

**Jan. 10, 1967**

**L. A. FATTORI**  
SHOCK RESISTANT PLASTIC CONTAINERS WITH  
SELF-CONTAINED LOCKING MEANS

**3,297,153**

Filed Sept. 28, 1964

3 Sheets-Sheet 1

Fig. 1

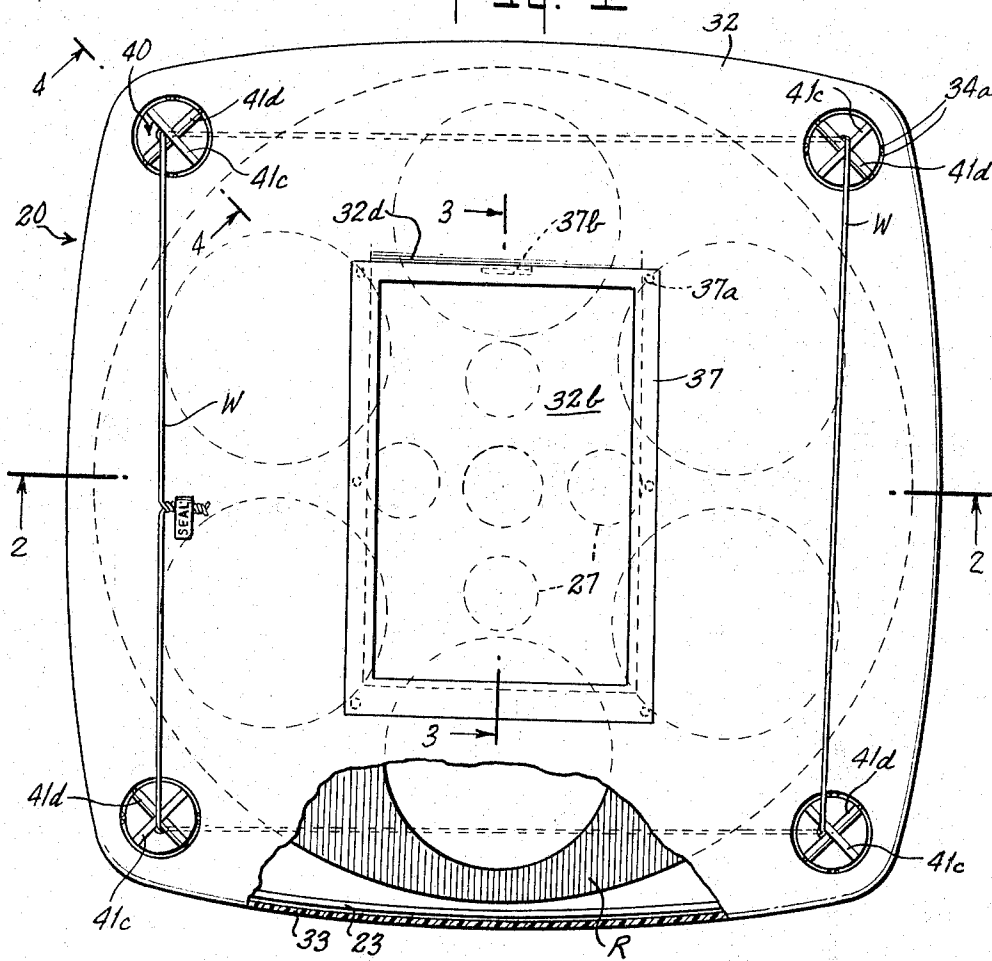


Fig. 2

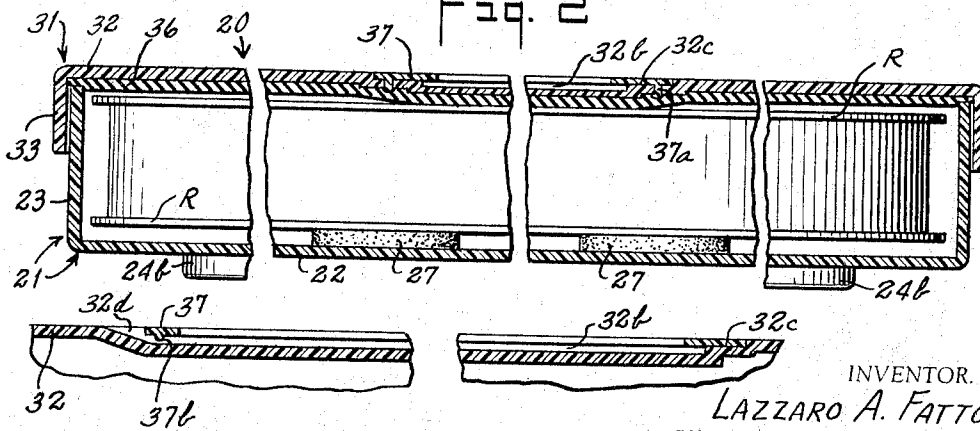


