

Aug. 1, 1961

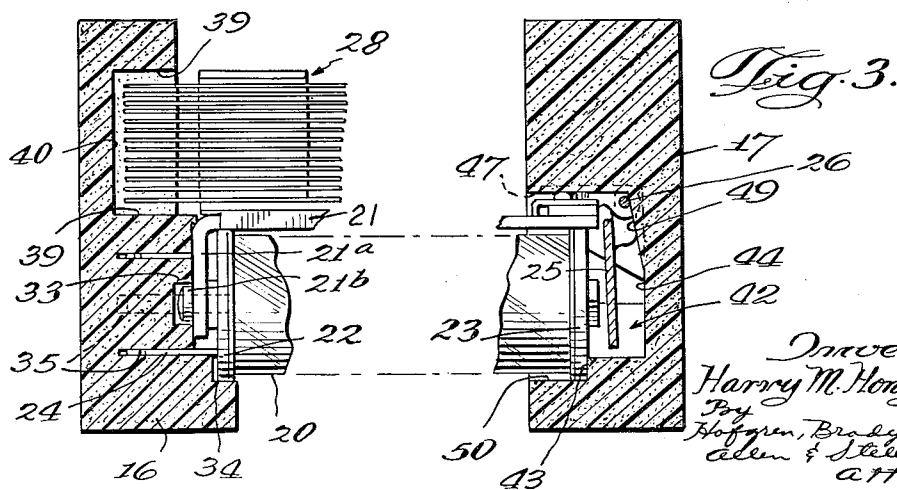
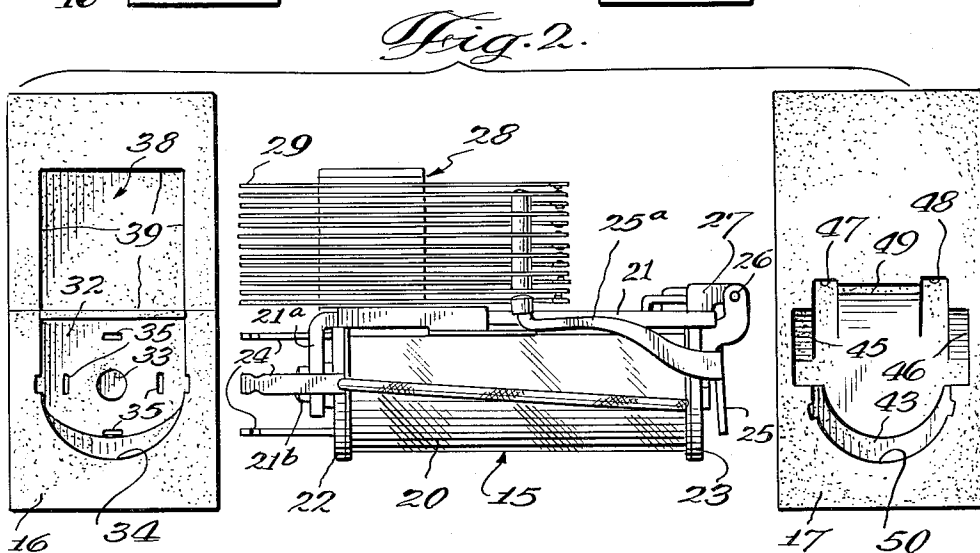
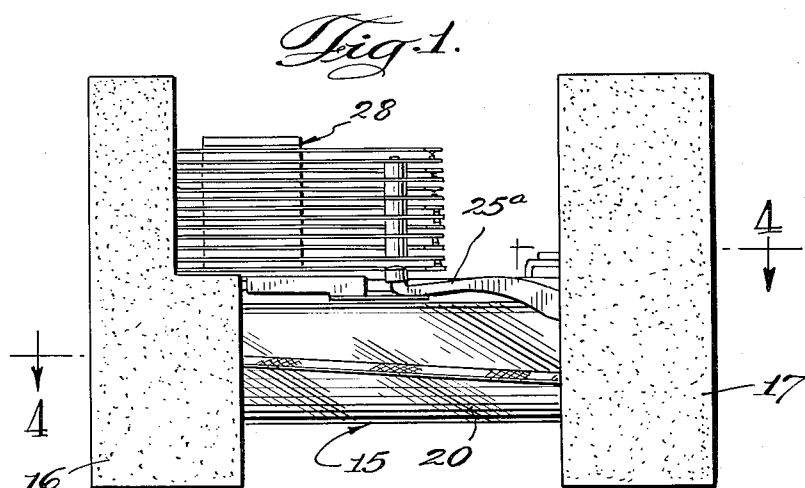
H. M. HONEYCUTT

