

May 19, 1964

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3,133,637

MEANS FOR PACKAGING SMALL ARTICLES

Filed Dec. 14, 1961

2 Sheets-Sheet 1

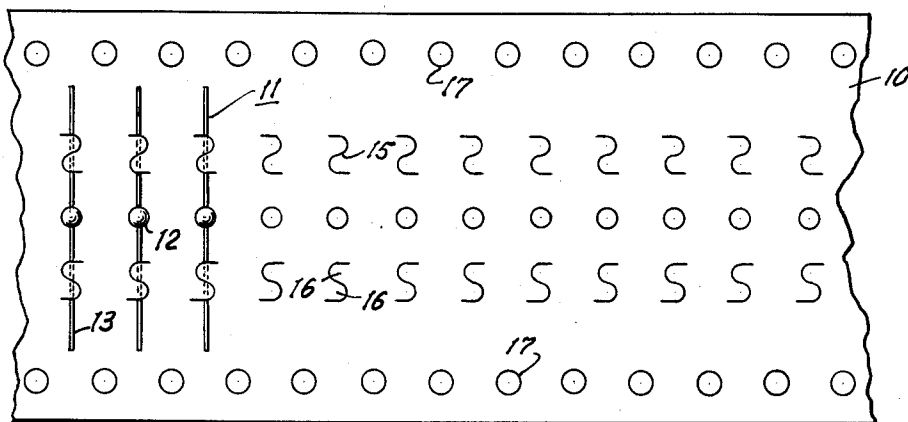


Fig. 1

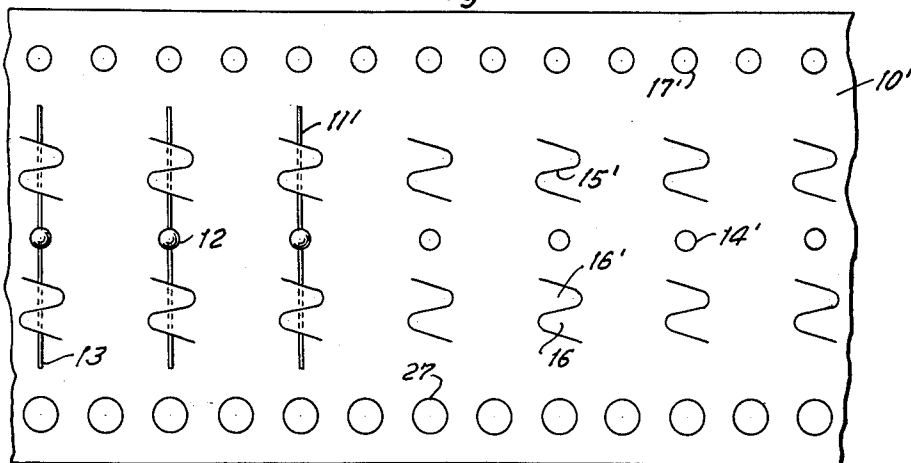


Fig. 2

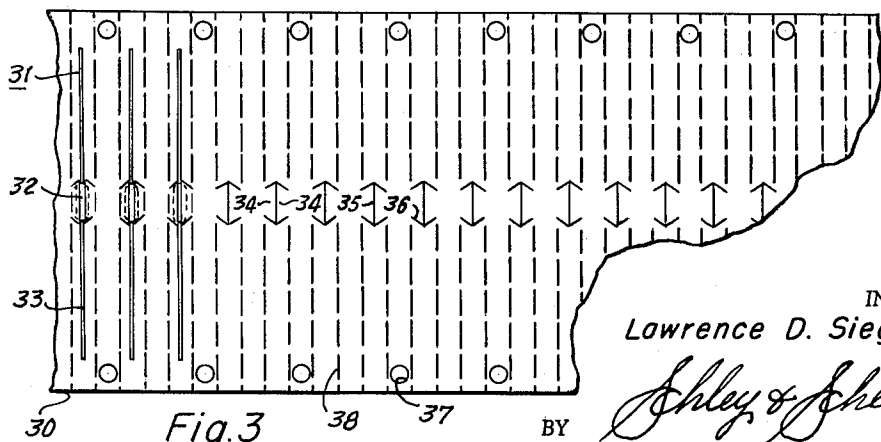


Fig. 3

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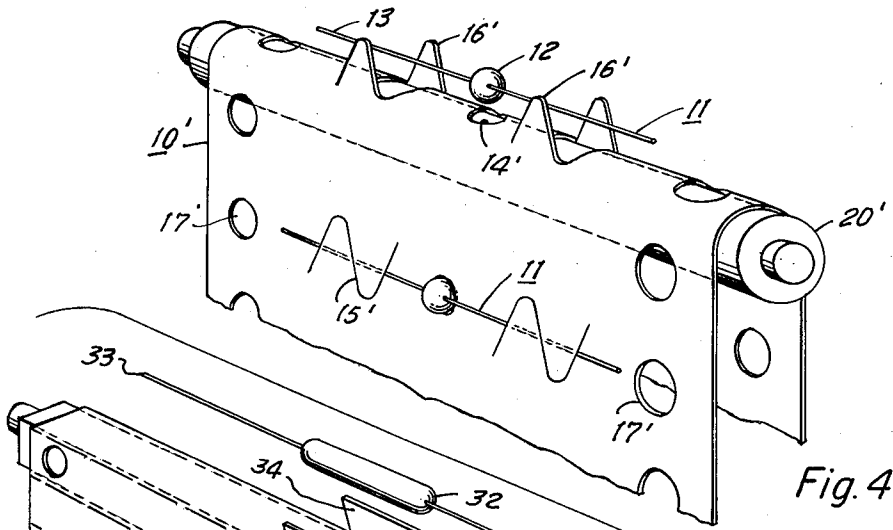


Fig. 4

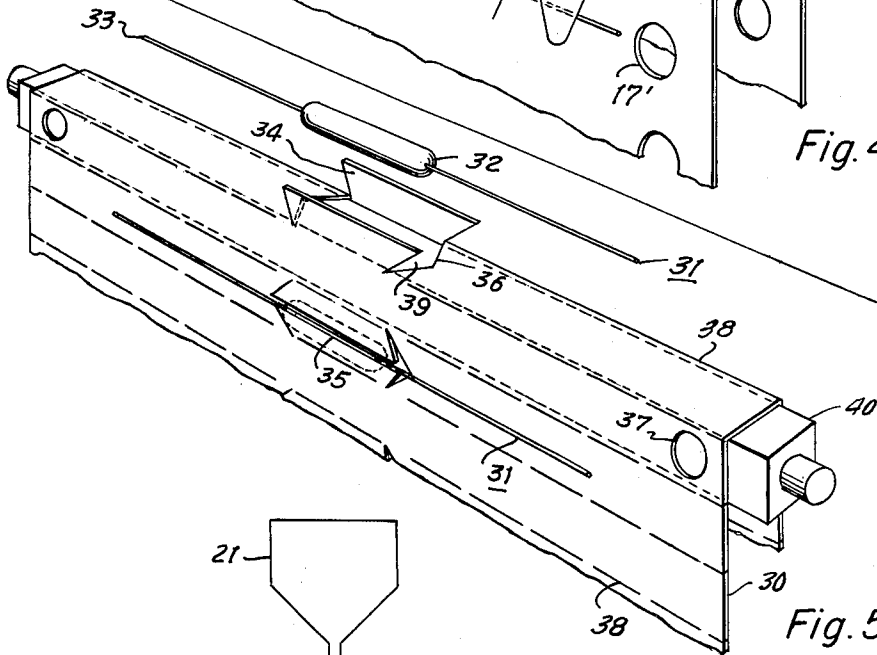


Fig. 5

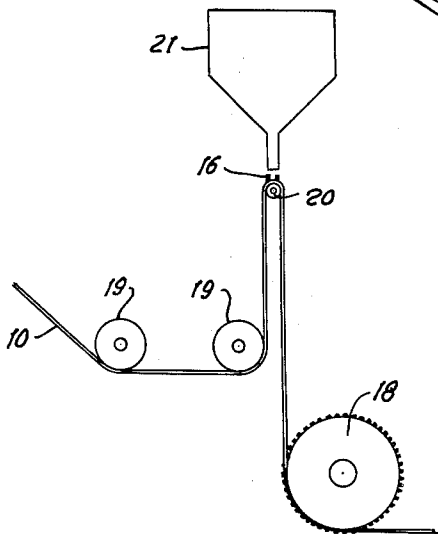


Fig. 6

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**MEANS FOR PACKAGING SMALL ARTICLES**  
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This invention relates to new and useful improvements in means for packaging small articles, particularly articles having rod-like end portions, such as electronic components having axial leads or terminals projecting from both ends thereof.

One object of the invention is to provide improved means for packaging small articles having rod-like end portions in convenient, orderly manner so as to protect said articles from damage and facilitate insertion, inspection, identification and removal thereof.

Another object of the invention is to provide improved packaging means of such construction that small articles having rod-like end portions may be inserted therein manually or mechanically and confined in spaced relationship for easy mechanical or manual removal therefrom.