Fig. 3

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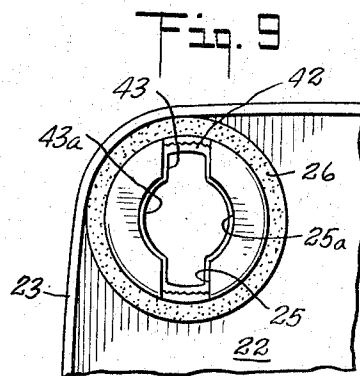
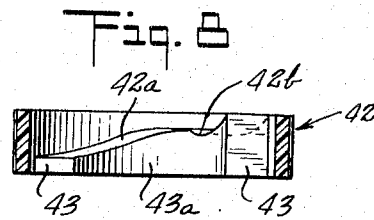
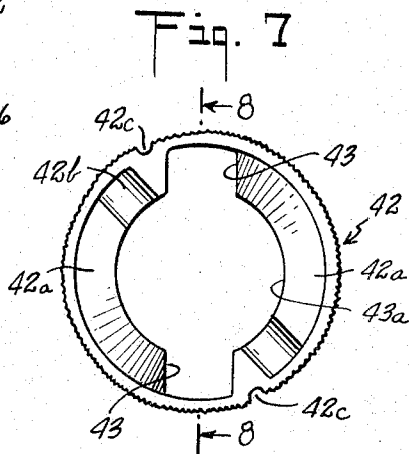
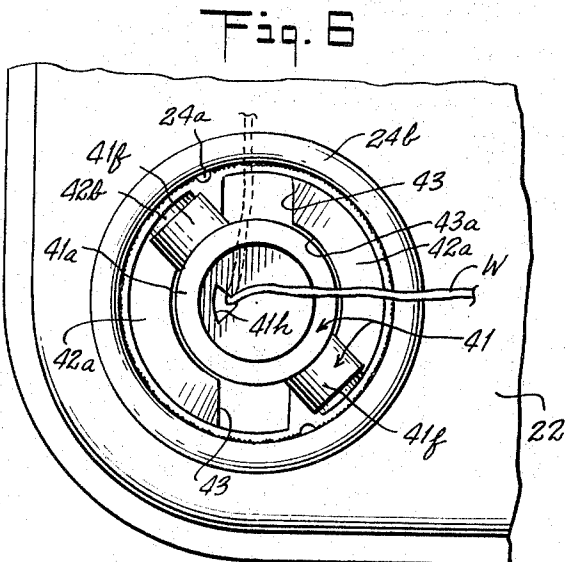
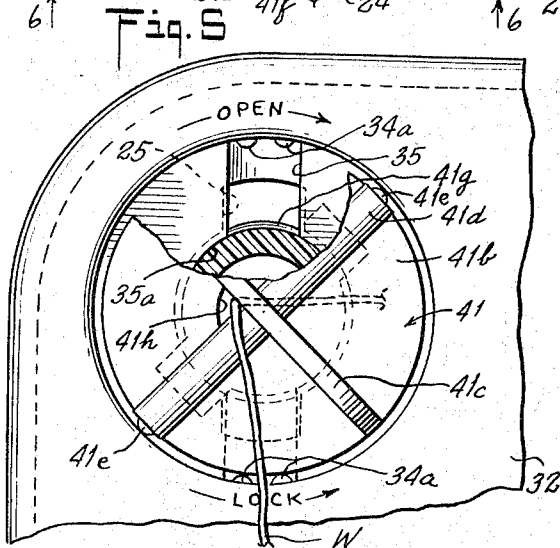