2,994,425

PACKAGE

Filed Jan. 23, 1959

2 Sheets-Sheet 1



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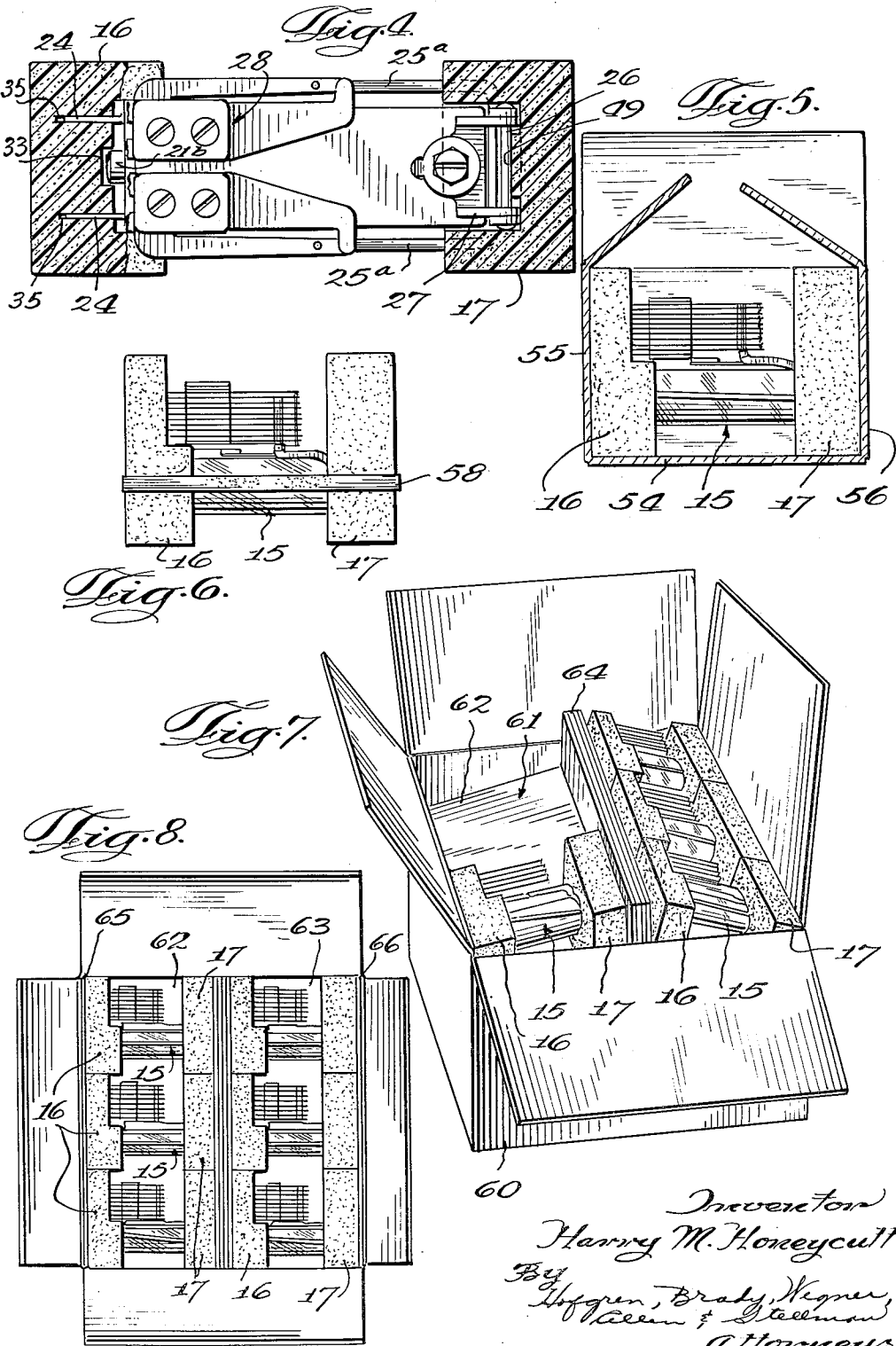
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PACKAGE

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2,994,425 PACKAGE

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This invention relates to a packaging arrangement and more specifically to a novel, safe and inexpensive package particularly designed for delicate or sensitive articles.