A further object of the invention is to provide improved packing means, of the character described, having a sheet or strip of flexible or readily bendable material in which coacting flaps are cut for confining the articles by their end or medial portions, the flaps being adapted to be opened by bending of said sheet or strip whereby the articles may be readily inserted and removed.

A construction designed to carry out the invention will be hereinafter described, together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, wherein examples of the invention are shown, and wherein:

FIG. 1 is a plan view of a packaging strip constructed in accordance with the invention,

FIG. 2 is a plan view of a modified strip,

FIG. 3 is a plan view of another modified strip,

FIG. 4 is a perspective view of the strip of FIG. 2 bent transversely around a roller to open the flaps for insertion or removal of an electrical component having axial leads,

FIG. 5 is a view, similar to FIG. 4, of the strip of FIG. 3 and another form of component, and

FIG. 6 is a diagrammatic view showing the loading of one of the strips.

In the drawings, the numeral 10 designates an elongate sheet, strip or tape of paper or other suitable flexible or readily bendable material for packaging electronic components or other small articles 11 having bodies 12, of circular or other shape, and axial leads or terminals or rod-like portions 13 projecting from both ends of the bodies. Preferably, the paper or other material is in continuous strip or tape form to facilitate automatic loading as well as coiling thereof in rolls, but the strip may be cut into shorter lengths or sheets prior to being packaged. A medial row of equally-spaced openings 14 extends longitudinally of the strip 10 and the openings are circular or otherwise complementary in shape to the bodies 12 of the articles 11 for receiving portions thereof, it being noted that said openings are of slightly less size than said bodies so that nearly one-half of each body projects through each opening. Between each opening 14 and each of the longitudinal margins of the strip an S-shaped slit 15 is cut transversely in said strip to provide a pair of coacting flaps 16 which are directed lengthwise of said strip. The rod-like end portions 12 of the articles are adapted to be inserted beneath the flaps 16 and removed when said flaps are bent upwardly or outwardly of the strip.

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When loaded in the strip 10, the articles 11 are confined against displacement by the coaction of the openings 14 and the adjacent pairs of flaps 16 and are disposed in parallel, spaced relationship with their end portions 12 spaced inwardly of the longitudinal margins of said strip. Although the material of the strip has sufficient flexibility to permit bending thereof and of its flaps, the latter are relatively small and of short length so as to have sufficient stiffness to retain the end portions of the articles regardless of the position of said strip so long as said strip is not bent transversely abruptly or about a small radius. It is noted that each pair of flaps may be opened or spread apart by manual bending thereof or by bending of the strip transversely upon itself.

In order to facilitate mechanical bending of the strip for automatic loading and dispensing of the articles, a row of equally-spaced openings 17 may be formed adjacent each longitudinal margin of said strip for coacting with a toothed drive wheel 18 (FIG. 6). As shown in this view, the strip may ride beneath a pair of rolls 19 and be pulled by the wheel 18 over and around a roller 20, of small diameter, which is disposed below the outlet of a suitable hopper or other feeding means 21. Due to the small diameter of the roller 20, the pairs of flaps 16 adjacent each opening 14 are opened or spread apart as the strip rides over said roller.

A modified strip 10' is shown in FIGS. 2 and 4 and is identical to the strip 10, except for its slits 15' and flaps 16', having identical medial openings 14' and marginal openings 17'. As shown by the numeral 27, one row of marginal openings may be different from or be of larger diameter than the openings 17' of the other marginal row for properly orienting the strip relative to a drive wheel by preventing said strip from being turned over relative to the wheel. The slits 15' are similar in arrangement and shape to the slits 15, but are more nearly Z-shaped whereby the flaps 16' are of greater length than the flaps 16 and of slightly greater width at their inner end portions. Due to the greater length of the flaps 16', the longitudinal spacing therebetween may be greater than the spacing between the flaps 16 so that the strip 10' may accommodate larger articles than the strip 10.

In FIG. 4, the modified strip is shown bent around a roller 20', similar to the roller 20, to open or spread apart the pairs of flaps adjacent one of its openings 14' for the reception or removal of one of the articles 11. It is pointed out that the diameter of each of the rollers is somewhat greater than the distance between the base portions of each pair of coacting flaps to ensure full opening thereof and that the strip 10', as well as the strip 10, is of a width greater than the length of the articles so as to protect the end portions thereof even if the marginal openings are not employed. Although capable of accommodating articles larger than the articles 11, the strip 10' may be utilized for packaging said articles 11.