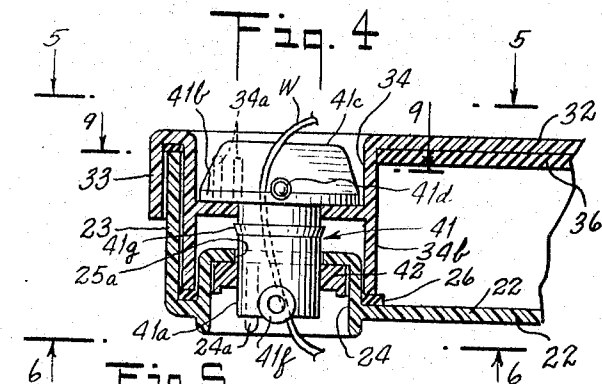
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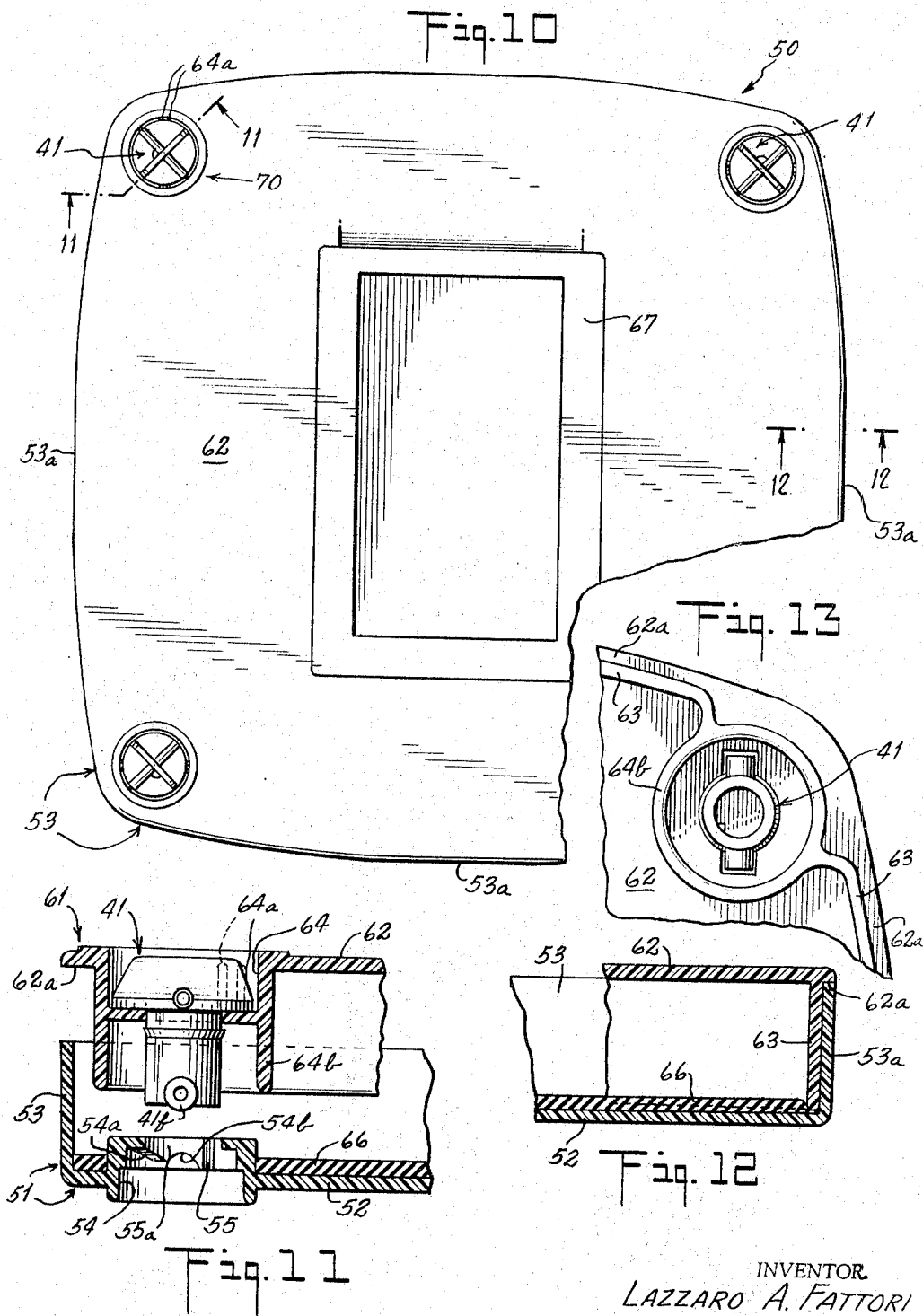
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## SHOCK RESISTANT PLASTIC CONTAINERS WITH SELF-CONTAINED LOCKING MEANS