Many packaging arrangements for different types of delicate or sensitive articles are presently used. Perhaps one of the most common is a wrapping of cushioning material, as resilient fibre or paper in a mass or thick sheet. Wrapping and unwrapping are time consuming and afford incomplete protection. For example, in shipping wrapped electrical relays, a twenty-five percent loss from shipping damage is normally anticipated. A sizable portion of this loss is directly attributable to handling damage as it is impractical to use a sufficient thickness of wrapping material to shield completely the sensitive or critical surfaces of the relay. In addition, wrapping introduces a problem in identifying the packaged article unless special controls are maintained over the wrapping operation to insure an outer marking. This is particularly troublesome where a single order may include several types of devices.

A principal object of the present invention is the provision of an inexpensive, safe and easy to use packaging arrangement which obviates the foregoing and other objections to previous packaging.

One feature of the invention is the provision of a packaging arrangement for an article having end portions comprising critical and noncritical surfaces, including a pair of article supporting end members each end member having article engaging surfaces in engagement with only the noncritical surfaces of the article, together with means for holding the end members in engagement with the article. Another feature is that the end members have recesses therein defined by surfaces spaced from and surrounding the exposed critical surfaces of the article to protect them.

A further feature is that at least a portion of the engaging surfaces of the end members and the article have a friction fit requiring conscious manipulation for removing the end members from the article.

Still another feature is that the external surfaces of the end members define a rectangular parallelepiped. This facilitates further packaging of the article either singly or in quantity, as in suitable cartons.

Yet a further feature is that the end members are urged toward each other, against the noncritical end surfaces of the article, utilizing the physical structure of the article to provide a stable package.

Another feature is that the article supporting end members are of a cellular material, as a molded expanded cellular plastic material.

Still a further feature of the invention is the provision of a packing carton especially adapted for a plurality of articles, including a carton and a tray therein having two portions, the tray having a first position with the portions generally coplanar and received within the carton and a second position with the portions inclined upwardly. The two portions of the tray are preferably separated by a centrally located and upwardly extending partition. In the first position of the tray, with the portions coplanar and within the carton, the partition bears against one of the end members supporting the packaged article holding it against the noncritical end surfaces. In the second position the upstanding tray is ready to be filled or emptied.

Further features and advantages will readily be appar-

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ent from the following specification and from the drawings, in which:

FIGURE 1 is an elevational view of a packaging arrangement for an electrical relay, embodying the invention;

FIGURE 2 is an exploded view of the elements of FIGURE 1;

FIGURE 3 is a broken vertical section through FIGURE 1;

FIGURE 4 is a transverse section taken generally along line 4-4 of FIGURE 1;

FIGURE 5 is a reduced sectional view of one form of the final package;

FIGURE 6 is a reduced view of a modified final package;

FIGURE 7 is a perspective of a packaging carton with a plurality of relays packaged therein; and

FIGURE 8 is a plan view of the carton of FIGURE 7. The packaging arrangement disclosed and claimed herein is particularly suited for articles which have generally opposed end surfaces some of which are critical or delicate and others of which are noncritical, i.e. to which force may be applied without damaging the article. An electrical relay has been selected as a specific example of such an article and the disclosure of the invention is made as related to such a relay. There are many other articles or devices of a delicate nature requiring special packaging and handling techniques with which the packaging arrangement of this invention may be used.

Turning now to the drawings, and particularly to FIGURE 1, a relay 15 is illustrated mounted between a pair of spaced end support members 16 and 17. The central portion of the body of the relay is exposed and identifying indicia thereon are readily visible.

As best seen in FIGURE 2, the relay 15 includes a coil 20 carried by the downturned extension 21a of frame 21 and having coil end surfaces 22 and 23. Extending outwardly from end surface 22 are a plurality of coil terminals 24 to which electrical connections are made for the coil. (Here the relay has two coils and four coil terminals.) A clapper armature 25 is mounted on pin 26 carried by arms 27 adjacent end surface 23 of the coil and actuating arm 25a extends from armature 25 along the side of coil 20. Mounted on the upper surface of frame 21 is a stack of leaf switches indicated generally as 28, the condition of the switches being determined by the position of the actuating arm 25a. Electrical connections with the switch leaves may be made through the terminals 29 which extend outwardly from the stack 28 above coil terminals 24.

