

July 6, 1965

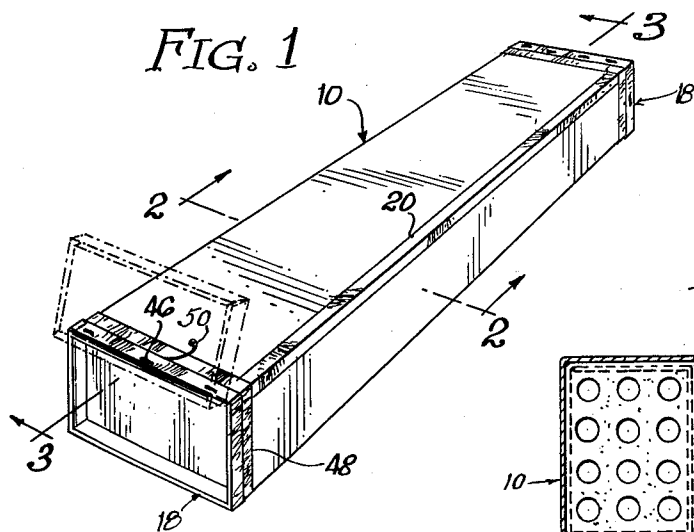
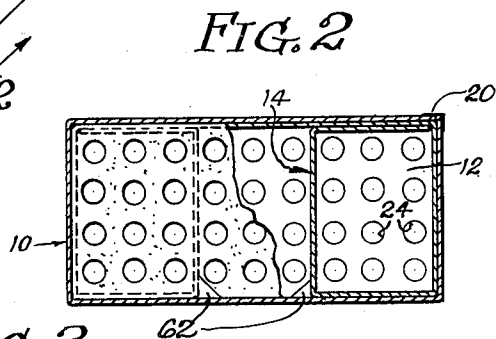
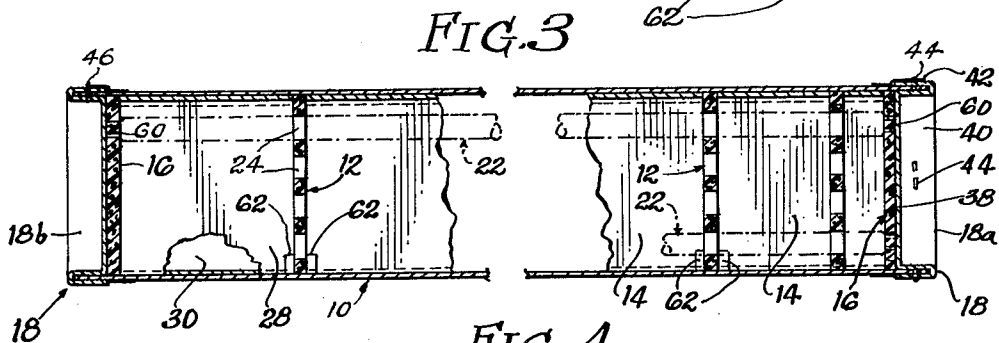
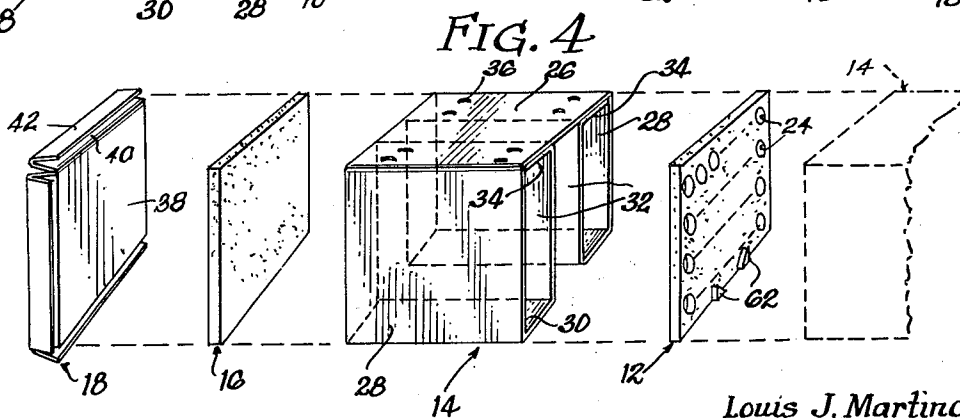
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3,193,095

