BOX FLAP HOLDER WITH ENHANCED DESIGN FEATURES

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ABSTRACT
A box flap holder design is disclosed that is useful for a large variety of boxes, is stackable, can be made at a low cost, and also provides surfaces that allow advertisement.
BOX FLAP HOLDER WITH ENHANCED DESIGN FEATURES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 60/746,916 filed on May 10, 2006.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not applicable.

REFERENCE TO A SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING

[0003] Not applicable.

COMPACT DISC APPENDIX

[0004] Not applicable.

BACKGROUND OF THE INVENTION

[0005] 1. Field of the Invention

[0006] The present invention is directed toward low cost convenience items that improve productivity. In particular, it is directed toward improvements in packaging and boxing by use of a specially designed box flap holder that is designed to hold cardboard box flaps against the side walls of a box.

[0007] 2. Discussion of Related Art

[0008] Other inventions have considered similar problems in providing a convenience feature but they have not been widely adapted, presumably because of difficulties and limitations in actual use.

[0009] U.S. Pat. No. 2,894,308 considers a similar problem where cardboard flaps are retained against the sidewall of a box. However, the invention does not consider the important need of immediate convenience in a production environment. Cardboard boxes are often stiff when new, and the design is a corner clamp to retain two flaps. The operator has to take the time to accurately fit the clamp to two corners of the box, which is frustrating for an operator to do quickly on a new box with stiff box flaps. The clamps are not designed to be stacked, which hinders their use in a production environment as a large space is needed to store numerous clamps. The design is difficult to implement in automated equipment. The clamps are relatively expensive because they are a complicated design. A number of bends are required to be made in their manufacture, which increases their cost.

[0010] U.S. Pat. No. 2,867,019 considers a similar problem where cardboard flaps are retained against the sidewall of a box. However, two clamps are designed to hold all four flaps. Each clamp holds three flaps resulting in an awkward, larger than needed size. Similarly, the clamps have a number of bends and are relatively expensive to manufacture. The clamps are not designed to be stacked, which hinders their use in a production environment as a large space is needed to store numerous clamps. The clamps are not designed to be implemented in automated equipment.

[0011] Both U.S. Pat. Nos. 5,290,126 and 4,761,936 consider a similar problem of holding box flaps in their downward, closed position. In U.S. Pat. No. 4,761,936, the holder is designed around a spring loaded clip which puts unnecessary pressure on the box flaps and damages the box. The design does not lend itself to simple manufacturing methods, nor is it stackable. Both articles have similar problems with clamp stacking, cost of manufacture, and use in automated equipment.

[0012] U.S. Pat. Nos. 6,578,759 and 4,528,800 considers a similar problem of holding box flaps in their open position. However, the corner method of holding box flaps open is difficult to implement and the narrow members are likely to scrape or damage the box. The clips in both patents do not lend themselves to automated and affordable manufacturing, are not readily stackable, and require careful insertion by the operator to prevent box damage.

[0013] None of the above patents provide a design that allows the box flap holder to be used for advertising. Box flap holders in a business environment can be used for business promotion, and it is vital that any printed surface is not exposed to significant damage. Companies that make boxes can increase sales by providing an inexpensive, convenient flap holder with their name on it. Moving companies, for example, that sell boxes to commercial or private individuals would improve their competitive position by including advertisements on box flaps holders with boxes they sell.

[0014] 3. Objects and Advantages

[0015] It is therefore the object of the present invention to overcome the deficiencies just discussed. A simple design is needed that has been adequately engineered to work with a large variety of boxes, is stackable, can be made at a low cost, and also provides surfaces that are printable for advertisement.

BRIEF SUMMARY OF THE INVENTION

[0016] Accordingly, it is the object of the present invention to simplify the clamping arrangement of box flaps in their open position, considering improvements in stacking, manufacture, advertising, and use.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0017] FIG. 1 shows an isometric view of a preferred box flap holder of the present invention.

[0018] FIGS. 2A and 2B show important details on how the box flap holder of the present invention is made.

[0019] FIG. 3 shows an alternate bending method for the box flap holder of the present invention.

[0020] FIG. 4 shows a method of how a number of box flap holders can be stacked in storage.

[0021] FIG. 5 shows an additional preferred embodiment of the present invention which can be adapted for use with a plastic material.

DETAILED DESCRIPTION OF THE INVENTION

[0022] The box flap holder is a tool to hold cardboard or corrugated box flaps open. When box flaps are held open, the box is much easier to pack and unpack. The holder provides a method to allow open boxes to be placed next to each other, and prevents the box flaps from getting in the way of the person packing or unpacking the box. Persons who are frequently dealing with box flaps, find that they struggle with the keeping box flaps in position and are likely to damage them when packing or unpacking.
The present invention is a convenient method of holding a box flap in the open position, by placing the box flap holder directly over the fold of the box flap, and sliding it downward. The motion of putting the box flap holder in place is designed to be extraordinarily convenient for the operator. The box flap holder is designed to be strong enough to stay in position, prevent box damage, and allow the operator to conveniently remove it. The box flap holder is also designed to provide other convenience features which include stack ability, to allow use in an automated machine, convenient and efficient manufacture, and to provide a large surface for advertising.