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This invention relates to shipping and storage containers and more particularly is directed to the construction of molded resinous plastic shipping containers or cases for reels of motion picture film and other like articles.

Among the objects of the invention is to generally improve the construction of shipping cases of the character described, which shall comprise few and simple parts including dish-shaped container and cover portions which may be molded in quantity production of resinous plastic material, which portions shall each be formed with companion elements of self-contained interlocking means eliminating exterior binding straps, which portions shall provide for retaining the reeled film contents in shock-proof, resilient but relatively fixed suspension within the case, which interlocking means shall be located and constructed to strengthen the corners of the cases by coating with shock absorbing means and side wall structure for equalizing stress and strain when shock forces are applied thereto, as for example, when the cases with their reeled film content are delivered to remote military outposts by dropping from a low flying aircraft, which interlocking means shall be foolproof in operation, be arranged for self-indexing to obviate the necessity for orientating the cover with respect to the container portions, provide for easy wire sealing of the container and cover portions in locked position and provide interengaging means between the cover of one case and the container of another case to facilitate stacking in a horizontal position, which cases, in an embodiment of the invention, shall be capable of standing vertically for storing in that position, which cases shall be neat and attractive in appearance, shall withstand repeated film shipments and which shall be practical and efficient to a high degree in use.

Other objects of the invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists of features of construction, combinations of elements and arrangements of parts which will be exemplified in the constructions hereinafter disclosed, the scope of the application of which will be indicated in the claims following.

In the accompanying drawing in which various illustrative embodiments of the invention are shown:

FIG. 1 is a top plan view of a shipping case constructed to embody the invention, part of the cover being broken away to show the contents as a reel of motion picture film.

FIG. 2 is an enlarged fragmentary view taken on line 2—2 in FIG. 1.

FIG. 3 is an enlarged fragmentary sectional view taken through the cover on line 3—3 in FIG. 1 showing details of the shipping label holder.

FIG. 4 is a sectional view taken on line 4—4 in FIG. 1 showing details of the corner latching means and shock equalizing construction, the latch being shown in locked position.

FIG. 5 is an enlarged top view taken substantially on line 5—5 in FIG. 4.

FIG. 6 is an enlarged bottom view taken substantially on line 6—6 in FIG. 4 showing the latch in locked position.

FIG. 7 is a plan view of the cam surface of the stationary latch element insert removed from its well in the bottom wall of the container portion.

FIG. 8 is a sectional view taken on line 8—8 in FIG. 7 showing details of the insert.

FIG. 9 is a fragmentary plan view of a corner of the container portion with the cover removed as seen substantially on line 9—9 in FIG. 4 showing details of construction.

FIG. 10 is a top plan view of a modified shipping case constructed to embody the invention in which the side walls of the cover and container portion form a flush closure to facilitate standing the case up on its side for storing vertically.

FIG. 11 is a sectional view taken on line 11—11 in FIG. 10 showing details of the corner latching means of the modified case, cover and container portions being shown in an exploded position.

FIG. 12 is a sectional view taken on line 12—12 in FIG. 10 showing the flush closure and flattened side wall exterior portion forming the base for supporting the casing in vertical position; and

FIG. 13 is a fragmentary plan view of the upper left corner of the cover turned upside down to show details of the side wall and corner latching means.

Referring in detail to the drawings, 20 generally denotes a shipping container or case constructed to embody the invention seen to comprise an open box or container portion 21 having a fitted cover 31 and four corner latching devices generally designated as 40 cooperating therebetween.

Box 21 and cover 31 are both preferably injection molded of a suitable resinous plastic material capable of withstanding high impact stress and strain, as for example, high density polyethylene, polypropylene and the like. Box 21 has a flat bottom wall 22 and an upstanding peripheral side wall 23, fitted cover 31 having a flat top wall 32 and a peripheral flange or side wall 33 into which the open top of side wall 23 telescopically nests.

As shown in FIG. 1, bottom wall 22 and top wall 32 are shaped in a modified square configuration having four symmetrical bulging or convex side edges, adjacent side edges meeting in four rounded corners whereby side wall 23 and flange 33 each have a curved surface configuration free of sharp corners.

The four corner latching devices 40 are seen from FIG. 4 to each comprise a seat or well 24 integrally formed as an upward depression in bottom wall 22 and a companion seat or well 34 integrally formed as a downward depression in top wall 32. Wells 24 and 34 are in registering alignment with each other when cover 31 is seated on box 21 and have their respective bottoms spaced from each other and formed with diametric slots 25 and 35 each having a center enlargement 25a and 35a, respectively, which are also in registering alignment to receive rotatable latch 41 therethrough.