SHIPPING AND STORAGE CONTAINER

Filed April 5, 1963

2 Sheets-Sheet 1



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FIG. 5

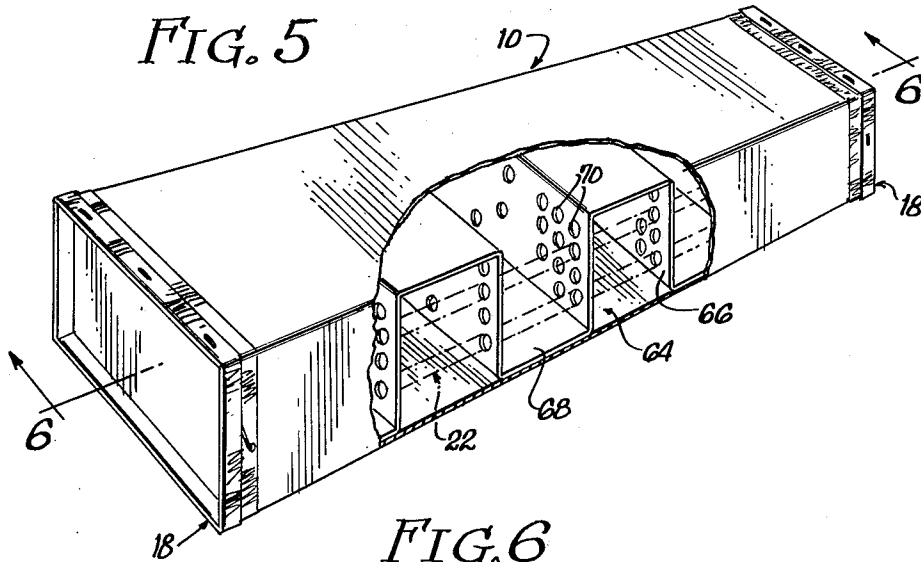


FIG. 6

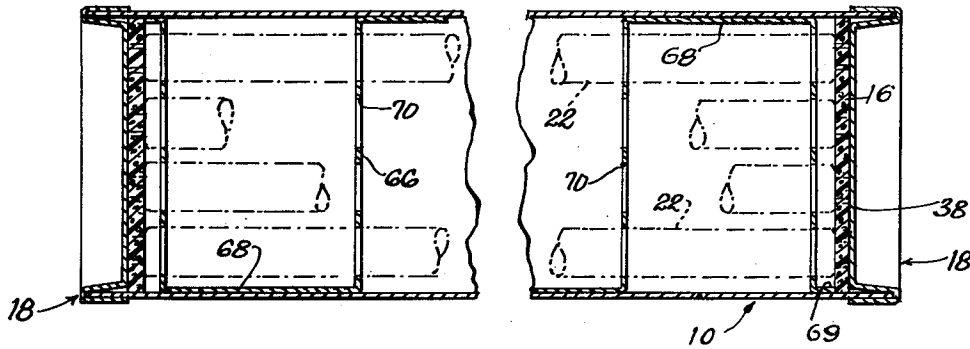
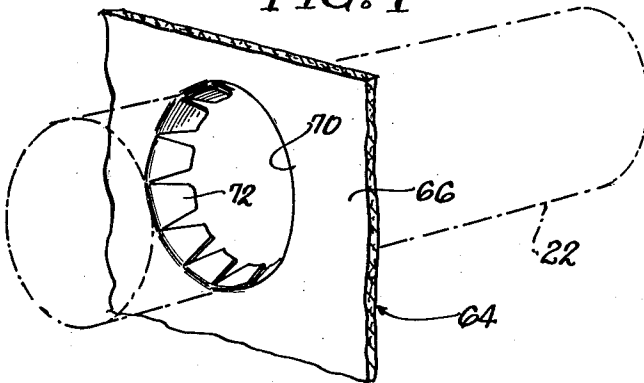


FIG. 7



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SHIPPING AND STORAGE CONTAINER

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Filed Apr. 5, 1963, Ser. No. 271,000

6 Claims. (Cl. 206-65)

The present invention relates to a shipping and storage container.

