United States Patent

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[54] **PACKAGE**

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[52] **U.S. Cl.** ..... **206/65 F**

[51] **Int. Cl.** **B63d 71/00**

[58] **Field of Search** ..... 206/65 R, 65 F; 221/279; 206/72

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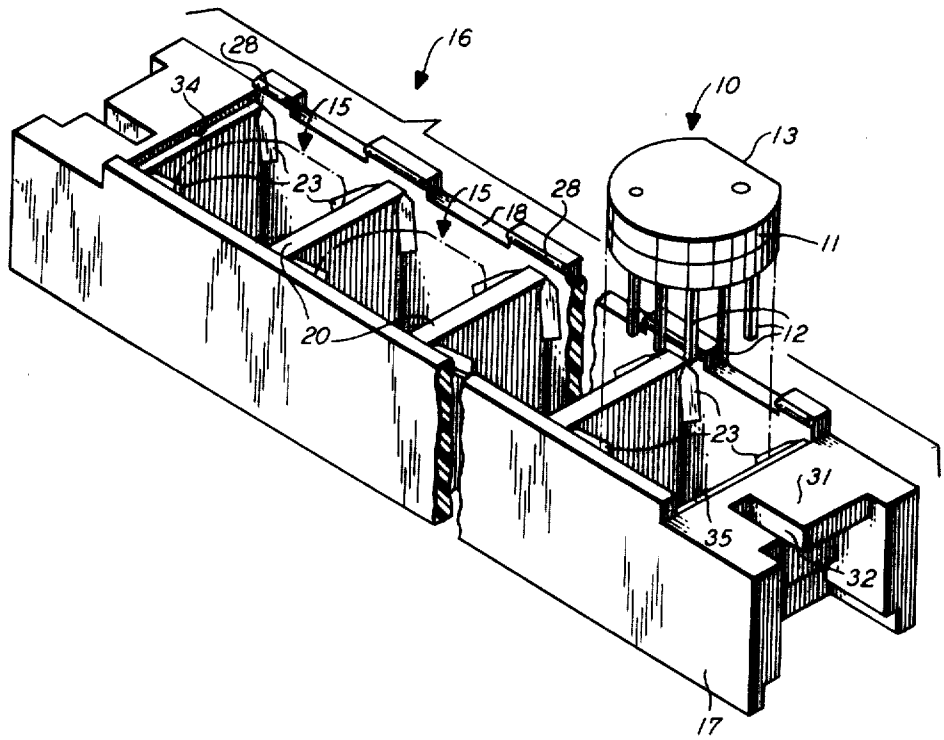
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[57] **ABSTRACT**

A package receives and maintains a plurality of articles having flat sides, tabs, or other nonsymmetrical dimensions in oriented positions. The package has a casing with a row of compartments open at the top and bottom. A plurality of resilient projections extend into each of the compartments to support the articles from falling through the open bottoms. The compartment walls mate with the nonsymmetrical dimensions of the articles to maintain the articles in oriented positions. A cover is secured over the top of the compartments to contain the articles. The cover has apertures aligned with each compartment such that a finger or pusher may be inserted into each compartment to force each article past the resilient projections out the bottom of the compartment without removing the cover

