

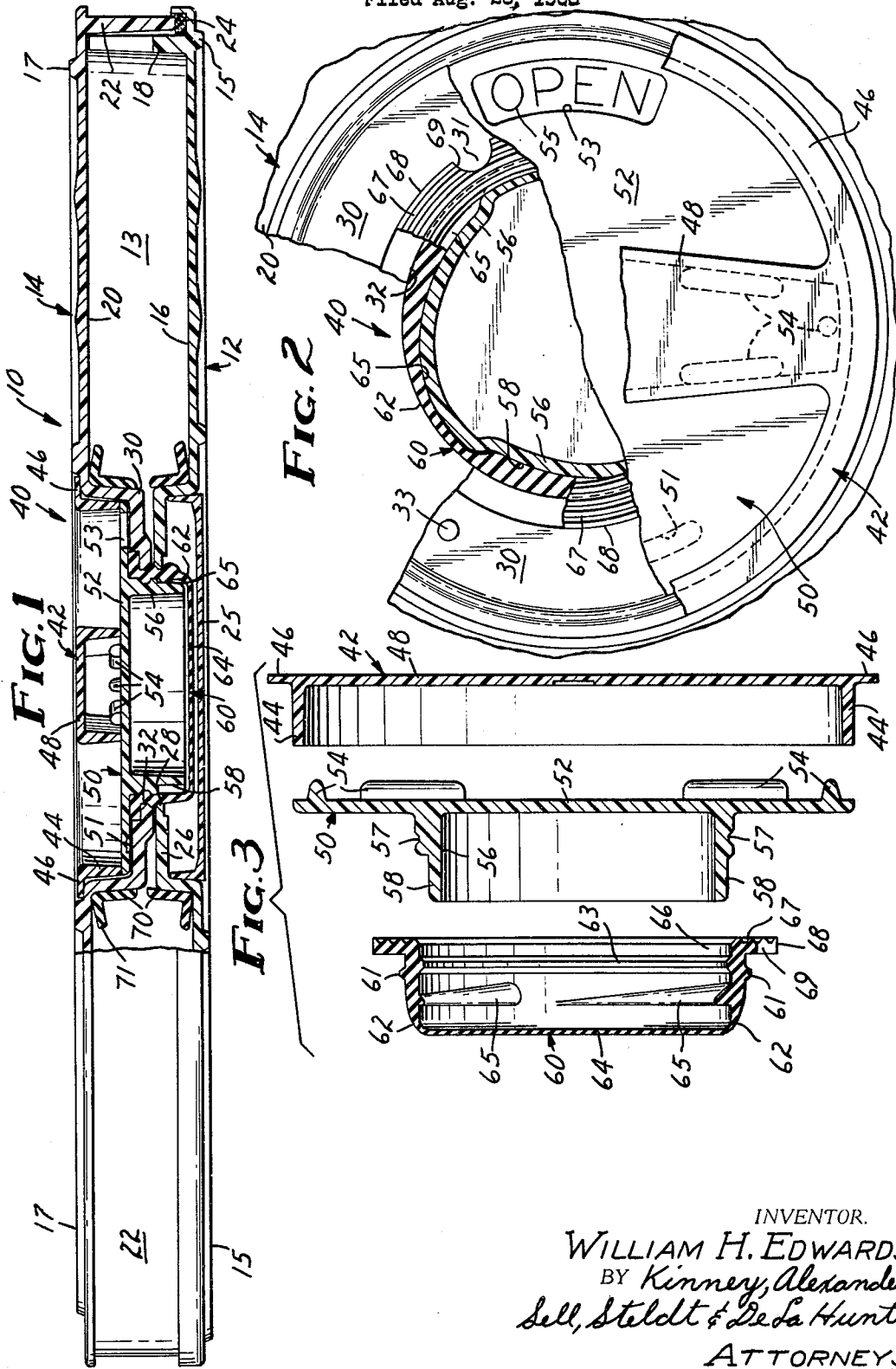
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TWIST-OPENING REEL CONTAINER

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TWIST-OPENING REEL CONTAINER

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4 Claims

ABSTRACT OF THE DISCLOSURE

Mechanism for releasably locking a cover to a base wherein an elastic expansion cup is fitted and secured into a socket in the cover to releasably engage the base. The generally cylindrical wall of the expansion cup projects beyond the inside of the cover and may, in its normal condition, be freely inserted into an aperture in the base. A handle disk is rotated within the cup to expandably force the wall of the cup into engagement with the base to thereby lock the cover to the base.

BACKGROUND OF THE INVENTION

It is desirable to maintain reels of magnetic tapes and photographic films, e.g. computer tapes and the like, in dust-free cases or containers for subsequent use of the uncontaminated tapes or films at a later date. Such a container generally comprises a circular base having a central opening and an upwardly extending peripheral rim, a circular cover having a central opening and a downwardly extending peripheral rim sealably interconnected with the base rim, and a mechanism extending through the central openings to secure the cover to the base and thus completely enclose the reel of magnetic tape or photographic film.