The container of this invention is particularly adapted for use with elongated articles, and is especially adapted to accommodate fragile articles, such as fluorescent tubes.

In use the container of the present invention is filled with a plurality of the intended elongated articles, such as fluorescent tubes. The consumer, when supplied with the container, may withdraw, from time to time, one or more of the elongated tubes. In the interim, the container may be kept in a convenient storage place until it is desired to use additional tubes, the container being designed to hold a relatively large number of tubes, more than are normally used at one time. The container, once tubes have been withdrawn, also provides convenient storage space for spent tubes until all of the new tubes have been removed.

The procuring and storage of elongated fluorescent tubes presents a considerable problem. If only a few are purchased, as required at any one time, it is quite inconvenient and the unit cost is relatively high. On the other hand, if a large number are purchased for the purposes of providing a supply of spares and of obtaining a lower unit price, the problem of storing the excess tubes is difficult, particularly in the case where, as with fluorescent tubes, they are fragile and easily broken.

A broad object of the invention, therefore, is to provide a container that is capable of containing a relatively large number of elongated articles, that protects those articles in shipment, and that when received by the user is of sufficiently convenient construction to enable it to be stored so that the articles can be withdrawn as needed, singly or in number fewer than the total capacity of the container.

Another and more specific object of the invention is the provision of a novel container of the foregoing general character which supports the articles at a relatively large number of points along the length thereof, thus accommodating extremely long articles.

A further object of the invention is to provide a container of the foregoing character that is of simple construction relative to the effectiveness in supporting articles in the manner mentioned.

A further object is the provision of a container of the foregoing character, including novel means for firmly, although slightly yieldingly, supporting the articles for preventing shifting and vibration thereof in transit.

Still another object of the invention is the provision of a container of the foregoing general character, having a novel construction which includes a plurality of supports for the articles with respectively aligned holes for receiving those articles, and means for spacing the supports apart along the length of the container.

Other objects and advantages of the invention will appear from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of a container embodying the features of the present invention;

FIG. 2 is a cross-sectional view, on an enlarged scale, taken on line 2-2 of FIG. 1;

FIG. 3 is a longitudinal sectional view, on an enlarged scale, taken on line 3-3 of FIG. 1;

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FIG. 4 is an exploded perspective view of the interior components of the container of FIG. 1;

FIG. 5 is a perspective view, partially broken away, of a modified form of container;

FIG. 6 is a longitudinal sectional view, on an enlarged scale, taken at line 6-6 of FIG. 5; and

FIG. 7 is a large-scale perspective detail view of a hole formation in a support for receiving an article to be contained.

Although as stated above, the container of the invention is particularly adaptable to use with fragile articles, and particularly fluorescent tubes, it is to be understood that it is not limited to such articles. Furthermore, while the invention is also particularly adaptable to relatively long articles, it will be understood that it is also adaptable to articles of shapes and proportions other than as herein illustrated.

Referring in detail to the drawings, attention is directed first to FIGS. 1 to 4, showing one form of container embodying the features of the invention. The container includes, as the main components, an outer casing or box 10, a plurality of supports 12 within the box, spaced apart by a plurality of spacers or sleeves 14, and plates 16, and end caps 18.

The outer box or casing 10 is preferably of corrugated cardboard of known character, and conveniently is made of a single sheet thereof, scored along lines for folding thereon into a rectangular shape in cross section. The meeting edges may be secured together in any convenient manner, such as by means of a strip of tape 20.