Rotatable latch 41 has a tubular body 41a sized to fit through center enlargements 25a and 35a and formed at the upper end thereof with head 41b of enlarged diameter with respect to body 41a and sized to seat in well 34. The top surface of head 41b has an upstanding diametric finger grip flange 41c and a diametric rib 41d extending in right angular relation to flange 41c. Rib 41d may terminate in opposite end protuberances 41e which project beyond the periphery of head 41b to each selectively engage an indexing means formed as pairs of spaced ribs 34a on the side wall of well 34. The opposite or lower end of body 41a has a pair of diametrically aligned lateral projections serving as latching elements 41f, the latter being in parallel alignment with diametric rib 41d. Spaced from head 41b, a retaining ring or shoulder 41g is formed on body 41a and, as shown in FIG. 4, may be wedge-shaped in cross-section providing a beveled surface to facilitate initial passage through center enlargement

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35a. One rotatable latch 41 is secured in each of the wells 34 and has flange 41c easily accessible for finger manipulation through the open top of well 34 and is preferably recessed from the surface of top wall 32, latching elements 41f being positioned for insertion through diametric slot 25 for locking engagement with the downfacing surface of well 24 when body 41a is rotated by means of flange 41c.

Any suitable means may be provided in well 24 for coacting with the latch elements 41f to accomplish said locking engagement, here shown as an insert 42 which may be permanently press fitted into well 24. Insert 42 has a diametric slot 43 formed with a center enlargement 43a which substantially conform in size and shape to slot 25 and enlargement 25a, respectively, of well 24 and are in registering alignment therewith. The surface of insert 42 bordering slot 43 is formed as a pair of cam surfaces 42a which are inclined toward bottom wall 22 in clockwise direction when viewed from the bottom, each surface 42a having a radially extending notch 42b adjacent the high end thereof shaped for seating latching element 41f. To facilitate proper aligning of insert 42 in well 24, the side wall of the latter may be molded with one or more ribs 24a to fit grooves 42c formed in the periphery of insert 42. Rotatable latch 41 and cooperating insert 42 may each be molded as an integral unit of a suitable plastic material having the required tough and non-abrasive properties, as for example, acetal resin, nylon and the like.

A feature of the invention is the provision in the structure of case 20 of a simple and efficient strengthening means which meets the high standards required by the intended use. This strengthening means may function by the equalization and distribution through the box 21 and cover 31, as well as by absorption, of the stress and strain of impact delivered to any small area of case 20 and particularly to the four corners which have been found to be particularly vulnerable, heretofore requiring additional metal corner pieces.

To this end, as seen in FIG. 4, each well 34 has its side wall extended downwardly as flange 34b to surround well 34 and contact a resilient shock absorbing padding in the form of a ring 26 which is adhesively attached to bottom wall 22. A resilient shock absorbing padding is also provided between the cover top wall 32 and the upfacing edge of bottom side wall 23, which may be in the form of padding sheet 36 shaped to fit the interior surface of cover top wall 32 with suitable cutouts for wells 34 and adhesively attached thereto. The central area of padding sheet 36 may cooperate with suitable padding means attached to bottom wall 22, here shown as a plurality of spaced cushions 27 so that reel R will be suspended in case 20 between the cushioning of sheet 36 and cushions 39. Any suitable resilient and compressible material may be used for rings 26, padding sheet 36 and cushions 39, as for example, rubber foam or polyurethane foam.

A central area of the exterior side of top wall 32 may be formed with a framed window for removably holding a shipping label. As shown in FIGS. 2 and 3, top wall 32 has a rectangular depression or recess 32b having a stepped border 32c in which window frame 37 is mounted to be flush with the exterior surface of top wall 32, frame 37 being secured to top wall 32 by any suitable means, such as spaced pins 37a, which may be integrally formed with frame 37 to extend through registering openings in top wall 32 and having their protruding ends spread by a cold or hot press in the well understood manner. As shown in FIG. 3, one of the sides of stepped border 32c is inclined and cut back beyond frame 37 to provide a slot 32d through which a shipping label may be inserted into and removed from recess 32b. The side of frame 37 at slot 32d may be formed with a downwardly projecting rib 37b serving as an obstruction to prevent the shipping label from being accidentally dislodged from recess 32b.

Head 41b of rotatable latch 41 may each have an opening 41h located in the central angle formed by upstanding

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flange 41c and diametric rib 41d and communicating with the hollow core of tubular body 41a through which suitable wire W may be threaded, for example, in the manner shown in FIG. 1, to seal case 20 against opening by unauthorized persons.

As will be clear from FIG. 4 well 24 being of smaller diameter than well 34, each well 24 has a prominent rim 24b extending downwardly from the exterior surface of bottom wall 22 serving as a foot for supporting box 21 on a horizontal surface and being sized to nest in well 34 of an underlying case 20 to facilitate horizontal stacking thereof.

