

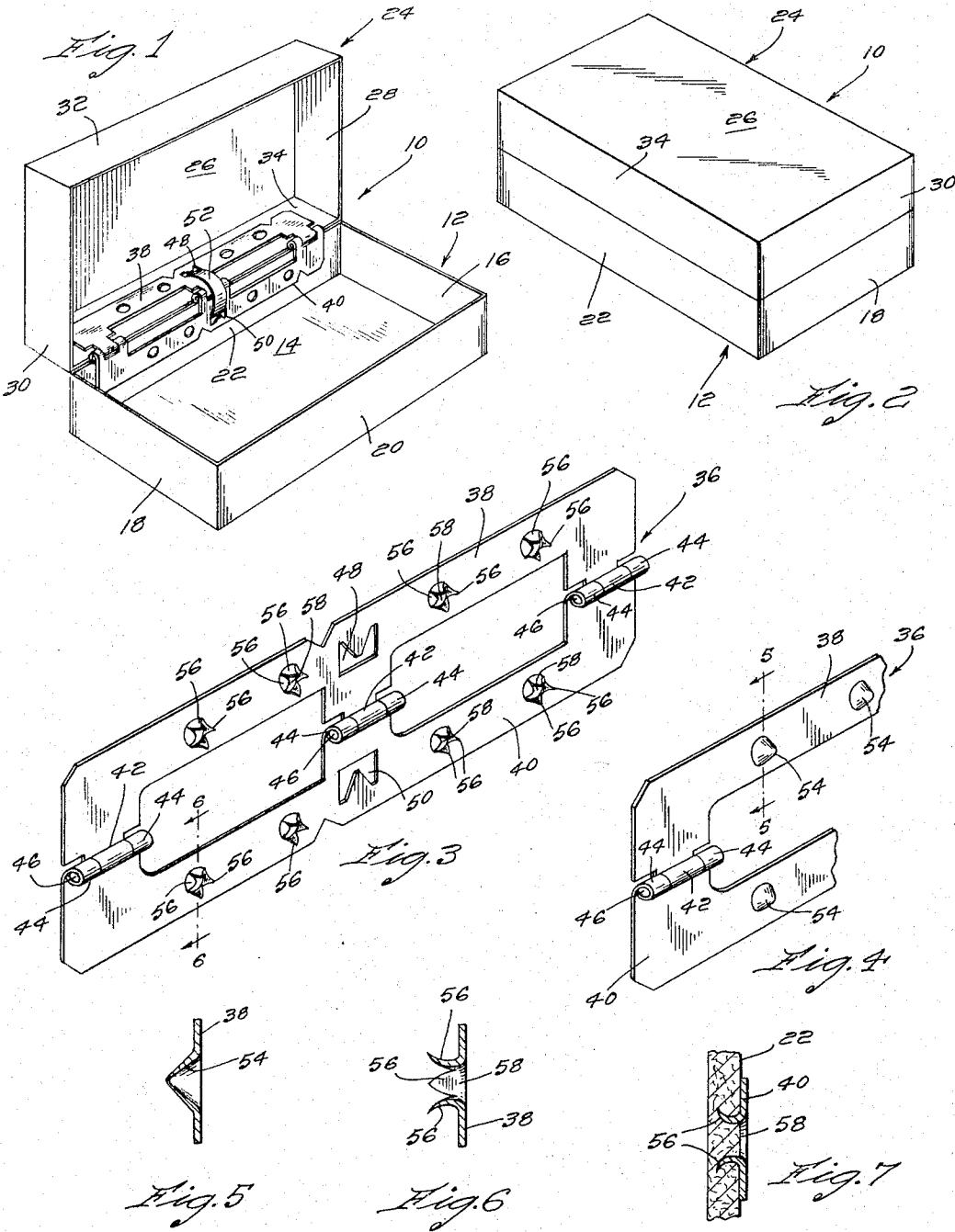
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METHOD OF HINGE CONSTRUCTION FOR A CARDBOARD BOX

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1

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METHOD OF HINGE CONSTRUCTION FOR A CARDBOARD BOX

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The present invention relates to a method of making a hinge construction. More particularly, the present invention relates to a method of making a hinge construction that is adapted to be secured to cardboard box sections, wherein the hinge elements that define the hinge construction are formed with clusters of prongs, each prong being shaped and proportioned for being embedded in the walls of the box sections so as not to penetrate through said walls.