In this particular relay, there are several critical or delicate surfaces or portions, as the armature 25, actuating arm 25a, leaf switch stack 28 and switch terminals 29. The relationship of these elements is carefully selected and adjusted during manufacture and subsequent disturbance of their configuration or relationship will render the relay unusable for its intended purpose. On the other hand, the frame 21, coil end surfaces 22 and 23, coil terminals 24, armature supporting arms 27 and pivot pin 26 are not delicate or critical and they will stand substantial forces without affecting the operation of the relay.

It will be understood that the foregoing detailed description of relay 15 is given solely to provide a basis for the subsequent discussion of the configuration of article supporting end members 16 and 17. The specific structure of the relay forms no part of the invention and other types of relays and other delicate or sensitive articles or devices may be used with the packaging arrangement disclosed herein.

Referring now to FIGURES 2, 3 and 4, the configura-

tion of the supporting end members will be considered. End member 16, associated with the left end of relay 15 as viewed in the drawings, is provided with a surface 32 against which the frame extension 21a bears. A recess 33 accommodates the head of coil mounting screw 21b. The lower edge of coil surface 22 rests on a corresponding ledge or shoulder 34 while four slit-like recesses 35 extend into but not through body 16 and receive coil terminals 24. The upper portion of end member 16 is provided with a relatively large recess 38 defined by peripheral surface 39 and end surface 40. The recess 38 accommodates leaf switch terminals 29 and surfaces 39 and 40 are spaced from these terminals a sufficient distance so that a blow or sustained force on end member 16 will not cause engagement with the terminal. For example, the surfaces are preferably spaced at least a sixteenth of an inch from the terminals, in all directions. The body of end member 16 surrounding terminals 29 serves as a protection therefor.

Right end member 17 is provided with a recess 42 which receives the right end of the relay assembly. A vertically extending surface 43 engages the lower peripheral portion of coil end surface 23, surrounding armature 25. The central portion of the inner surface 44 of recess 42 is spaced from the armature. The lateral edges 45 and 46 of recess 42 are believed to accommodate switch actuating arms 25a, without contacting them. The surfaces 47 and 48 at the top of recess 42 bear on the upper edges of armature mounting arms 27 and the lower edge of end surface 23 rests on surface 50 of the end member. An inclined surface 49 extends outwardly from the rear wall 44 of the recess and bears against pivot pin 26, between mounting arms 27. There is no contact between the supporting member 17 and armature 25 or actuating extensions 25a, and the inner surfaces of the recess 42 are sufficiently spaced from these critical relay surfaces so that subsequent handling will not bring them into contact.

The specific construction and configuration of the article supporting end members illustrated and described herein is designed for the specific construction of relay 15. Where other and differently shaped articles are to be supported or packaged, the configuration of the supporting end members will be modified to accommodate these differences. Important features of the configuration are that the end members have surfaces which engage the noncritical or rugged surfaces of the article being packaged and are relieved or provided with recesses the walls of which are spaced from the delicate or critical surfaces of the article, the body of the end members surrounding the critical surfaces and providing protection therefor.

The end members are so designed relative to the article being supported that they have a friction fit therewith, requiring a conscious physical manipulation to remove them. For example, in the embodiment illustrated in the drawing, the slit-like recesses 35 have a tight frictional engagement with coil terminals 24; and the lower peripheral edge of relay coil end member 23 and arms 27 bear against the surfaces 47, 48 and 50 of end member 17 holding it tightly on the other end of the relay.

End members 16 and 17 are preferably urged against the noncritical end surfaces of the relay or article 15 holding them tightly in place and completing a rigid unit through the structure of the article being packaged. In FIGURE 5, relay 15 and supporting end members 16 and 17 are illustrated packed in an individual carton 54. The spacing of the end surfaces 55 and 56 of the carton is such that end members 16 and 17 are held tightly in engagement with relay 15. In FIGURE 6, end members 16 and 17 are held in engagement with relay 15 by elastic band 58.

End members 16 and 17 are preferably formed by molding in order to insure a precise formation of the article engaging surfaces and the protective surfaces which define the recesses around the critical surfaces of the

article to be supported. A material which has been found to be particularly suited for this purpose is expanded polystyrene. In molding this material, granules of polystyrene are placed in a mold and heated by dry steam whereupon they expand forming a cellular mass having the desired configuration. This material is strong, light in weight and relatively nonabsorbent. It is resilient, cushioning the supported article against damage from shock. It has a high coefficient of friction which aids in holding the end members on the article so that they will not accidentally fall off. The material may be molded accurately to very close tolerances and may be colored by the addition of pigment to the plastic granules if this should be desired.

