

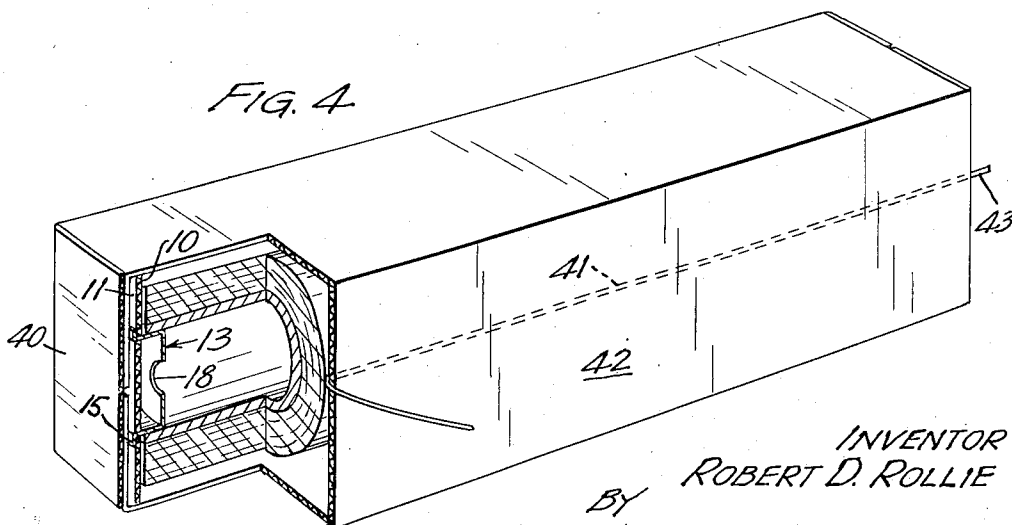
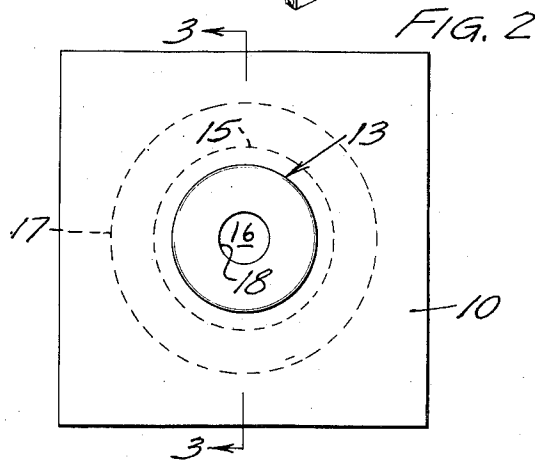
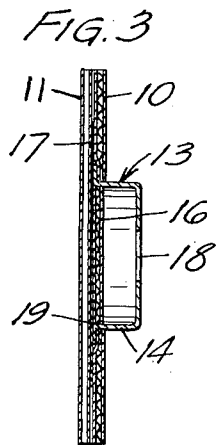
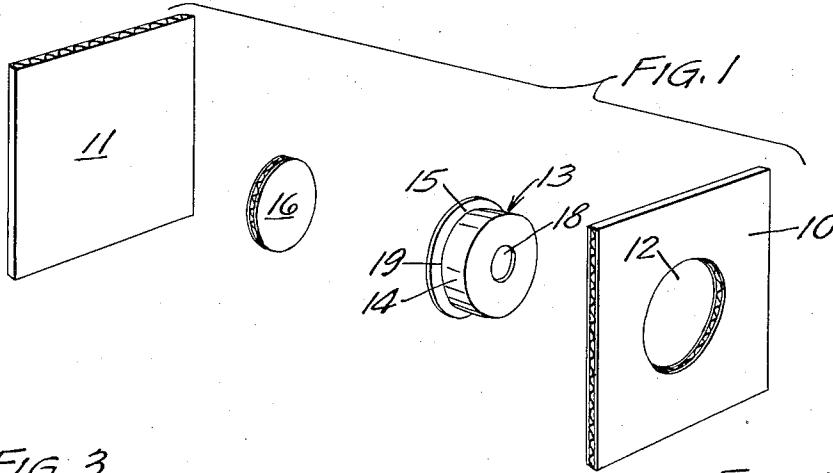
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2,853,185

DAMAGE-RESISTANT PACKAGES

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## DAMAGE-RESISTANT PACKAGES

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This invention relates to a roll-suspension type package adapted for use also as a dispenser, and more particularly, relates to a new and improved roll-suspension packaging pad for use in suspending and supporting rolls of material in sturdy damage-resistant fashion within the confines of a shipping package, container, or carton.