The box or container 10 in the illustrated form is relatively long, and adapted for containing relatively long tubes, for example, about eight feet in length. Such tubes and particularly tubes of that length, are extremely fragile and must be supported at a plurality of points along their length to insure against breakage. These tubes, indicated at 22 in FIG. 3, are supported in spaced relation by the supports 12, which may be of any desired number and which are spaced apart and parallel to each other along the length of the box. Supports 12 which, as illustrated, may be of expanded polystyrene, both strong and light, are provided with a plurality of aligned holes or apertures 24, dimensioned for receiving the fluorescent tubes 22 in a sliding fit. The capacity of the container may be as desired, such as the 36 tubes illustrated herein (FIG. 2). Supports 12 are of such peripheral dimensions that they fill the transverse area within the box 10 to provide the proper support thereof by the box.

The supports 12 are spaced apart by a plurality of spacers or sleeves 14, one of which is positioned between each two adjacent supports, and one of which is positioned beyond each end support. Sleeves 14 may be made of a continuous piece of corrugated cardboard, as will be observed from FIG. 4. A piece having a width equal to the desired spacing between the supports 12 is scored along predetermined lines, parallel to the longitudinal axis of the box 10, for folding on those lines to form a central segment 26, downwardly extending side segments 28, horizontally and inwardly extending bottom segments 30, which continue into vertical and inwardly positioned segments 32, these latter concluding in outwardly extending top segments 34 secured to the central segment 26 as by staples 36. The transverse dimensions of sleeves 14 are the same as those of supports 12 and therefore they also engage the inner surfaces of the walls of the box 10 to prevent their shifting within the box, and to engage the support 12 around its entire perimeter. The supports 12 and sleeves 14 are assembled in the box 10 in alternate arrangement, as illustrated in FIG. 3, the holes or apertures 24 in the respective supports being then in alignment and adapted to receive the fluorescent tubes 22. It is to be noted that sleeves

14 do not block apertures 24 and in fact provide open areas aligned with apertures 24 to accommodate tubes 22.

The two end caps 18, of identical construction, are preferably made of corrugated cardboard, each including a main transverse element 38 surrounded by a flange 40 to which is connected a return bend flange 42. The two flanges 40 and 42 may be split at the corners, as shown in FIG. 4. The end caps as applied to the box receive and enclose the peripheral end edge of the box between flanges 40 and 42. Caps 18 are suitably secured in place such as by staples, or tape.

In the present instance, one of the end caps, designated 18a, is permanently secured to the box as by staples 44, while the other end cap 18b is applied in such a way as to form a hingedly mounted openable door. In the case of the permanently fixed end cap 18a, the staples 44 may desirably extend through both of the flanges 40 and 42 as well as the marginal end edge portion of the box and on all four sides, while in the case of the openable end cap 18b, staples 46 are used for securing the end cap along only one side of the box, such as the side seen as the top in FIGS. 1 and 2. In that case, if desired, the staples 46 may extend only through the outer flange 42 and the end edge portion of the box, leaving the inner flange 40 free for facilitating opening of the door.

When the container is filled with tubes and ready for shipment, the cap 18b may then be secured and sealed in closed position. That is accomplished, in accordance with this invention, by adhering a tear tape 48 along the outside surface of flange 42 at its edge and along the adjacent surface of box 10. That is best seen in FIGS. 1 and 3. By that means the end cap 18b is retained in closed position during shipment. Tear tape 48 is provided with a rip cord 50 for quick manual opening. When the box 10 containing the fluorescent tubes is received by the user, the latter need merely rip the tape 48 by pulling rip cord 50. Rip cord 50 may completely encircle box 10 or it may be provided only on the two sides and the bottom as seen in FIG. 1. Desirably rip cord 50 is disposed where tape 48 meets the rearwardly disposed end of flange 42 and box 10. Once rip cord 50 has been pulled, the user applying his fingers to the lowermost flange portion 42 lifts the lower edge of the end cap to swing the latter upwardly to the dot-dash line position indicated in FIG. 1. After the desired number of tubes are removed, the end cap 18b may then be again lowered for closing the container, it then being held in closed position by friction.