FIG. 1 shows a general arrangement of a box flap holder, as conceived in the present invention. A folded metal sheet 11 or plate is bent in a prescribed fashion in a stamping facility with a uniform radial bending radius 10 that allows the resulting opening to be wide enough for a box flap and box sidewall. Two holes, centered on the radius of curvature and symmetric to the width, provide the ability to stack multiple box flaps efficiently. The holes also are useful for locating the ellipse in the forming operation, such as press break bending, and also for a convenient placement of a hanging hook which is used in an external coating operation.

The design of FIG. 1 was the result of a number of experiments. Aluminum, plastic, and steel were tested. The box flap holder must be strong enough to hold the box flap open without a change in dimensions. In particular, the box flap holder opening must remain stable upon multiple uses. The box flap holder must have enough friction so the natural tendency of the box flap to force the box flap holder off of the box will be prevented.

In laboratory experiments, steel provides very satisfactory results and is a preferred embodiment. The steel may be metallic coated for corrosion protection such as galvanized, or it may be uncoated steel. Overall, steel provides the best choice for manufacturing costs, ease of manufacture, and stack ability.

Aluminum was tried with less satisfactory, but still acceptable, results. For similar strength properties, it is necessary to use a heavier gauge aluminum which raises the cost of manufacture. The opening force on the box flap holder is significant, and the box flap holder opening dimension is likely to change over time without sufficient strength to resist that force.

A plastic material was tried, according to the design shown in FIG. 1. In particular, lexan was used as a material, but was difficult to work with. The result was not as satisfactory due to the lower friction and lower strength to resist the opening force.

The box flap holder as shown in FIG. 1 is also very compact and stackable. It is a size that allows a number of stacked box flap holders to be stored in a pocket, tool belt, or a convenient stand. This allows the box flap holder to be immediately available for use.

FIGS. 2A-2C show how the overall design of the preferred embodiment is made. In FIG. 2A, a substantially elliptical shape 21 of uniform thickness has a minor axis 22 and a major axis 23. Two through holes 26 are centered on the minor axis 22 and are placed symmetrically about the major axis 23. The through holes are preferably 3/4" in diameter. Three forming areas 27, 28, and 29 are defined as shown in FIG. 2B. The areas 27 and 29 are substantially equal in size and symmetric with respect to the minor axis of the ellipse. FIG. 2C shows an end view of the box flap after it is formed by bending the ellipse about the radius of curvature 24 where the area 28 is uniformly curved, and areas 27 and 29 remain substantially flat. The most preferable dimensions for the oval 21 are approximately 5" wide and 6" long. The width is the distance along the minor axis. Satisfactory length to width ratios are 1.1 to 1.75. A thickness of 20 gauge was found to provide sufficient rigidity with multiple uses when the box flap holder was made out of steel. Suitable metal gauges are 16 to 24 gauge. Based on testing, suitable widths were 4 to 6.5". The opening angle 25 between areas 27 and 29 is preferably 0 to 15 degrees and the bending radius 24 is most preferably 1/4". A bending radius range of 1/8" to 1/4" is suitable to accommodate different box thicknesses.

Experiments uncovered the surprising result that the elliptic shape had the best ability to restrain the box flaps with the best overall economy. Several other design shapes were tried, including a circle, a star shape, and a large X. These alternate designs were rejected as there was insufficient material to maintain the box flap holder opening with sufficient rigidity in an economical and practical design. Surprisingly, the longer portions of the oval shape also lowered the friction requirement of the box flap holder. The flaps of waxed boxes could be held successfully.

The design of the present invention considers the critical parameters of the box flap holder which are the bending radius, length of the oval, and the opening angle. If the angle is too large, i.e., over 25 degrees, the box flap is likely to have sufficient force to lift the box flap holder off of the box.

The overall design also considers stack ability. The 15 degree angle shown in FIG. 2 provides a good optimum of stack ability, ability to work on different box thicknesses, and ability to properly restrain the box flap.

The box flap holder is preferably coated with a powder coating or paint. A thickness of 4 to 5 mils was found to be preferred, although alternate thicknesses could also be used. The powder coating of 4-5 mils was found sufficient to cover any edge burrs and provide a satisfactory surface for advertisements or other printing. It is important to ensure there are no edge burrs when metal is used as this would cause box damage.

FIG. 3 shows an alternate design where the leading edges of the box flap holder 31 are bent further apart from the internal angle 32 opening to an additional outer angle 33. This additional angle is preferred in some situations where ease of insertion into a box flap is important.

FIG. 4 shows how the two through holes are used to create a highly efficient stacking capability of the present invention by use of guide rods. Also, the box flap holder may be stacked without using the rods as illustrated. The stacking capability lowers shipping costs by reducing the volume, and is also convenient for the end user.