In order to eliminate the necessity of properly orientating the corners of cover 31 with respect to those of box 21 when closing case 20, that is, providing for self-indexing of cover 31 on box 21, rotational symmetry is provided for latching devices 40 with respect to the corners of box 21 and cover 31. In FIG. 1 all latches 41 are shown in locked position wherein diametric ribs 41d in the upper left and lower right corners are parallel to each other and those in the lower left and upper right corners are parallel to each other but at 90° to the former pair. The rotational symmetry will be apparent by visualizing case 20 being rotated 90° in a clockwise direction so that the upper left corner becomes the upper right corner and the latter becomes the lower right corner, etc. In this new position diametric ribs 41d in their respective corners have the same relative orientation as in the old position. The same will hold true upon further rotation in 90° increments. Correlating this with the details of latching device 40 shown in FIGS. 5 and 6, it will be clear that in the embodiment here illustrated diametric slots 25 located in the upper left and lower right corners always extend along a vertical axis while slots 25 located in the lower left and upper right corners extend along a horizontal axis.

In order to accomplish said desirable self-indexing, the alignment of latching elements 41f in cover 31 is assured by suitable means for locking latches 41 in an open position, namely, protuberances 41e terminating diametric ribs 41d, each protuberance 41e engaging between one pair of spaced ribs 34a, the pairs of spaced ribs 34a in the upper left and lower right corners being aligned along a vertical axis parallel to diametric slots 25 as shown in FIG. 5 and in the lower left and upper right corners being aligned along a horizontal axis parallel to corresponding diametric slots 25.

The practical utility of case 20 will now be apparent. With box 21 open, cover 31 removed therefrom and latches 41 having been rotated to and locked in open position, namely, with protuberances 41e engaged between spaced ribs 34a, a reel R of motion picture film or magnetic tape is centralized in box 21 on spaced cushions 27. By merely indexing any corner of cover 31 with any corner of box 21, latching elements 41f will be properly aligned for passing through diametric slots 25 and cover 31 will readily telescope over box 21. Each corner latching device 40 is then locked by finger gripping upstanding flange 41c and applying counterclockwise torque thereto to first free latch 41, that is, to snap protuberances 41e out of engagement between spaced ribs 34a. Latch 41 is then rotated through an arc of about approximately 135° until latching elements 41f, riding on cam surfaces 42a, engage and lock in radial notches 42b. The coaction between latching elements 41f and cam surfaces 42a compresses the border of padding sheet 36 between top wall 32 and the upfacing edge of side wall 23 and also compresses the ring 26 between bottom wall 21 and the downfacing edge of each flange 34b, reel R being held firmly in position and cushioned between sheet 36 and cushions 39. As an aid to the user, the border of each well 34 on top wall 32 is seen in FIG. 5 to have suitably embossed thereon the words "OPEN" and "LOCK" with arrows pointing in the appropriate direction.

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To open case 20, the procedure is performed in reverse order resulting in latches 41 being locked in open position to assure the self-indexing hereinbefore described.

FIGS. 10 to 13, inclusive, illustrate a modification embodying the invention as case 50 comprising an open box or container portion 51 having a fitted cover 61 and four corner latching devices 70, all substantially similar to box 21, cover 31 and latching devices 40 of case 20 but differing in the following respects.

Box 51 has a flat bottom wall 52 and an upstanding peripheral side wall 53. The latter, as seen in FIGS. 11 and 12 forms an exterior side wall for case 50 and has each side section midway between the corners formed with flattened portions 53a for supporting case 50 in an upstanding vertical position on a horizontal surface. Cover 61 has a flat top wall 62 which is sized and shaped to conform to the contour of the open box 51 and to have a periphery flush with the exterior surface of side wall 53. A side wall 63, extending from top wall 62 is spaced inwardly of the periphery thereof to telescope into side wall 53 and provide a peripheral overhang 62a for engaging the upper free end of side wall 53 as a butt joint closure for case 50.

