troughs and peaks running transversely of the length of the backing strip. Within each compartment, the flute contour provides a spring-clip holding action which secures the columnar article to be packaged through frictional engagement of the article by the sidewalls of the trough or flute. This gripping action is enhanced by the upper portions of opposite sidewalls in a trough, adjacent the apices of the peaks flanking each trough, which overhang and form a restricted opening or entry to the trough.

Such packages have given excellent service in the transport or other handling of many articles, as mentioned above, and afford excellent protection against lateral movement of the articles and the damage to them that can thus result. Prior packages of this type, however, require supplemental partitioning or insert members to provide positive restraint against endwise or axial movement of the individual articles within their respective compartments. Not only do such inserts add to the cost of the packaging material, but they generally involve an extra operation in the process of inserting the articles into the package, thereby increasing packing costs still further.

It is accordingly a principal object of the present invention to modify and supplement the basic package structure above described to incorporate integral means for positively restraining endwise or axial movement of the articles within their respective compartments, without the necessity of additional separators or partitioning inserts, and the assembly operations which these entail.

In accordance with the present invention, a package structure of the fluted or undulated design above described is employed, but this is modified in respect to the designs heretofore proposed by the provision of transverse slits formed in the sidewalls of the troughs, below the apices

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of the peaks of the flutes, such slits being formed in opposite walls of the trough and spaced therealong a distance corresponding to the axial extent of the body of the article to be retained in the trough. In addition, the fluting of the article-receiving strip is modified to increase slightly the distance between the adjacent sidewalls of adjacent troughs, and the trough width is decreased slightly from that heretofore standardized with respect to articles of given diameter, so that the maximum width of the trough in the present design is appreciably less than the diameter of the articles to be retained. When, therefore, an article is placed in a trough between spaced slits in the sidewalls thereof, that portion of the wall of the trough in which the article is nested is expanded laterally and projects on opposite sides of the article into the spaces between adjacent flutes below the peaks thereof. The remaining portions of the wall of each trough, i.e. the portions extending beyond opposite ends of the retained article, are left unexpanded and accordingly the edges of these wall portions intersect the ends of the body of the columnar article cord-wise of such articles, thereby providing shoulders or stops at each end of the respective article preventing its axial movement within its trough.

The arrangement hereinabove briefly described and comprising the present invention is extremely simple and effective, yet may be readily incorporated into fluted packages of previous design with little modification of existing package-forming equipment, involving only the addition of simple slitting means, such as rotary knives. The improvement thus afforded by the invention is entirely compatible with the existing equipment used for inserting the articles into the package and, of course, eliminates the necessity for a separate operation involved in placing a barrier strip or the like in position to effect the desired restraint against endwise movement of the articles.

The invention is explained in greater detail hereinafter by way of example with reference to a specific embodiment illustrated in the accompanying drawings, in which

FIG. 1 is a perspective view of an article package embodying the invention as applied to the packaging of electrical capacitors or condensers;

FIG. 2 is a view in cross-section, taken on line 2—2 of FIG. 1; and

FIG. 3 is a fragmentary plan view of a package similar to that in FIG. 1 but of slightly modified form.

Article package 10 comprises a generally flat backing strip 12 of flexible sheet material, and an undulated strip 14, also of flexible sheet material, folded or fluted to produce a repetitive series of rounded peaks 16 and troughs 18 running transversely of the extent of backing strip 12. Strip 14 is preferably secured to the backing member by adhesive applied externally along the bottom of each trough, or by other equivalent means.

Tubular or columnar articles, such as condensers C, are adapted to be nested in the respective troughs 18 and retained therein against lateral as well as axial shifting movement. To this end, troughs 18 are formed with a restricted opening and a communicating main cavity or compartment which is slightly narrower in its widest dimension than the diameter of condensers C. The sidewalls of these troughs are transversely slitted, as at 20, 20 below peaks 16, at spaced intervals along each trough, the distance between slits 20 corresponding to the axial length of the body of a condenser C. Slits 20 at each location are discontinuous across the trough, being confined in their transverse or peripheral extent to the side walls only.