FIG. 5 shows another embodiment of the present invention useful when a non-metallic material is used. In this case, the structural strength of the box flap holder must be designed to incorporate stiffening ribbing so that the box flap holder does not break when inserted on top of the box flap and is able to satisfactorily withstand the forces involved. The design shown is 80 mm tall, 127 mm wide (dimension 53), with an inside radius of curvature of 6 mm, is a nominal 2.5 mm thick, and the ribbing 54, 55 is an additional 2 mm in thickness. The width may range from 100 to 150 mm with satisfactory results. The inside radius may also be from 3 to
9 mm depending upon the box thickness. The overall minimum thickness may be 1.5 to 5 mm and provide satisfactory results, however, 2.5 mm is a preferred embodiment. The opening angle 51 is about 5 degrees and demonstrated very satisfactory results when holding a variety of box flaps. The ellipse half length 52 as shown is approximately 83 mm. The ribbing defines various cavities, of which a radial cavity 56 is typical and has a nominal thickness of 2.5 mm. The ribbing may be tapered as it extends to the end of the ellipse, so as to provide good economy as well as suitable stiffness. Ribbing thicknesses of 1 to 3 mm when measured at the thickest location provide good stiffening. A logo 57 may be imprinted onto the surface as part of the injection molding process. Similarly, other printing could be applied including adhesive films or paper with decorative printing or advertisements.

[0038] The ribbing shown in FIG. 5 is useful to lower part cost and maintain suitable rigidity. The ribbing shown is selectively positioned to optimize stiffness, lower overall weight, and prevent breakage. The box flap holder of FIG. 5 is preferably made from an injection molded ABS. Other plastics with similar mechanical properties could also be used with similar tensile strength, modulus of elasticity, and impact strength. Such materials include polycarbonate, nylon, PVC, polyester, and acrylic.

[0039] While various embodiments of the present invention have been described, the invention may be modified and adapted to various similar box flap holding arrangements to those skilled in the art. Therefore, the present invention is not limited to the description and figure shown herein, and includes all such embodiments, changes, and modifications that are encompassed by the scope of the claims.

1. A box flap holder useful for the purpose of temporarily restraining box flaps against the sides of a box comprising:
   a) a metallic sheet of uniform thickness substantially in the shape of an ellipse,
   b) wherein said metallic sheet incorporates a uniform radial bend parallel to the minor axis of said ellipse and said uniform radial bend is substantially centered on said ellipse,
   c) wherein said ellipse incorporates two through holes of substantially 1/8" diameter symmetrically placed relative to the major axis of said ellipse, said two through holes are centered on said uniform radial bend, and said two through holes are useful for stacking and manufacturing purposes,
   d) wherein said ellipse has a major axis length to a minor axis length ratio between 1.1 and 1.75:1 inclusive,
   e) wherein said minor axis length is 4 to 6 1/4 inches inclusive,
   f) wherein the inside radius of said uniform radial bend is between 3/8" and 3/4" inclusive,
   g) wherein the arc of said uniform radial bend results in an opening angle between 0 and 15 degrees inclusive,
   h) wherein said uniform thickness is between 16 and 24 gauge inclusive, and
   i) wherein the external surfaces of said ellipse are covered with an external coating, whereby said box flap holder rigidly holds said box flaps against the sides of said box and may be installed with one hand.

2. The box flap holder according to claim 1 wherein said metallic sheet is primarily steel, and said external coating is optionally a metallic coating that prevents corrosion.

3. The box flap holder according to claim 1 wherein said metallic sheet is primarily aluminum.

4. The box flap holder according to claim 1 wherein any major surface of said metallic sheet incorporates printing or a decorative coating.

5. The box flap holder according to claim 1 wherein said external coating is paint or a polymer based coating.

6. A box flap holder useful for the purpose of temporarily restraining box flaps against the sides of a box comprising:
   a) a plastic sheet of a nominal thickness substantially in the shape of an ellipse,
   b) wherein said plastic sheet incorporates a uniform radial bend parallel to the minor axis of said ellipse and said uniform radial bend is substantially centered on said ellipse,
   c) wherein said ellipse has a major axis length to a minor axis length ratio between 1.1 and 1.75:1 inclusive,
   d) wherein said minor axis length is between 100 and 150 mm inclusive,
   e) wherein the inside radius of said uniform radial bend is between 3 and 9 mm inclusive,
   f) wherein the arc of said uniform radial bend results in an opening angle between 0 and 15 degrees inclusive,
   g) wherein said nominal thickness is between 1.5 and 5 mm inclusive,
   h) wherein said ellipse incorporates stiffening ribbing substantially parallel to the major axis of said ellipse, and said stiffening ribbing is made out of said plastic and incorporated onto the surface of said ellipse, and
   i) wherein said stiffening ribbing is substantially between 1 and 3 mm thick when measured at the thickest location, whereby said box flap holder rigidly holds said box flaps against the sides of said box and may be installed with one hand.

7. The box flap holder according to claim 6 wherein said plastic sheet is ABS.

8. The box flap holder according to claim 6 wherein any major surface of said plastic sheet incorporates printing, a decorative imprint, an externally adhering film, or an externally adhering paper.

9. The box flap holder according to claim 6 wherein said ellipse incorporates two through holes of substantially 1/8" diameter symmetrically placed relative to the major axis of said ellipse, said two through holes are centered on said uniform radial bend, and said two through holes are useful for stacking purposes.