Reel containers that have been commercially available before my invention have utilized any one of a variety of locking mechanisms to secure the cover to the base. One such container utilizes a locking mechanism whereby a rubber gasket is squeezed between the cover, the base, and a lower plate moving longitudinally relative to the cover. For example, see U.S. Patent No. 3,138,250, issued to F. H. Burgess et al. In variance therefrom but also utilizing a longitudinal movement to actuate the locking mechanism is a reel container comprising an expandable elastic cup affixed to the cover and a plunger within the cup to expand the cup to engage the base of the reel container upon longitudinal movement of the plunger. For example, see U.S. Patent No. 3,369,653, issued to W. H. Edwards.

The Edwards container, U.S. Patent No. 3,369,653, as sold, has a plunger-handle projecting beyond the cover of the container when the locking mechanism is in the unlock position. When a plurality of such unlocked containers are vertically stacked on top of each other, the projecting handle could interfere with adjacent containers and cause instability of the entire stack. Also, the projecting handle could snagably interfere with objects adjacent to the cover resulting in annoyance to one handling the container and possible damage to the locking mechanism. Moreover, the Edwards container, U.S. Patent No. 3,369,653, requires a push-pull activation of its locking mechanism. This push-pull locking motion is objected to by a portion of the public which would rather have a twisting or rotational motion, as is more commonly utilized when tightening a lid on a jar or a cap on a bottle,

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to actuate the locking mechanism of a reel container.

The expandable locking mechanism of my invention which is actuated by a rotational movement of the handle, provides a compact dust-tight reel container which may be empty stored in an unlocked position without a handle projecting beyond the cover. Thus, interference with adjacent containers is avoided and storage in the unlocked position ensures full life of the elastic sealing member. These and other advantages of my invention will be apparent by reference to the continuing specification and claims.

SUMMARY OF THE INVENTION

The present invention relates to a locking mechanism useful for securing together a dust-tight reel container and more particularly to a new and improved laterally expandable locking mechanism wherein a handle disk is rotated within an elastic expansion cup to laterally expand the expansion cup into frictional and bulbous engagement with the base of the case and thus secure the cover to the base.

Thus, a principal object of this invention is to provide a reel container with a locking mechanism wherein a handle-disk, within an elastic expansion cup, is rotated to expand the elastic cup to frictionally and bulbously engage the base of the container.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like numerals designate like parts throughout the figures and wherein:

FIGURE 1 is a side view, shown partly in section, of a reel container incorporating a locking mechanism of my invention;

FIGURE 2 is a top view, shown partly in section, of the expandable locking mechanism in an open position; and

FIGURE 3 is an exploded side elevation, in section, of the expandable locking mechanism.

In the accompanying drawing and description of the embodiment of the invention shown, the upper portion of the circular reel container shown in FIGURE 1 will be referred to as the "top" of the container and the portion opposite from the "top" is the "bottom" of the container. The axis extending through the center of the "top" and "bottom" is the "longitudinal axis" and movement in the axial direction is "longitudinal movement." That which is relatively closer to the "longitudinal axis" is "inner" of that which is radially outward, "outer," from the "longitudinal axis."

Referring now to FIGURE 1, there is shown a circular dust-proof reel container 10 comprising plastic and rubber parts, or like material, having a base 12, a cover 14 and an expandable locking mechanism 40 (all generally located about a longitudinal axis) to secure the cover 14 to the base 12 for containing a reel of magnetic tape or photographic film (not shown) within the reel cavity 13. The base has a circular bottom wall 16 with an upwardly extending peripheral rim 18 and the cover 14 has a circular top wall 20 with a downwardly extending peripheral rim 22 which fits outside the rim 18 of the base and abuts a sealing gasket ring 24 on the edge of the bottom wall 16 to effectively enclose the outer periphery of the reel cavity 13.

The circular lower ridge 15 on the bottom of the base fits outside a circular upper ridge 17 on the cover of

another container when a plurality of the containers are stacked one on top of the other. Thus, the engagement of the ridges 15 and 17 will restrict lateral movement between the containers to thereby result in a more stable stack of containers.

The base 12 includes a central inset 26 having a circular aperture 28. The cover 14 also has a central inset 30, corresponding to the inset 26, and a circular socket 32. The insets 26 and 30 are partially inserted into a reel hub when a reel is contained within the reel cavity 13. Thus, the insets 26 and 30 are adjacently located when the container 10 is closed, as illustrated in FIGURE 1.

The base 12 has a circular bottom insert 25 affixed to the central circular portion of the bottom wall 16 by suitable means, such as an adhesive, to prevent foreign particles, dust and the like, from entering the reel cavity through the circular aperture 28.

A cushion ring 70 around each of the insets 26 and 30 provides a cushion seating for a contained reel. The resilient flange 71 of the cushion ring 70 is biased inwardly on the walls 16 and 20 and supports the contained reel to avoid longitudinal movement of the reel and thereby prevent the contained reel from contacting either wall 16 or wall 20.

An expandable locking mechanism 40, which is affixed to the cover 14, releasably secures the cover 14 to the base 12. The expandable locking mechanism 40 comprises a handle 42, a handle disk 50 and an elastic expansion cup 60, as more clearly illustrated in the exploded side elevation of FIGURE 3.