6 Claims, 5 Drawing Figures



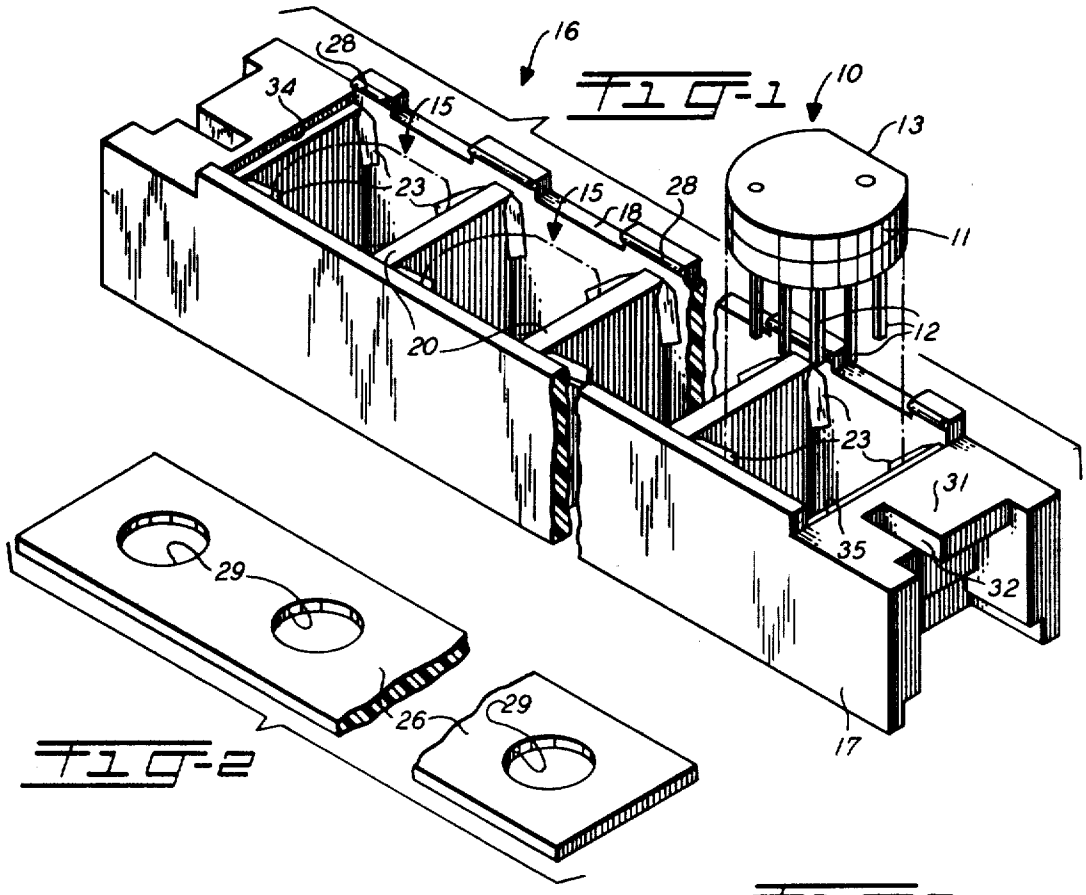


FIG-1

FIG-2

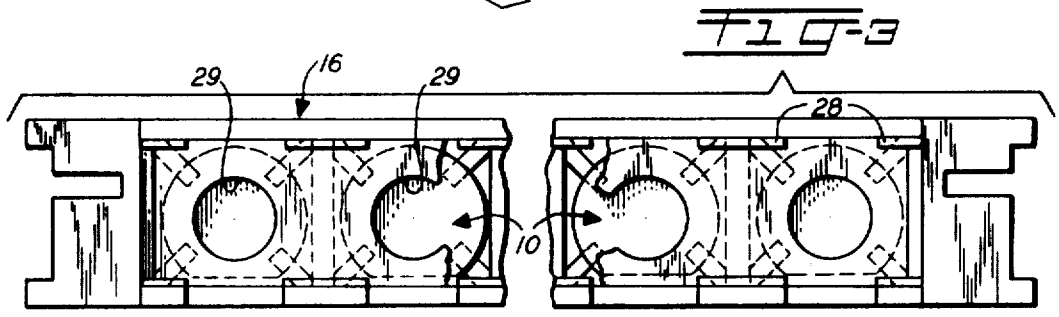


FIG-3

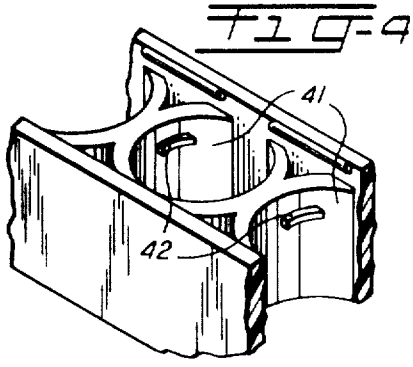


FIG-4

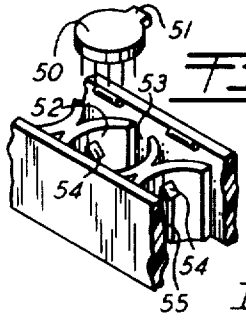


FIG-5

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PACKAGE

BACKGROUND OF THE INVENTION

1. Field of the Invention

Packages are utilized in the handling, transportation, and storage of articles. The packages protect the articles from damage while providing a convenient container for handling the articles. In the manufacture of electronic systems, articles, such as electronic components, are automatically assembled into units, such as logic boards, etc. It is desirable that the package containing the articles be suitable for use with automatic assembling apparatus. Further, it is desirable that the package maintain the articles in a predetermined orientation.