One of the chief difficulties in providing a dispenser-type shipping carton for rolls of material (such as a roll of makeready sheet material adapted for use in letterpress printing) resides in the problem of providing adequate protection for the roll against handling damage during shipment without interfering with the easy and ready removal of the material by unwinding it from the roll thereof in the carton at the point of use. During handling of a carton in shipment, it is apt to be dropped and packaging precautions are necessary to minimize possible damage such as bending or squashing of the roll under such treatment. At the point of use, an operator should be able to easily and readily gain access to the contents of the carton, and remove any amount of rolled material that may be needed without disturbing the remainder.

This invention provides a solution to the aforementioned problem. According to this invention rolls of material may be economically and simply packaged in cartons, such as those of cardboard, in sturdy fashion against damage, without interfering with the convenient and easy dispensing or unwinding of material from the roll thereof in the carton at its point of use.

This invention further provides a new type of roll-suspension packaging pad adapted for use in suspending and supporting the ends of rolls of material within cartons. Even though my roll-suspension pad may be formed from materials known to be relatively weak structurally, the pad is surprisingly resistant to damage by shear forces acting upon it during handling of the carton. Contrary to the usual case where the lower portion of the foundation of a horizontal support element is subjected to most of the shear force acting upon the horizontal support element, the pad hereof is of such structure as to distribute shear forces acting upon its horizontal support element in an essentially uniform manner about the area of its foundation, thereby minimizing any tendency for it to be damaged.

My invention will now be further described with particular reference to the illustrative drawing made a part hereof, wherein:

Figure 1 is an exploded view in perspective of the elements of my roll-suspension packaging pad in position for assembling;

Figure 2 is a front elevation of said pad facing the projecting horizontal support element;

Figure 3 is a cross sectional view through line 3—3 of Figure 2; and

Figure 4 is a cut-out perspective view of a combination carton and dispenser showing a roll of sheet material supported therein by my roll-suspension packaging pads.

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As illustrated in Figures 1, 2 and 3, my suspension packaging pad comprises two pieces of relatively stiff but resiliently yielding flat sheet material 10 and 11, one of which is provided with a center hole 12; and additionally includes a hub member 13 having a cup-like portion 14 and a flange 15, a disc member 16, and a layer of flexible adhesive 17.

The two pieces of flat sheet material 10 and 11 are suitably formed from paperboard (for example, corrugated cardboard), or other sheet material having similar properties of stiffness and resilient strength with some yieldability. The general shape and dimensions of the flat area of these two sheet materials should be essentially the same as the shape and dimensions of the interior end of a carton in which the roll-suspension packaging pad is to be used.

As illustrated in the drawing, sheet member 10 is provided with a hole 12, which should be of no greater size than necessary to allow the cup-like portion 14 of hub member 13 to slip therethrough and fit snugly therein, with flange 15 juxtaposed in essentially flush position with the surface of sheet member 10 on the side of that sheet member from which hub member 13 was inserted. Hole 12 is of insufficient size to permit flange 15 of hub member 13 to pass therethrough. In preferred practice, hole 12 is circular and is cut using a die. The portion die-cut from member 10 to form the hole may be used as disc member 16 in the formation of the pad. If desired, disc member 16 can be reinforced by bonding together two or more layers of sheet material such as corrugated cardboard.

Hub member 13 is preferably formed by stamping it out of thin sheet metal. It has a cup-like configuration, as illustrated at 14 in the drawing, being hollow and having an end-hole 18 in its "bottom" and a recess opening defined by lip edge 19 (see Figures 1 and 3) at the "top" of the "cup." As aforementioned, the cup-like portion 14 of hub member 13 is of a size adapted to snugly fit within hole 12; and should further be of a size to fit reasonably snugly within the end recess of the particular roll of sheet material to be packaged. At the lip edge 19 of the cup-like portion 14 is a narrow flange member 15. This flange member is preferably integral with the cup-like portion 14, and extends outwardly from lip edge 19 and lies in a plane perpendicular to the axis of hub member 13, i. e., approximately in the plane of the circle defined by lip edge 19.