It has been the practice in the construction of lightweight boxes such as those used for the display of ornamental articles of jewelry to fabricate the box sections of a material such as cardboard. The cardboard material not only reduces the weight of the box, but it is, furthermore, economical and, also, lends itself to ease of manufacture. Prior to the instant invention, it had been the practice to interconnect the base and cover sections of such cardboard box constructions by hinge members that were formed with struck projections that extended through the rear walls of the base and cover sections of the box. The struck portions of these heretofore known hinge members thus cooperated with the rear walls of the base and cover sections to secure the hinge members in place, wherein the rear walls of the base and cover sections were interconnected in edge-to-edge abutting relation. Although these prior known constructions have been employed with satisfactory results, the penetration of the projections through the rear walls of the base and cover section has been found to be objectionable since it required either the turning over of the points of the projections or of the covering of the base and cover sections with another sheet of material such as paper, plastic or leather.

The present invention eliminates the requirement of an additional overlay sheet and includes a hinge construction, the hinge elements of which are provided with outwardly extending projections or prongs. The prongs are formed in clusters and are shaped and proportioned such that upon securement of the hinge elements to the side or rear walls of a box base and cover section, they are caused to yieldably bend, thus, the prongs in the present invention become embedded in the cardboard material from which the rear walls of the base and cover sections are fabricated and are thereby prevented from penetrating through the rear walls. In carrying out the concept of the invention embodied herein, the hinge elements that define the hinge construction are first formed with a plurality of conically shaped depressions or dimples. The conically shaped dimples or depressions are punched with an appropriate tool which causes the metal material from which the hinge elements are formed to stretch in a direction towards the apices of the depressions. Thus the metal is drawn toward the apex of each depression and is thinnest at this point. Each of the depressions is then punched through to define an opening about which a cluster of prongs are formed. Since the metal had been stretched during the formation of the depressions of dimples, each prong has a gradually reducing taper toward the point thereof and furthermore has an outwardly curved configuration. When the prongs are inserted into the cardboard material of the side or rear walls of the base and cover sections, the curvature thereof causes the prongs to be turned in a direction away from the rearmost surface of the side or rear walls. The prongs are thus em-

2

bedded and are thereby prevented from penetrating through the walls in which they are inserted. It is seen that turning over of the points of the prongs or providing an additional paper covering for the box sections is no longer required.

Accordingly, it is an object of the present invention to provide a method of making a hinge construction for a box that interconnects the base and cover sections thereof and eliminates the requirement for an additional covering thereover.

Another object of the invention is to provide a method of making a hinge construction for use in a display box, the hinge construction including a plurality of prongs that are embedded within the side or rear walls of the box elements to which the hinge construction is secured.

Still another object is to teach a method of forming and attaching a hinge construction to walls of a box, wherein clusters of prongs formed on the hinge elements are shaped and proportioned for embedding in the walls to which the hinge construction is secured.

Still another object is to teach a method of forming a hinge construction wherein a plurality of depressions are first formed in the hinge elements that define the hinge construction, the depressions then being punched out to form curved tapered prongs that are adapted to be embedded in the walls of the box to which the hinge construction is secured.

Other objects, features and advantages of the invention will become apparent as the description thereof proceeds when considered in connection with the accompanying illustrative drawings.

In the drawings which illustrate the best mode presently contemplated for carrying out the instant invention:

FIG. 1 is a perspective view of a box shown in the open position thereof and illustrating the location of the hinge construction embodied in the present invention;

FIG. 2 is a perspective view of the box shown in FIG. 1 with the box sections in the closed position thereof;

FIG. 3 is a perspective view of the hinge construction embodied in the present invention;

FIG. 4 is a fragmentary perspective view of the hinge construction showing the formation of depressions therein and prior to the punching out of the depression to define clusters of prongs;

FIG. 5 is a sectional view taken along lines 5—5 in FIG. 4;

FIG. 6 is a sectional view taken along lines 6—6 in FIG. 3; and

FIG. 7 is a fragmentary sectional view showing the location of the prongs of a hinge element in the embedded position thereof with respect to a wall on which the hinge element is secured.