2. Prior Art

In the prior art, articles, such as electronic components, are transported in a shipping package made of a porous or cellular plastic block with a plurality of cavities, each cavity for receiving a single article. The prior art packages do not maintain alignment of the articles and are not easily adopted for use with an automatic assembling machine.

SUMMARY OF THE INVENTION

An object of the invention is a new and improved package for handling and transporting articles.

Another object of the invention is a package which maintains orientation of the articles.

A further object of the invention is a package which may be readily utilized with an automatic assembling apparatus.

In accordance with these and other objects of the invention, a package constructed in accordance with the invention utilizes a casing having a compartment open at both first and second opposite ends with inside dimensions of sufficient magnitude to allow the article to pass therethrough. A plurality of resilient projections extend inside the compartment such that an article inserted in the first end is retained by the projections from passing out the second end. A cover is then secured over the first end of the compartment to contain the article in the package.

Additionally, the cover has an aperture through which a finger or pusher may be inserted to force the article past the projections out the second end of the compartment. Also, the compartment has a wall dimension which mates with an external non-symmetrical dimension of the article to maintain the orientation of the article. In one embodiment of the invention, the casing has a row of compartments for holding a plurality of articles, such that the package may be indexed in a machine wherein the articles are automatically discharged from the package.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of a casing of a package for receiving a plurality of articles in accordance with the principles of the invention;

FIG. 2 is an isometric drawing of a cover for closing the top of the casing shown in FIG. 1 to contain the articles in the package;

FIG. 3 is a top view showing the casing of FIG. 1 and the cover of FIG. 2 assembled to contain the articles in the package; and

FIGS. 4 and 5 are isometric views of alternative embodiments of the casing shown in FIG. 1.

DETAILED DESCRIPTION

Referring first to FIG. 1, there is shown an article **10** which has a head **11** with a plurality of parallel leads **12—12** extending downward therefrom. The head **11** has a flat side **13** to aid in the orienting of the article **10** to insure that the leads **12—12** are inserted into proper openings in a socket, printed circuit board, or similar receptacle. The article **10** may be an electrical component, such as an integrated circuit, to which external electrical connections are made through the leads **12—12**.

Also in FIG. 1, there is shown a casing **16** with a row of compartments **15—15** for receiving a plurality of articles **10—10**. The casing **16** has a pair of parallel side walls **17** and **18** with perpendicular walls **20—20** extending therebetween. The walls **17**, **18**, and **20—20** form the row of compartments **15—15** which receive the articles **10—10**. The compartments **15—15** are in the shape of rectangular parallelepipedons open both at the top and bottom ends. The internal dimensions of the compartments **15—15** are sufficiently large to allow the articles **10** to pass therethrough.

A plurality of resilient fingers or projections **23—23** extend from the four corners of each compartment **15—15** such that the bottom edges of the head **11** of an article **10** inserted in the compartment through the top engages the resilient fingers **23—23** and is supported thereby. The fingers **23—23** are positioned below the tops of the compartments such that each head is fully received in the compartment and the leads do not extend through the bottom openings of the compartments. The fingers **23—23** have sufficient resilience that a predetermined force which is greater than the force of gravity may be exerted on the top of the article **10** to push the article out the bottom of the cavity.

The size of the compartments **15—15** are designed such that the flat side **13** of the article **10** is maintained in a predetermined orientation by the wall **18**. The articles **10** may thus be readily discharged through the open bottoms of the compartments **15—15** in the proper orientation. Also, the wall **18** is notched while the wall **17** is straight to indicate that the side **18** is the proper side for placing the flat sides **13** of the articles **10**.

The casing **16** at each end has an end extension **31** with a notch **32** formed therein. The notch **32** may be placed at one of a plurality of relative positions on the tab **31** in order to identify the particular component which is contained within that package.

The casing **16** is made from a resilient plastic material, such as clear general purpose polypropylene, or the like. The casing **16** may be molded in a unitary structure in a suitable injection mold.

Referring now to FIG. 2, there is shown a cover **26** which is designed to fit on the top of the casing **16** of FIG. 1. The cover **26** may be made from a similar material to that of the casing **16**. Referring back to FIG. 1, the side walls **17** and **18** of the casing **16** extend above the walls **20—20** and have a plurality of resilient ribs or projections **28—28** which retain the cover **26** when it is snapped or slid into position on top of the casing **16**. The ends **34** and **35** of the casing **16** also ex-

tend above the walls **20** to prevent the cover **26** from sliding lengthwise once it is in position. The cover **26** is a suitable length and the casing **16** may have suitable tapered edges to aid in the assembling of the cover **26** on the casing **16**. The cover **26** has a plurality of apertures **29—29** which align with the compartments **15—15** in the casing **16** such that a member, such as a finger or pusher, may be inserted to force the articles **10** past the fingers **23** out the bottom of the casing **16**.