The end plates 16 are positioned between the outermost sleeves 14 and the respective end caps 18. These end plates 16 are preferably made of expanded polystyrene, similarly to the supports 12, and receive the end prongs 60 customarily provided on the ends of the fluorescent tubes. In inserting the tubes into the container these prongs are simply pushed into the end plates which prevents lateral vibration, and which, because of its yieldability, eliminates the necessity of precise accuracy in the length of the container to effectively prevent endwise shifting of the tubes.

For the purpose of retaining the downwardly extending segments 32 of the sleeves 14 in properly spaced position, locating bosses 62 are provided on opposite sides of each support plate 12. These locating bosses are located to engage the lower edges of the inner vertical segments 32 of sleeves 14, and are effective for maintaining the downwardly depending portions apart and segments 28 in full effective engagement with the inner surfaces of the sidewalls of box 10.

The package, including the container with the fluorescent tubes therein, is thus an effective means for transporting or shipping fluorescent tubes, the tubes being spaced apart, and each being supported at a large number of points along its length. The polystyrene, of which

the supports 12 and end plates 16 are formed, possesses a certain yieldability and softness, while possessing the desired firmness to protect the tubes against undue vibration. When the package is received by the ultimate user, he may place the same in a storehouse, on the floor, under a table or bench, or even support it from the ceiling by convenient hangers. To remove a tube from the package he need merely open the door 18b, to gain access to the tubes, it being understood that sufficient space must be available beyond the open end of the carton or box to permit withdrawal of tubes. Upon removal of a spent tube from a light fixture, it may be conveniently inserted in the container to be stored for later disposal.

Attention is now directed to the modified form of the container shown in FIGS. 5, 6 and 7. In that embodiment, the box or outer casing 10 and end caps 18 are identical with the corresponding parts described above. A different spacing mechanism is provided however. Within the box or container is a member 64 which serves both as the means for directly supporting the tubes and as the means for spacing the tube supporting means parallel and apart along the length of the box. The member 64 is preferably made of corrugated cardboard, and is formed from a single flat piece scored transversely at lines about which it is folded to form the respective elements. This member 64 includes a plurality of support elements 66 interconnected by alternate spacer elements 68, the blank being folded in such manner as to provide all of the support elements 66 in vertical position, with the spacer elements 68 alternately at top and bottom. That may be characterized as being generally serpentine in shape. The elements 66 are provided with a plurality of holes or apertures 70 aligned throughout all of the support elements 66 for receiving the fluorescent tubes 22. Each support element 66 of course extends substantially the full transverse dimensions of the interior of the box while the spacer elements 68 are of appropriate dimension in longitudinal direction according to the desired spacing of the supporting elements 66. The end caps 18, and particularly the transverse elements 38 thereof, are so spaced apart as to effectively engage the ends of the fluorescent tubes for confining the latter against endwise shifting. Preferably however, end plates 16 such as those described above, may be interposed inwardly of the transverse elements 38 (FIG. 6). The prongs 60 of the tubes may be inserted thereinto. The spacer elements 68 may be secured to the wall elements of the box as by gluing or stapling, and beyond the endmost support elements 66, short spacer elements 69 may be provided. They engage the end plates 16 for retaining the latter in proper position.

A feature of the container of FIGS. 5, 6 and 7 is that it permits a special formation of the holes 70. As shown in FIG. 7, holes 70 may be formed as by punching in an operation which leaves a plurality of tabs 72 attached to the marginal edge surrounding the hole and extending at an angle to the plane of the supporting element 66 in which it is formed, being tapered inwardly toward the central axis of the hole. These tabs provide a substantial degree of cushioning effect against transverse movement or vibration of the tubes, while also resisting endwise shifting thereof.

While we have shown and described herein certain preferred embodiments of the invention, it will be understood that changes may be made therein within the scope of the appended claims.