In assembling these parts together, the cup-like portion 14 of hub 13 is inserted through hole 12 of member 10 until flange member 15 is fitted next to member 10 so as to lie juxtaposed with the surface thereof, i. e., so as to lie flush against member 10. Next disc member 16 is inserted into the internal recess of hub member 13, i. e., within the area defined by the lip edges 19 of hub 13, where it fits snugly. Disc member 16 is fitted in this recess so that it lies in approximately the same plane as the plane of sheet member 10, and presents an essentially flush surface on the side of member 10 opposite the side of that member from which the cup-like portion 14 of hub 13 projects. A layer of flexible adhesive 17, preferably a rubber-based adhesive, is then spread or coated over the exposed surface of disc 16, flange 15, and at least some of the immediately adjacent area of sheet member 10, as illustrated in Figures 2 and 3. Sheet member 11 is then placed over the layer of adhesive and pressed into position. Where sheet members 10 and 11 are of corrugated cardboard, improved strength may be gained by cementing sheet members 10 and 11 together with the corrugations in one sheet member perpendicular to the corrugations in the other, as illustrated. A push-rod may be inserted through hole 18 to press disc 16 against panel 11 during assembly by the method noted.

A strong but non-brittle resilient adhesive bond is formed between sheet member 11 and the remainder of the elements of the packaging pad, i. e., disc member 16, flange 15, and adjacent area of sheet member 10 (see Figure 3). The resulting structure formed as above described is strong and sturdy but yields resiliently under such stresses as encountered when a package or carton containing the pad is jarred, tumbled, or even dropped in handling.

Suitable rubber-based flexible and resilient adhesives to employ for the aforementioned bonding are those well known in the art as rubber-resin type pressure-sensitive adhesives, of which the adhesive described in Drew Patent No. 2,177,627 is illustrative; and the disclosure of this Drew patent is here incorporated by reference. Rubber-based adhesives other than the pressure-sensitive type may, however, be employed with satisfactory results, an illustrative example being the adhesive of Thompson Patent No. 2,610,910, the disclosure of which is also here incorporated by reference. Brittle adhesive cements such as silicates are to be avoided in the aforementioned application where the resulting roll-suspension pad is to be used in the packaging of the heavier rolls of sheet materials, but may be suitable where my packaging pad is employed in the packaging of light weight rolls of sheet materials such as ribbons of light weight fabric and the like. Of course, in the packaging of light weight rolls of material, shear forces which act on the packaging pad during handling and jarring are relatively small and the problem with respect to shear force damage as here noted is largely not present.

Referring now to Figure 4, a composite durable shipping container and dispenser package containing my roll-suspension or supporting pads is formed by first inserting the cup-like portion 14 of hub member 13 of pads of the aforescribed type into each end of the hollow tubular core of a roll of sheet material. A shipping carton may then be formed about the roll of material having the packaging pads supporting each end, or a roll of material with packaging pads inserted into each end recess thereof may be slipped into a preformed shipping carton. It is important to use packaging pads having hub members of a size which snugly fit into the end recesses of the particular roll of material one desires to package. Extremely loose fittings tend to permit motion, which in turn tends to increase the shear forces acting on the roll-suspension pad through the hub element thereof during handling. However, in cases where it is desired to be able to unroll a roll of packaged material while it is supported by the hub members, the fit of the hub member into each end of the core of rolled material should not be so snug as to prevent rotation of the roll of material on the bearing support surface of cup-like projection 14 of the hub member 13.

As illustrated in Figure 4, sheet members 10 and 11 are both preferably of the same shape and have essentially the same dimensions for their flat area as the interior of each end panel 40 of the carton. A tear strip 41, which suitably may be a strip of tough material such as filament reinforced pressure-sensitive adhesive tear strip tape, may be secured on its adhesive side to the inside of longitudinal side panel 42 of the carton, as illustrated. The end of the tear strip may be provided with a grip tab 43 for easy and ready access into the interior of the carton by gripping this tab and pulling upon it to tear side panel 42 along the boundary lines of the tear strip 41. Once the tear strip is pulled and the carton side torn, either or both of the remaining longitudinal portions of side panel 42 may be torn by hand to provide a larger egress opening through which to remove material from the roll in the carton.

When this carton is dropped on its bottom or on any side panel, the greatest shear force tending to displace hub member 13 from its position in the center of panel 10 is exerted. Surprisingly, however, this package can withstand considerable forces exerting a shearing tend-

ency without becoming damaged. For example, a roll of sheet material weighing about 70 pounds was stably suspended at its ends within a carton using suspension pads fabricated of materials as aforescribed. Specifically, pads having corrugated cardboard panels of about  $7\frac{3}{4}$  inches by  $7\frac{3}{4}$  inches and stamped hub members of about 3 inches diameter and about  $\frac{3}{4}$  inch projection from the surface of panel 10 were employed. A rubber-based adhesive of the type described in the aforesaid Thompson patent is suitable. Such a resulting package, when subjected to ordinary rough handling in shipment, including tumbling and the like, remained essentially undamaged with its suspension pads still in position and the hub thereof structurally sound and not displaced.