The assembled cover **26** and casing **16**, as shown in FIG. **3**, form a package for safely transporting and handling the articles **10**. Additionally, the package may be placed in automatic machines where the articles **10** may be automatically removed in proper orientation for further processing or assembling.

Referring to FIG. **4**, there is shown an alternative embodiment of a casing similar to the casing **16** of FIG. **1**. The casing shown in FIG. **4** differs from that in FIG. **1** in that the compartment walls **41** are cylindrical with one flat side designed to have a similar configuration to the outside dimensions of the article **10**. Also, the fingers **23—23** of FIG. **1** are replaced by smaller resilient projections **42—42** which serve to support the article **10**.

Referring to FIG. **5**, there is shown a third embodiment for receiving an article **50** which has a tab **51** projecting therefrom for orientation. The internal wall **52** of the casing shown in FIG. **5** has a groove **53** for maintaining the proper orientation of the article **50**. Also, the wall **52** of the casing has channels **55—55** into which article supporting fingers **54—54** are received when the article **50** is forced downward.

The above-described embodiments of the invention are simply illustrative of the principles of the invention and many embodiments may be developed without departing from the scope and spirit of the invention.

What is claimed is:

1. A package for a plurality of electrical components, each component having a head with a plurality of parallel leads extending from the bottom of the head, comprising:

a casing having a plurality of compartments all in a row with each compartment open at first and second opposite sides of the casing, said compartments being sufficiently large to allow components to pass therethrough;

a plurality of resilient projections extending inside each compartment for engaging the bottom of the head of a component inserted into a compartment on the first side of the casing to support the component in the compartment, said projections spaced from the openings on the first and second sides of the casing such that each head is fully received in a respective compartment and the leads do not extend through the openings of the compartments, said projections having sufficient resilience that a predetermined force causes the projections to yield allowing a component to pass out a compartment on the second side of the casing; and

a cover having a plurality of apertures adopted to be secured over the openings in the first side of the casing to contain the components in the package, each aperture aligned with an opening of a compartment in the first side of the casing such that a member may be inserted through each aperture into a respective compartment to force a component out an opening in the second side of the casing.

2. A package as defined in claim **1**, wherein:

each component has an outside nonsymmetrical dimension which may be utilized to orient the component; and

each compartment has an inside dimension for mating with the outside nonsymmetrical dimension of each component to retain the articles in a predetermined rotational orientation about an axis parallel to the leads.

3. A package for a plurality of electrical components, each of which has a head with a plurality of leads extending from the head, wherein the head of each component has an outside nonsymmetrical dimension which may be utilized to orient the component in a predetermined rotational orientation about an axis parallel to the leads, comprising:

a casing having a plurality of compartments all in a row with each compartment open at first and second opposite sides of the casing, said compartment being sufficiently large to allow components to pass therethrough, each compartment having an inside dimension for mating with the nonsymmetrical outside dimension of the head of each component to maintain each component in a predetermined rotational orientation about an axis parallel to the leads;

a plurality of resilient projections extending inside each compartment for engaging the bottom of the head of a component inserted into a compartment on the first side of the casing, to support the component in the compartment, said projections spaced from the first and second sides such that the head of each component is fully received in its respective compartment and the leads do not extend through the openings on the second side of the casing, said projections having sufficient resilience that a predetermined force causes the projections to yield allowing the components to pass out the compartments on the second side of the casing; and

a cover having a plurality of apertures adopted to be secured over the openings in the first side of the casing to contain the components in the package, each aperture aligned with an opening of a compartment such that a member may be inserted through the aperture to force an article past the projections out the second side of the casing.

4. A package as defined in claim **3**, wherein:

each compartment is substantially the shape of a rectangular parallelepipedon;

the resilient projections are resilient fingers which extend the four corners into each compartment; and

the outside nonsymmetrical dimension of the head of each component is a flat surface parallel to the leads and which mates with a flat wall of each compartment to maintain orientation

5. A package as defined in claim **4**, wherein there is a tab at the end of the row of compartments with a notch therein to identify the components contained in the package.

6. A package as defined in claim 4, wherein the flat wall which mates with the flat surface of the head of each component has an edge with grooves therein to indicate the proper orientation of the components.

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