The four corner latching devices 70 each utilize a rotatable latch 41 and include wells 54 and 64 formed in bottom wall 52 and top wall 62, respectively, pairs of spaced ribs 64a, flange 64b and diametric slot 55 all constructed in a manner similar to wells 24, 34, spaced ribs 34a, flange 34b and diametric slot 25 in case 20. However, the bottom of well 54 is shown integrally formed with cam surfaces 54a and radial notches 54b in place of insert 42 with its cam surfaces 42a and notches 42b, it being understood that either the integral or insert construction may be used in boxes 21 and 51. The direction of rotation of rotatable latch 41 in case 50 is seen in FIG. 10, which shows all latches 41 in locked position, to be reversed, namely, by reversal of cam surfaces 54a and radial notches 54b so that latch 41 is rotated clockwise to "LOCK" and counterclockwise to "OPEN." The equalization, distribution and absorption of stress and strain in case 50 is accomplished by the butt joint closure afforded by overhang 62a with respect to side wall 53 in combination with padding sheet 66 located for compression between bottom wall 52 and the downfacing edges of side wall 63 and flange 64b. As shown in FIG. 13, at each corner, side wall 63 may be curved inwardly away from the periphery of top wall 62 to merge with well 64 and flange 64b forming an integral structure, the free edge of which transmits cushioned shock to bottom wall 52 through padding 66. The latter, which may be adhesively attached to bottom wall 52, is seen in FIGS. 11 and 12 to conform to the interior surface thereof with suitable cutouts for wells 54 and also cushions and snugly retains reel R in position in case 50.

Cases 20 and 50, constructed to embody the invention, may be made in various depths to accommodate reels of various thicknesses as well as a plurality of reels in stacked relation.

Cover 61 may also be provided with a frame 67 for removably holding a shipping label.

Case 50 may be opened and locked in a manner similar to that hereinbefore described for case 20 and by virtue of the telescoping of cover side wall 63 into box side wall 53, the butt joint closure and the flattened side wall portions 53a, a plurality of cases 50 may be readily stored on a shelf standing up in vertical position as well as stacked in horizontal position. In addition to the shipping label provided on the top of case 50, a label designating the title and subject matter of the contents may be adhesively attached to an outfacing flattened side wall portion 53a.

The improved shock resistant plastic cases with self-contained locking means herein disclosed are seen to achieve the several objects of the invention and to be well adapted to meet conditions of practical use. As

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various possible embodiments might be made in the above invention, and as various changes might be made in the disclosed constructions, it is to be understood that all matters herein set forth or shown in the accompanying drawings are to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A shipping and sorting case comprising an open top box having a substantially flat bottom wall and upstanding peripheral side wall, said box bottom wall being sized and shaped to receive a flat side of a reel thereon in substantially concentric delation and having four rounded corners extending beyond the periphery of the reel, a fitted cover for the box open top having a substantially flat top wall shaped to conform to the box bottom wall and a downwardly extending side wall telescopically engaging said box side wall, said bottom and top walls in each corner being formed with aligned wells depressed inwardly from the exterior surfaces thereof, said wells having aligned openings therein, a rotatable latch mounted for rotation in each of the top wall well openings and having latching means extending through the opening in the bottom wall well for locking engagement on rotation thereof, each latch having a finger manipulative flange for effecting said rotation located in the top wall well and recessed from the top wall exterior surface.

2. The shipping and storing case defined in claim 1 in which said four corners and top and bottom wells are rotationally symmetrical providing self-indexing of said cover on the box obviating the necessity for orientation.

3. The shipping and storing case defined in claim 2 in which each rotatable latch includes means coaxing with companion means formed in the top wall well for snap locking the rotatable latch in an open position.

4. The shipping and storing case defined in claim 1 in which said top wall wells have a base area larger than the bottom wall wells, said top wall wells each having an extension flange surrounding the bottom wall wells and projecting to engage the bottom wall, and cushioning means interposed between said flange and bottom wall.

5. The shipping and storing case defined in claim 4 in which said cover side wall is spaced inwardly of the periphery of the flat top wall and telescopes into said box side wall, said cover side wall being integrally formed with and having portions in common with each of said top wall wells and extension flanges, said cover side wall projecting to engage the bottom wall, said cushioning means being sheet material conforming to the interior contour of said bottom wall and having border areas interposed between said cover side wall and bottom wall.

6. A shipping and storing case comprising an open top box having a substantially flat bottom wall and upstanding peripheral side wall, said box bottom wall having four symmetrical rounded corners extending beyond a contents receiving central area, a fitted cover for the box open top having a substantially flat top wall shaped to conform to the box bottom wall and a downwardly extending side wall telescopically engaging said box side wall, said bottom and top walls in each corner being formed with aligned wells depressed inwardly toward each other from the exterior surfaces thereof, said wells having aligned openings therein, a latch mounted for rotation in each of the top wall well openings and having latching means extending through the opening in the bottom wall well for locking engagement on rotation thereof, and means associated with each top wall well projecting to engage the bottom wall for equalizing and distributing impact stress and strain between the top and bottom walls.