Although not illustrated in the drawing, a small hole in the center of disc member 16 coinciding with another equally small hole in the center of member 11 may provide certain advantages in the fabrication and use of my packaging pad. In the fabrication of my pad, such a small hole in the center of members 11 and 16 may be used to facilitate accurate orientation of member 11 when it is placed over the assembly of other elements of the pad and bonded thereto. In using my packaging pad, such a small hole permits a small rod to be slipped there-through and through the core of a roll of sheet material so that an assembly comprised of a roll of sheet material and my packaging pads inserted in each end thereof can be handled as a unit while supported on the rod.

While I do not wish to be bound by theory, I believe that the insertion of disc member 16 within the recess of lip edges 19 of hub 13, and the combination of this feature with the flexible rubber-based adhesive bond between various elements of my pad, act in large measure to provide for the improved resistance to shear damage exhibited by my packaging pad. Experiments with structures consisting solely of panel 10, hub 13, and panel 11 have shown that hole member 12 of panel 10 is enlarged excessively when a package containing such a pad is subjected to rough handling. It appears that the shear forces during handling and dropping of such a package are concentrated on the lower portion of hole 12, and tend to cause this hole to be enlarged in that area. With such a package, once hole 12 is thus enlarged, hub member 13 tends to sag and even to fall out of position. On the other hand, with the structure for the packaging pad herein illustrated and described, substantial stability is imparted against shear force damage. Presumably the shear forces acting upon the pad through the supporting hub member 13 are essentially uniformly distributed about the circumference of the foundation of the hub member. Whatever the explanation, the composite roll-suspension packaging pad herein described shows surprisingly high resistance to shear force damage.

The foregoing is intended as illustrative and not limitative of the invention described herein, as further set forth in the appended claims.

That which is claimed is:

1. A roll-suspension packaging pad adapted to distribute shear forces acting upon the same in an essentially uniform manner about the foundation of the roll-suspending hub member thereof, and comprising (1) a hub member having a cup-like configuration and a lip flange extending outwardly a short distance from the lip edge of said cup-like portion, said hub member being adapted for snug insertion into the end recess of a roll of material, (2) a first flat sheet of material having a hole in which said hub member is snugly fitted with the cup-like portion thereof projecting upon one side of said flat sheet and the lip flange of said member juxtaposed with the surface of the other side of said flat sheet, (3) a disc member snugly fitted within the internal area defined by the lip edge of said cup-like portion of said hub member and positioned in essentially the same plane as the plane

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of said first flat sheet, and (4) a second flat sheet of material bonded to the foregoing assembly of elements on the side thereof opposite the side from which said cup-like portion of said hub member projects.

2. A combination of a dispenser type shipping carton and a roll of material supported and suspended therein on roll-suspension packaging pads, said packaging pads being of a structure satisfying the requirements of claim 1.

3. A combination satisfying the requirements of claim 2, and additionally having a tear strip extending essentially the full length of one side panel of said carton parallel with the roll of material within said carton.

4. A roll-suspension packaging pad adapted to distribute shear forces acting upon the same in an essentially uniform manner about the foundation of the roll-suspending hub member thereof, and comprising (1) a hub member having a cup-like configuration and a lip flange extending outwardly a short distance from the lip edge of said cup-like portion, and lying in the same plane as the plane defined by said lip edge, said hub member being adapted for snug insertion into the end recess of a roll of material, thereby to support said end of said roll on the outer bearing surface of said cup-like portion, (2) a first flat sheet of paperboard having a centrally located hole in which said hub member is snugly fitted with the cup-like portion thereof projecting upon one side of said flat sheet and the lip flange of said member juxtaposed with the surface of the other side of said flat sheet, (3) a disc member snugly fitted within the internal

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area defined by the lip edge of said cup-like portion of said hub member and positioned in essentially the same plane as the plane of said first flat sheet, (4) a second flat sheet of paperboard juxtaposed with the surface of said first flat sheet which is opposite the surface from which said cup-like portion of said hub member projects, and (5) a layer of rubber-based flexible adhesive bonding said second flat sheet to the essentially flush surface presented by the disc member, lip flange of said hub member, and the area of said first flat sheet immediately adjacent the area covered by the lip flange of said hub member.

5. A combination of a dispenser type shipping carton and a roll of material supported and suspended therein on roll-suspension packaging pads, said packaging pads being of a structure satisfying the requirements of claim 4.

6. A combination satisfying the requirements of claim 5, and additionally having a tear strip extending essentially the full length of one side panel of said carton parallel with the roll of material within said carton.

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