In FIGURES 7 and 8, a special carton is illustrated which is particularly designed for packing a plurality of articles carried by end members as 16 and 17. The carton 16 is provided with one or more trays, indicated generally as 61 which are formed of a suitable material as corrugated paper. The tray is divided into two supporting portions 62 and 63 divided by an upstanding center partition 64. The outer edges 65 and 66 of the tray are folded upwardly and the platform portions 62 and 63 are joined with partition 64 along fold lines. By virtue of the folds formed in the corrugated material and the inherent strength of the material itself, platform 61 may assume either one of two positions. In the first position, illustrated in FIGURE 8, the platform portions are generally coplanar and the entire platform is received within the carton 60. In a second position, illustrated in FIGURE 7, the platform portions 62 and 63 are inclined upwardly toward the center partition 64 which is elevated. The inherent resiliency of the platform material holds it in this position with the upturned edges 65 and 66 bearing against the walls of carton 60. In the position of FIGURE 7, articles 15 with the end members 16 and 17 mounted thereon may be placed on the surfaces of the two tray portions. After the tray is filled, a downward pressure on partition 64 forces the tray into the position of FIGURE 8 and the article supporting end members are held tightly on the articles between the center partition and the upturned edges 65 and 66. The carton 60 may of course be designed with sufficient depth to accommodate several trays of articles.

The packaging arrangement disclosed herein is much less expensive, both in material and labor costs, than packaging formerly used for delicate articles. The end members can be applied easily and rapidly while holding the relay by the body of coil 15. The leaf switches are visible at all times and are not likely to be damaged by improper handling. The formation of the outer surfaces of the end members, defining a rectangular parallelepiped, facilitate ultimate packaging in a carton.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims.

I claim:

1. A packaging arrangement comprising: a relay having generally opposed end portions, said end portions comprising critical switch and actuator surfaces and non-critical coil and frame surfaces; a pair of relay supporting end members, each end member having means defining relay engaging surfaces in engagement with said non-critical coil and frame surfaces and spaced from said critical switch and actuator surfaces; and means engaging said end members and holding them in engagement with said relay.

2. A packaging arrangement comprising: a clapper relay having a coil wound on a frame, leaf switch means mounted thereon with terminals at one end of the frame and a clapper armature at the other end of the frame; a pair of relay supporting end members, each end mem-

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ber having means defining relay engaging surfaces in engagement with said frame and coil of the relay and having recesses defined by means forming protective surfaces spaced from and surrounding said switch terminals and clapper armature; and means engaging said end members and holding them in engagement with said relay.

3. The packaging arrangement of claim 2, wherein said relay coil is provided with terminals extending from an end of the relay and the associated end member has means defining surfaces in frictional engagement with the relay coil terminals.

4. A packaging arrangement comprising: an article having generally opposed end portions, each end portion comprising means defining critical and noncritical surfaces; a pair of separate article supporting end members, each end member having means defining article engaging surfaces in engagement with only the noncritical surfaces of said article, the external surfaces of said end members defining planes forming a rectangular parallelepiped having parallel end surfaces; and carton means enclosing said end members and article, engaging a plurality of the surfaces of each end member, including the parallel end surfaces, holding the end members in engagement with said article and positioning the end members and article within the carton.

5. A packaging arrangement comprising: an article having generally opposed end portions, each end portion comprising means defining critical and noncritical surfaces; a pair of separate article supporting end members, each end member having means defining article engaging surfaces in engagement with only the noncritical surfaces of said article, the outer end surfaces of said sup-

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porting members being parallel and generally at right angles to the longitudinal axis of said article said end members having generally planar lateral surfaces; and a container for said article and end members, including means engaging the outer end surfaces of said end members holding the end members in engagement with said article and further means engaging at least some of the lateral surfaces of the end members, positioning the article and end members within the container.

6. The packaging arrangement of claim 5, wherein said end members are of a molded expanded cellular material.

7. The packaging arrangement of claim 5 wherein said end members are of molded expanded polystyrene.

8. A packaging arrangement, comprising: a relay having generally opposed end portions comprising critical relay connector and operating surfaces and non-critical relay structural surfaces; a pair of relay supporting end members having means defining relay engaging surfaces in engagement with said non-critical relay structural surfaces and spaced from said critical relay connector and operating surfaces; and means engaging said end members and holding them in engagement with said relay.

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