7. A shipping and storing case comprising an open top box having a substantially flat bottom wall and upstanding peripheral side wall, said box bottom wall hav-

ing four symmetrical rounded corners extending beyond a contents receiving central area, a fitted cover for the box open top having a substantially flat top wall shaped to conform to the box bottom wall and a downwardly extending side wall telescopically engaging said box side wall, said bottom and top walls in each corner being formed with aligned wells depressed inwardly toward each other from the exterior surfaces thereof, said wells having aligned openings therein, a latch mounted for rotation in each of the top wall well openings and having latching means extending through the opening in the bottom wall well for locking engagement on rotation thereof, said box, cover and latch being molded of resinous plastic material, and a shipping label holder molded as a rectangular central shallow depression in said top wall, said depression having a stepped border, a window frame mounted in said border substantially flush with the exterior surface of the top wall, one of the sides of said stepped border having an inclined wall cut back beyond the frame providing an entrance slot for the insertion of a shipping label into said depression behind said frame.

8. A shipping and storing case comprising an open top box having a substantially flat bottom wall and upstanding peripheral side wall, said box bottom wall being sized and shaped to receive a flat side of a reel thereon in substantially concentric relation and having four rounded corners extending beyond the periphery of the reel, a fitted cover for the box open top having a substantially flat top wall shaped to conform to the box bottom wall and a downwardly extending side wall telescopically engaging said box side wall, said bottom and top walls in each corner being formed with aligned wells depressed inwardly toward each other from the exterior surfaces thereof, said wells having aligned openings therein, the openings in said bottom wall wells being shaped as diametric slots, said diametric slots in opposite corners being parallel and in adjacent corners being at right angles to each other for rotational symmetry providing self indexing of said cover on the box, and a rotatable latch mounted for rotation in each of the top wall well openings and having latching means conforming to said diametric slot for entering therein when in alignment therewith for rotation to an angular snap locking position with respect to said slot, said rotatable latch having means coacting with companion means formed in the top wall well for snap locking the rotatable latch in position aligning the latching means with the slot.

9. A shipping and storing case comprising an open top box having a bottom wall, a fitted cover for the box open top having a top wall, integrally formed wells depressed inwardly toward each other from the box bottom and top walls, said wells each having a diametric slot formed with a central enlargement in alignment with each other, a rotatable latch having an elongated body extending through said central enlargements when the cover is in closed position on said box, said elongated body terminating at one end in a head of enlarged diameter positioned in the top wall well and terminating at an opposite end in laterally extending diametrically aligned latch elements, said latch elements being sized to fit through said slots when in alignment therewith, said elongated body having an annular shoulder spaced from said head for retaining the latch against removal from the top wall well enlargement, said bottom wall

well having cam surfaces and notches surrounding said enlargement for engaging and locking said latch elements on rotation of the latch from an open position wherein the latch elements are in alignment with said slot to a closed position, said head having an upstanding finger manipulative flange for effecting said rotation.

10. The shipping and storing case defined in claim 9 in which said top wall well has a side wall formed with protruding indexing means, said rotatable latch head being formed with a lateral protuberance extending beyond the periphery thereof for snap-in engagement with said indexing means when the latch is rotated to said open position.

11. The shipping and storing case defined in claim 9 in which said elongated body has a hollow core open at said opposite end, and said head has an opening therein communicating with said core, said head opening and core forming a passageway for threading a sealing wire therethrough.

12. The shipping and storing case defined in claim 9 in which said box, cover and rotatable latch are molded of resinous plastic material, said annular shoulder being molded with a tapered underside for snap in mounting of the rotatable latch in said top wall well enlargement.

13. A shipping and storing case comprising an open top box having a substantially flat bottom wall and upstanding peripheral side wall, said box bottom wall being sized and shaped to receive a flat side of a reel thereon in substantially concentric relation and having corners extending beyond the periphery of the reel, a fitted cover for the box open top having a substantially flat top wall shaped to conform to the box bottom wall and a downwardly extending peripheral side wall for telescoping engagement with said box side wall, said bottom and top walls in each corner being formed with aligned wells depressed inwardly from the exterior surfaces thereof, a rotatable latch mounted for rotation in each of the wells of one of said flat walls, each well of the other flat wall having a bottom formed to receive therethrough and engage one of the rotatable latches for removably retaining the cover on the box.

14. The shipping and storing case defined in claim 13 in which each rotatable latch includes means coacting with companion means formed in the mounting well thereof for snap locking the rotatable latch in an open position.

15. The shipping and storing case defined in claim 13 in which the wells of one of said flat walls have base areas larger than the base areas of the wells of the other flat wall and include extension flanges surrounding the other wells and projecting to engage the other flat wall, and cushioning means interposed between each flange and the other flat wall.

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