Another modified strip 30 is shown in FIGS. 3 and 5 for packaging electronic components or other articles 31 having cylindrical or elongated bodies 32 and axial leads, terminals or end portions 33, similar to the end portions 12 of the articles 11. The strip 30 is of a width greater than the length of the articles and has a medial row of pairs of coacting flaps 34 extending longitudinally thereof and formed by equally-spaced, transverse slits 35 and longitudinally-directed slits 36 of wide V-shape. The apices of the slits 36 coincide with the ends of the slits 35 and have their arms or legs diverging inwardly whereby the flaps 34 are of trapezoidal shape. As shown in FIG. 5, the opening 39 formed by each pair of flaps is slightly larger than the body 32 of each article 31 so that one-half of said body projects through said opening and the other half of said body is substantially covered by the flaps when the article is inserted or loaded in the strip.

Openings 37, similar to the openings 17 and 27, may be formed in the longitudinal margins of the strip 30 for driving connection with a wheel, not shown and similar to the wheel 18, in order to facilitate mechanical bending of said strip and opening of its flaps for automatic loading and dispensing of the articles.

Although the flaps 34 of the strip 30 may be opened or spread apart by manually bending said flaps or said strip transversely upon itself, as shown by the numeral 38, it is preferable to crease or score said strip transversely so as to simplify bending thereof and opening of its flaps. The crease or score lines 38 are alined with the base portions of the flaps, which are not creased or scored, whereby said flaps open fully when the strip is bent on the lines alined with said base portions (FIG. 5). A roller 40, square in cross-section and of a width substantially equal to the distance between the transverse crease or score lines may be provided for bending the strip 30 on said lines in substantially the same manner as the rollers 20 and 20'. Due to the crease or score lines 38, the strip 30 may be formed of stiffer or less flexible material than the strips 10 and 10'. It is readily apparent that the articles 31 could be packaged by the strips 10 and 10' by merely elongating the medial openings 14 and 14' transversely of said strips in substantial conformity with the shape of the bodies 32 of said articles and confining the end portions 33 thereof beneath the flaps 16 and 16'.

From the foregoing, it is readily apparent that improved means for packaging electronic components and other small articles of similar shape has been provided. When packaged, the articles are arranged in convenient, orderly manner and protected from damage, particularly, their end portions, axial leads or terminals. The articles may be readily inserted and removed manually or automatically as well as inspected and identified. Although the flaps 34 of the strip 30 substantially conceal one of the sides of the bodies 32 of the articles 31, the other of said sides and nearly all of the bodies 12 of the articles 11 are readily visible when the strips are unrolled. Again, it is noted that any one of the strips may be coiled in a roll or cut into shorter lengths or sheets.

The foregoing description of the invention is explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. Packaging means for electronic components having rod-like end portions, said means including a single substantially flat strip of flexible material for supporting the components in transverse relation thereto, opposed flaps substantially medially of the strip in alignment with each other providing an opening therebetween substantially complementary when spread apart to the medial portion of one of said components, said strip having aligned transverse score lines extending from the base portion of each flap to the longitudinal margins of said strip to facilitate bending of said strip and spreading apart each

pair of flaps, each flap of said pair having an unscored base portion of sufficient stiffness to substantially maintain the flap in the plane of said strip and to return said flap to said plane after repeated flexing out of said plane, said strip having aligned holes extending along each margin thereof to facilitate the use of said strip in an automatic packaging machine.

2. Packaging means for electronic components having rod-like end portions, said means including a single substantially flat strip of flexible material for supporting the components in transverse relation thereto, spaced pairs of flaps cut into the strip intermediate its longitudinal margins, the flaps of each pair being opposed and directed lengthwise in said strip overlying and confining the rod-like end portions of the components intermediate its ends to prevent the displacement thereof, each flap of said pair having an unscored base portion of sufficient stiffness to substantially maintain the flap in the plane of said strip and return said flap to said plane after repeated flexing thereof through an angle of 90° while being pulled up, over and around a roller of small diameter, said strip having a row of equally spaced openings along each longitudinal margin for coacting with a tooth drive mechanism.

3. Packaging means for electronic components having rod-like end portions of a smaller diameter than their medial portion, said means including a single substantially flat strip of flexible material for supporting the components in transverse relation thereto, spaced pairs of flaps cut in the strip intermediate its longitudinal margins, the flaps of each pair being opposed and directed lengthwise of said strip overlying and confining the end portions of a component to prevent displacement thereof, each flap of said pair having an unscored base portion of sufficient stiffness to substantially maintain the flap in the plane of said strip after repeated flexing of said flaps while being carried up, over and around a roller of small diameter, said strip having openings substantially complementary to the medial portion of the components, said openings being slightly larger than the medial portion of the components so that part of said medial portion projects through said opening, said strip having a row of equally spaced openings along each longitudinal margin thereof for coacting with a tooth drive mechanism.

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