Referring now to the drawing and particularly to FIG. 1, a box construction generally indicated at 10 is illustrated therein and is of conventional style and shape. As shown, the box construction 10 includes a base section generally indicated at 12 that is defined by a bottom wall 14, vertical side walls 16 and 18, a vertical front wall 20, and a vertical rear wall 22. Cooperating with the base section 12 to define the box construction is a cover section generally indicated at 24 that is, in turn, defined by a top wall 26, side walls 28 and 30, front wall 32, and a rear wall 34.

Referring now to FIGS. 3 through 7, the hinge construction embodied in the present invention is illustrated and is generally indicated at 36. As shown, the hinge construction 36 is adapted to interconnect the box sections 12 and 24 and is defined by a member that includes a first hinge element 38 and second hinge element 40 that is interconnected to the first hinge element 38. The hinge elements 38 and 40 are interconnected to each other in hinged relation, and for this purpose the hinge

3

element 38 is formed with hinge rolls 42, while the hinge element 40 is formed with hinge rolls 44. Extending through the hinge rolls 42 and 44 are hinge pins 45 that hingedly interconnect the elements 38 and 40 in the conventional manner. As shown in FIG. 3, the hinge elements 38 and 40 are cut out at the center portions thereof. This is done to eliminate unnecessary material in the hinge member, although it is understood that the hinge elements 38, 40 may be formed in a solid construction, as is well known in hinges of the type illustrated herein. It is further understood that if the hinge elements 38 and 40 were formed in the solid construction, the hinge rolls 42 and 44 would extend the length of the hinge elements, and an elongated hinge pin would extend through the hinge rolls for the length thereof.

Formed intermediate the length of the hinge element 38 is an opening 48, while a similar opening 50 is formed intermediate the length of the hinge element 40. A conventional spring member 52 shown in FIG. 1 is secured in the openings 48 and 50 and is formed with inturned lips that engage the edges of the openings 48, 50. It is understood that the spring member 52 will act to retain the cover section 24 in the open or closed position thereof as is well known in hinge constructions of the general type illustrated herein.

As shown in FIG. 1, the hinge elements 38 and 40 are adapted to be secured to the rear walls 34 and 22, respectively, of the cover and base sections. For this purpose, and in the construction of the hinge elements 38 and 40, a plurality of prongs are formed thereon that are adapted to be inserted into the cardboard material from which the rear walls 22 and 34 are fabricated. Since an object of the invention is to prevent the points of the prongs that are formed on the hinge elements 38 and 40 from penetrating through the rear walls 22 and 34, a unique manufacturing technique is employed in the construction of the hinge elements. Referring now to FIGS. 4 and 5, a plurality of dimples or depressions are shown formed in the hinge elements 38 and 40. The depressions which are indicated at 54 are conical in configuration and are formed by a tool that upsets or stretches the metal material from which the hinge elements 38 and 40 are fabricated. Thus, as shown in FIG. 5, the depression 54 that is illustrated therein has a wall thickness that decreases toward the apex of the depression. With the metal defining each depression 54 stretched toward the apex thereof, as seen in FIG. 5, a tool is then inserted within each depression 54 and struck to punch therethrough to define a rosette or cluster of prongs, each prong being indicated at 56 in FIGS. 3 and 6. As shown particularly in FIG. 6, each cluster of prongs 56 defines an opening 58 in the hinge elements 38 and 40, and each prong as punched out is formed with a decreasing taper toward the point thereof. It is further seen that the punching operation produces a curvature in each of the prongs 56 as shown in cross section in FIG. 6.

Since the prongs 56 that define the rosette or cluster of prongs around each of the openings 58 are formed in the configuration as illustrated in FIG. 6, they will yield when pressure is applied thereto upon the insertion thereof into contact with the rear walls 22 and 34. Thus, when the hinge elements 38 and 40 are placed in contact with the inner surfaces of the rear walls 22 and 34 and the prongs 56 are pressed into the material from which the rear walls 22 and 34 are fabricated, the points of the prongs 56 will yield and will tend to bend in a direction away from the rear surface of each rear wall. As shown in FIG. 7, this direction of bending of the points of the prongs 56 is generally perpendicular to the axes of the openings 58 around which the prongs are formed. The prongs 56 are thus embedded within the walls 22 and 34 and are prevented from penetrating therethrough.