We claim:

1. A package containing elongated articles such as fluorescent tubes and the like for shipping and storing said elongated articles, said package comprising an elongated rectilinear box having end caps at the longitudinal ends of said box, said end caps being secured to said box and enclosing the ends thereof, each of said end caps having a main transverse element extending across an

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end of said box, said transverse elements being spaced apart to prevent lengthwise shifting of said elongated articles when said end caps are in a box-closing position, support means for supporting each of said elongated articles at at least three spaced points along their length, said support means extending across the full transverse dimensions of said box, said support means having aligned holes therein along a plurality of parallel axes for receiving the same number of said elongated articles in said elongated box, separate spacer means extending longitudinally of said box intermediate said support means for positioning said support means along the length of the box against relative movement within said box when said end caps are in a package-closing position, said spacer means defining a plurality of open areas across the transverse dimensions of said box and including segments lying intermediate said elongated articles, at least one of said end caps being hingedly secured to said box and being openable and closable for removal and insertion of elongated articles therethrough without displacement of said support means and said spacer means when elongated articles are inserted and removed from said box, said elongated articles being insertable and removable from said box only through said ends of said box, and elongated articles disposed within the aligned holes of said support means.

2. The package of claim 1 in which one of the end caps is hingedly mounted on one side of the box to form an openable door, said end cap being temporarily secured to the box along the remaining sides by tape having an associated rip cord.

3. A container for elongated articles comprising in combination an elongated box openable and closable only at its longitudinally spaced ends, at least three parallel spaced supports therein, the peripheral dimensions of each of said supports being substantially the same as the transverse dimensions of the interior of said elongated box, said supports each having a plurality of holes, the respective holes of each support being aligned with the holes of the other supports for receiving elongated articles substantially the length of the box therethrough, at least two separate spacers, one between each pair of spaced supports, each of said spacers extending substantially the transverse dimensions of the interior of said box for spacing the supports apart along the length of said box, each of said spacers extending longitudinally of said box and contacting an extended portion of the interior surfaces of said box, each of said spacers including wall elements defining a plurality of open areas aligned with the holes of said supports to accommodate elongated articles to be disposed in said holes, and an end cap secured to each longitudinally spaced end of said box for closing the ends of said box for confining elongated articles to be disposed in said box against longitudinal shifting therein, at least one of said end caps being hingedly secured to said box and being openable for removal from and insertion into said box of elongated articles in the direction of their longitudinal axes without displacement of said supports and said spacers as elongated articles are inserted into and removed from said box.

4. The container of claim 3 including end plates disposed adjacent the inner surfaces of each of the end caps,

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said plates being composed of relatively yieldable material adapted to be penetrated by the prongs of fluorescent tubes, and further having one of said end caps hingedly mounted on one side of said box and temporarily secured along the other sides by a tape having a rip cord associated therewith.

5. A container for elongated articles comprising, in combination, an elongated box, at least three thin, flat, parallel spaced supports therein, the peripheral dimensions of each being the same as the transverse dimensions of the interior of the box, said supports each having a plurality of aligned holes, respective holes of each support being aligned with the holes of the other supports, for receiving elongated articles substantially the length of the box, at least two spacers, one between each pair of supports, extending substantially the transverse dimensions of the interior of the box for spacing the supports apart along the length of the box, said spacers having open areas aligned with the holes to accommodate elongated articles to be disposed in said holes, and end caps secured to the box enclosing the ends thereof for confining articles to be disposed in the box against endwise shifting, at least one of said end caps being openable and closable for removal and insertion of elongated articles without displacement of said supports and said spacers when elongated articles are inserted and removed from said box, each of said spacers being formed from a continuous piece having segments folded about lines extending parallel to the longitudinal axes of the box, each spacer having a segment which contacts an extended transverse portion of each inner surface of the box.

6. The container of claim 5 in which each spacer includes depending transversely spaced segments and in which the supports are provided with locating bosses for engagement by the depending transversely spaced segments adjacent their lower ends for retaining said depending segments in spaced apart relation and for retaining said spacers in contact with the inner surfaces of said box.

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