Although the troughs are normally slightly narrower than the diameter of the condensers, the flexibility of the walls, supplemented by slits 20, permit the intermediate portions 22 of the sidewalls to expand laterally below peaks 16 to receive the condensers. This expansion is

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accommodated by the spacing between the adjacent walls of adjacent troughs, as best seen in FIG. 2. The intermediate portions 22, i.e. that portion between slits 20, comprise band or "sling" portions for receiving and tangentially gripping the articles within the troughs, and suspending them above the bottoms of the troughs. These slings thus form flexible portions which are semi-independent of the rest of the wall yet are continuous, i.e. uninterrupted peripherally of the troughs, whereby these sling portions readily conform to and are in tangential and uninterrupted peripheral contact with a significant portion of the surface of each article on opposite sides of each trough. The overhang of the sidewalls just below peaks 16 supplements the normal gripping engagement to restrain any outward escape of the articles from troughs 18.

It will be noted that the edges of strip 14 presented by the outer portions 24 of the sidewalls, i.e. the wall portions outside of sling portions 22, thus serve as shoulders or stops on either side at each end of each condenser to restrain it against axial movement along the trough. This arrangement does not interfere in any way with projections extending from the body of the packaged articles, as for example the pigtails on the condensers here illustrated, and does not impede the insertion or removal of the articles from the package. Yet such projections, which are often fragile or are connected to the main body of the article in a fragile manner, are thus fully protected against damage that would result from endwise shifting of the articles within their respective troughs.

The modified package shown in FIG. 3 is essentially similar to that in FIG. 1 except that each trough 18 is provided with more than the one set of paired slits as employed in the previously described embodiment. Thus added sets of slits 20', 20' and 20'', 20'', in each trough adapt the package for articles of predetermined different lengths so that one standard package may serve for articles of different lengths. The presence of slits 20, or 20' does not interfere with the retaining function of the troughs when articles of a length corresponding to the distance between slits 20'' for example are packaged. The plural sets of slits also makes it possible to pack two articles in the same trough, without danger of endwise contact between them. Thus one article can be positioned between each of the paired sets of slits 20'-20'', for example, in the arrangement shown in FIG. 3.

Thus, the package construction here disclosed eliminates the need for any separate partitioning or insert members to prevent endwise shifting of the articles within the troughs.

Article package 10 may, if desired, be enclosed in a conventional folding or other type of cardboard box or sleeve of appropriate size and conventional construction. Likewise, of course, the package may be made in any length to accommodate any quality of articles, as required. Loading of articles into package 10 may be accomplished by the same automatic method and equipment as disclosed in the aforesaid Patent 2,767,532, or the package may, of course, be filled manually.

It will thus be seen that the objects set forth above, together with those made apparent from the preceding

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description, are efficiently attained and, since certain changes may be made in the precise constructions described above without departure from the scope of the invention, it is intended that the foregoing description should be interpreted as illustrative and not in a limiting sense. Thus it is intended that the generic and specific features herein described, as well as the obvious equivalents of the particular structures shown, are comprehended by the following claims.

What is claimed is:

1. An article package of modular compartmented design for supporting a plurality of generally similarly-shaped columnar article individually in separated compartments against lateral and axial shifting therein, which comprises

(a) a generally flat backing strip of flexible sheet material;

(b) an undulated strip secured at spaced intervals to said backing strip to provide a plurality of article-receiving compartments formed by a repetitive series of peaks and troughs running transversely of the extent of said backing strip,

(1) said trough being wider than said peaks but narrower than the diameter of the columnar articles to be received therein, and

(2) the sidewalls of said troughs being slitted transversely at spaced intervals along their extent to form sling portions which are peripherally continuous with the trough walls, said sling portions corresponding lengthwise of said troughs to the axial length of the bodies of the columnar articles to be retained therein.

2. An article package as defined in claim 1, wherein the walls of said troughs adjacent said peaks overhang and restrict the openings of said troughs, and said transverse slits in said trough walls are confined to portions thereof below the apices of said peaks.

3. An article package as defined in claim 2, wherein the slits in said trough walls are discontinuous peripherally of the troughs.

4. An article package as defined in claim 1, wherein said troughs are slit at multiple points along said troughs to provide sets accommodating articles of different predetermined lengths.

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