The integral handle 42 comprises a cylindrical handle rim 44 with a circular handle flange 46 and an inverted cross-sectional U-shaped central portion 48 diametrically secured to rim 44. The integral handle disk 50 comprises a generally flat circular plate 52, having bosses 54 for aligning the handle 42 on the disk 50, and a generally cylindrical rim 56 coaxially located on the plate 52. The rim 56 further comprises an annular groove 57 and a rotatable engagement means having three equally spaced radially outwardly extending camming surfaces 58. The plate 52 is also provided with an arcuate, rectangular opening 53 to enable the operator to view indicia 55 on the central inset 30 which will indicate whether the reel case is in an "Open" or "Lock" position. The integral elastic expansion cup 60, which may be made of rubber or other like expandable material, is generally cup-shaped with a generally cylindrical wall 62, a closed end 64, an open end 66 and a retaining flange 68. The cylindrical wall 62 is provided with an outer annular rib 61, an inner annular rib 63 and expansion means comprising three equally spaced radially inwardly extending incline planes 65. The retaining flange 68 is provided with circular ribs 67, to decrease the frictional drag caused by the relative movement between the flange 68 and the under surface of the plate 52, and three equally spaced semicircular notches 69 (see FIG. 2) to engage the three equally spaced ears 31 on the central inset 30 and thus prevent relative rotational movement between the expansion cup 60 and the cover 14. An abutment 33 on the upper central inset 30 is aligned with the arcuate determinate groove 51 in the lower surface of plate 52, to restrict the rotational movement of disk 50 to approximately 65 degrees and thus provide positive end positioning (corresponding to "Lock" and "Open") of the handle relative to the container 10.

To assemble the expandable locking mechanism 40, the elastic expansion cup 60 is forced downwardly through the circular socket 32 so as to position the outer annular rib 61, of the cup 60, below the central inset 30 and the retaining flange 68 above the central inset 30; with the ears 31, of inset 30, within the notches 69, of the cup 60. The handle 42 is adhesively secured to the handle disk 50 and the handle disk 50 is forced into the cup 60 until the inner annular rib 63 coincides with the annular groove

57. Thus, the expandable locking mechanism 40 is longitudinally affixed to the cover 14.

In operation, the handle 42 is rotated relative to the cover 14 to the "Open" position wherein the three camming surfaces 58 are not in engagement with the incline planes 65 and the cylindrical wall 62 is in its normal constrained position; the cover 14 is placed over the base 12 so as to insert the cup 60 into the circular aperture 28 of the base 12; the handle is then rotated to the "Lock" position wherein the camming surfaces 58 engage the incline planes 65 to enlarge the cylindrical wall 62 to thus frictionally grip the wall of the aperture 28 and bulbously engage the base below and adjacent to the aperture 28 (see FIG. 1). Thus, the reel container 10 is now in a "Lock" position. To open or unlock the reel case 10 the above operation is reversed.

While one embodiment of the invention has been shown and described, it will be appreciated that this is for the purpose of illustration and that numerous modifications or alterations may be made therein without departing from the spirit and the scope of the invention.

What is claimed as the invention is:

1. A substantially circular dust-proof reel container including a longitudinal axis and having particular utility for containing magnetic tape or photographic film, comprising:

(1) a cover having a central socket located substantially about the longitudinal axis;

(2) a base positioned adjacent to said cover and including a central annular aperture located opposite to said central socket along the longitudinal axis;

(3) an expandable locking mechanism to secure the cover to the base, comprising:

(a) an elastic expansion cup having an open end, a closed end, and a generally cylindrical wall extending between said closed end and said open end, said cup positioned through said central socket and said central annular aperture whereby said open end is located adjacent said cover and said cylindrical wall extends through said central socket and said central annular aperture;

(b) said cup including means for securing said cup to said cover to prevent rotational movement of said cup relative to said cover;

(c) said cup including at least one incline plane formed on the inner surface of said cylindrical wall and progressively extending inwardly;

(d) a handle disk extending into said open end of said cup; and

(e) rotatable engagement means on said handle disk for engaging said incline plane and expanding said expansion cup upon rotational movement of said disk relative to said cup to thereby cause said expansion cup to lockably engage said base beneath and adjacent said central annular aperture and thus secure said cover to said base.

2. A dust-proof reel container according to claim 1 wherein:

said handle disk further comprises at least one camming surface extending radially outwardly to engage said inclined plane upon rotational movement of said disk relative to said cup to thereby outwardly expand said cup and lockably engage said base beneath and adjacent said central annular aperture and thus secure said cover to said base.

3. A dust-proof reel container according to claim 2 wherein:

(1) said cover further comprises an abutment; and

(2) said handle disk further comprises an arcuate groove of a determinate length to engage said abutment upon predetermined rotational movement of said handle disk relative to said expansion cup.

4. A dust-proof reel container according to claim 2 wherein:

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said handle disk includes annular means for longitudinally securing said disk to said cup.

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WILLIAM T. DIXSON, JR., Primary Examiner

U.S. Cl. X.R.

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