Although the invention as illustrated and described herein shows the formation of the prongs 56 in the conventional type of hinge construction that is secured to

4

the rear walls of the box sections, it is contemplated that the invention will be employed in other forms of hinge constructions. For example, the concept of the invention may be utilized in a corner hinge construction of that type shown and described in the patent to Roy, No. 3,100,073 issued Aug. 6, 1963, wherein the prongs struck from right angle flanges of the hinge plates are inserted into the side walls of the top and bottom sections of a box.

It is seen that the present invention defines a unique departure over the box constructions known heretofore wherein projections on the hinge elements are inserted into cardboard walls of the box construction. By providing the tapered and curved prongs in each of the hinge elements of the present invention, it is possible to prevent the points of the prongs from penetrating through the walls of the box sections to which the hinge elements are secured. Turning over of the prong points exteriorly of the box walls is thus avoided, and the requirement for supplying an additional paper cover is also avoided. The configuration of the prongs 56 as illustrated and described is obtained by the unique step of first forming depressions in the hinge elements so as to stretch the metal defining the depressions. With the metal stretched in the manner as illustrated in FIG. 5 of the drawing, punching out of the depressions will result in the formation of the curved and tapered prongs 56. Since the prongs 56 are curved and tapered in the manner as shown, it follows that they will yield to pressure when inserted into the walls of the box sections and the points thereof will be turned in a direction that is generally perpendicular to the axes of the openings around which the prongs are located. The prongs are thus embedded in the walls of the box sections as shown in FIG. 7, and, accordingly, are prevented from penetrating through the walls.

Since the metal of the hinge plates is actually stretched during the formation of the depressions 54 therein, it is seen that the thickness of the prongs 56 may be varied by controlling the depth of the depression when the metal is initially upset. It is seen that the greater the depression, the more the metal is stretched and the thinner the individual prongs are formed after the punching operation. The thinner the prongs are formed, the greater the control thereafter during penetration thereof into the walls of the box section. Thus in a very thin box wall, the prongs will be formed relatively thin so as to provide for easier bending and to prevent penetration of the prong points through the thin wall. Conversely, if a thick box wall is employed, the depressions 54 may be relatively shallow, which would result in shorter prongs. The shorter prongs of greater thickness would thus penetrate further into the thicker box wall.

While there is shown and described herein certain specific structure embodying the invention, it will be manifest to those skilled in the art that various modifications and rearrangements of the parts may be made without departing from the spirit and scope of the underlying inventive concept and that the same is not limited to the particular forms herein shown and described except insofar as indicated by the scope of the appended claims.

What is claimed is:

1. In a method of securing a hinge member to adjacent walls of the base and cover sections of a box construction, comprising the steps of forming a plurality of conically shaped depressions in metallic hinge elements of said hinge member by using a first tool element such that the metal from which the hinge elements are formed is effectively stretched toward the apex of each depression but is not penetrated therethrough, punching an opening in each conical depression with a second tool element to form a cluster of prongs around each opening, wherein each of said prongs is formed in a generally outwardly curved configuration and with an outwardly reducing cross sectional dimension, and pressing said clusters of prongs into said walls to secure said hinge elements

5

thereto, said pressing step causing the points of said curved prongs to bend in a direction that is generally perpendicular to the axes of said openings, wherein the points of said prongs are prevented from penetrating through the outer surface of said walls into which the prongs are inserted.

2. In a method of forming a metallic hinge member that is adapted to be secured to the walls of a cardboard box construction, including the steps of forming clusters of prongs on said hinge member by indenting said hinge member with a plurality of conically shaped depressions therein by using a first tool element, such that the metal from which the hinge member is fabricated is effectively stretched at each depression but is not penetrated, wherein the cross sectional dimension thereof is gradually decreased in a direction toward the apex of each depression, and penetrating each depression at the apex thereof with a second tool element to form a plurality of openings, each of which is bordered by a plurality of curved, tapered prongs that define the clusters of prongs.

3. In a method of forming a metallic hinge member that is adapted to be secured to the walls of a cardboard box construction, including the steps of forming a plurality of conically shaped depressions in the body of said metallic hinge member by using a first tool element such

6

that the metal from which the hinge member is constructed is effectively stretched at each depression but is not penetrated, wherein the cross-sectional dimension of the metal at each depression is gradually decreased in a direction toward the apex thereof, and penetrating each depression at the apex thereof with a second tool element to form a plurality of openings, each of which is bordered by a plurality of curved, tapered prongs.

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