June 23, 1964 F. H. BURGESS ETAL 3,138,250

REEL CASE

Filed March 22, 1963

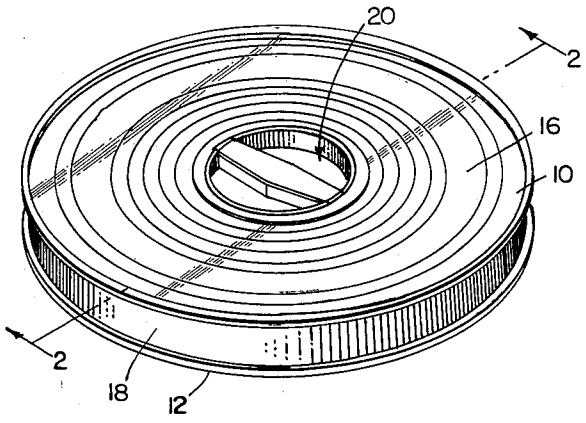


FIG. 1

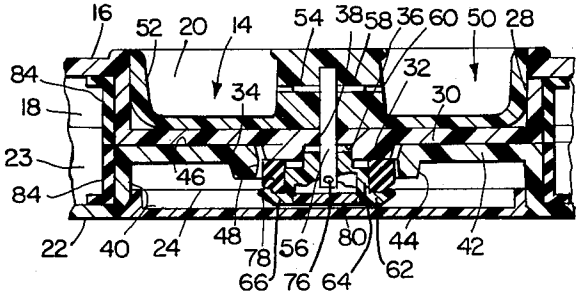


FIG. 2

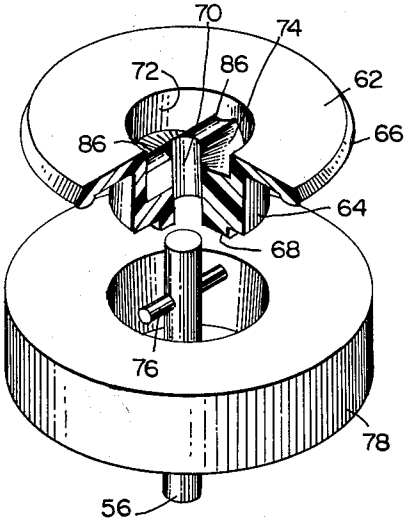


FIG. 4

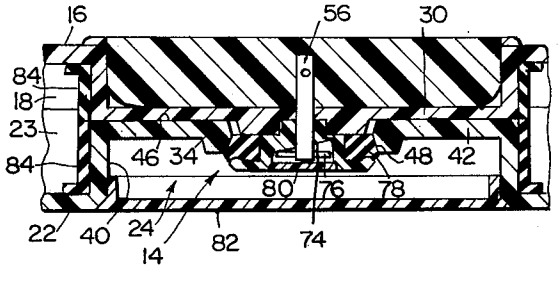


FIG. 3

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REEL CASE

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This invention relates to tape and film reel cases and more particularly comprises a new and improved case that provides a sealed chamber for a reel and a convenient lock for maintaining the case closed and sealed about the reel.

In recent years a substantial market has develeoped in the computer field for reels and reel cases for storing magnetic tape. It is most desirable that the cases for storing the tape provide a sealed chamber to protect the tape particularly when the tape is stored for prolonged periods. It is essential that the case have a reliable locking device to prevent it from accidentally opening and dropping the enclosed reel. For such cases to afford maximum protection for the tape the locking device employed should not be of a type which, upon wear of the lock parts, deposits an abrasive material within the case which would be harmful to the tape.

One important object of the invention is to provide a reel case having a lock which does not deposit in a region where they may be harmful, abrasive particles created by the wear of the parts.

To accomplish this and other objects, the reel case of this invention comprises a base member and cover member. An opening is formed in the central portion of one of the members and a handle is secured to the other of the members. A cam member is carried by said other of the members as is a gasket which when in the normal condition is adapted to fit within the opening in said one member. A cavity is formed in the cam member and in which is positioned a cam and cam follower, and the cam and follower are closed in the cavity by means of a sealed cover plate. The cam follower is secured to the handle, and upon actuation of the handle the cam member moves against the gasket and causes the gasket to expand so that it is larger than the opening in said one member. Thus, when the handle is actuated, the gasket locks the case closed.

These and other objects and features of this invention will be better understood and appreciated from the following detailed description of one embodiment thereof, selected for purposes of illustration and shown in the accompanying drawing, in which:

FIG. 1 is a perspective view of a reel case constructed in accordance with this invention;

FIG. 2 is an enlarged fragmentary cross-sectional view taken along the corresponding section line in FIG. 2 and showing the case in an unlocked condition;

FIG. 3 is an enlarged fragmentary cross-sectional view similar to FIG. 2 but showing the case in a locked condition; and

FIG. 4 is an exploded perspective view of a portion of the lock shown in FIGS. 2 and 3, with the parts inverted.

The reel case shown in the drawing includes a cover 10, a base 12 and a lock 14 secured to the cover 10. The cover 10 is provided with a generally flat top wall 16, a peripheral downwardly extending skirt 18 and a well 20 in the center of the top wall which houses part of the lock 14. The base 12 includes a generally flat bottom wall 22, a peripheral upwardly extending wall 23 which lies immediately within the skirt 18 of the cover 10, and a well 24 formed in the center of the bottom wall

and which receives a part of the lock 14 mounted in the well 20 of the cover.

Well 20 formed in the cover is defined by a cylindrical wall 28 and a bottom wall 30. A thickened plate or boss 32 is formed on the lower surface 34 of the bottom wall 30 at its center, and a rectangular recess 36 extends upwardly from the lower surface of the boss 32. A circular hole 38 extends through the wall 30 from the top of the recess 36.

The upwardly extending well 24 provided in the base 12 of the case is defined by a cylindrical wall 40 and a flat upper wall 42 that has a downwardly extending open collar 44 formed at its center. The diameter of the inner surface of the collar reduces from the upper surface 46 of the top wall 42 to a neck 48 and then gradually increases from the neck to the bottom of the collar.

In FIGS. 2–4 the lock 14 for the case is shown in detail. The lock includes a dish-shaped handle 50 which sits within the well 20 in the cover. While one is not shown, a washer made of nylon or some other comparable material may be seated on the bottom of the well between the wall 30 and the handle 50 to reduce friction between these members. Because the side wall 52 of the handle is virtually the same height as the side wall 28 of the well 20, the entire surface of the well 20 is covered and no opportunity is presented for the fingers of the operator manipulating the handle to be pinched between the handle and the well wall.

The handle 50 includes an upwardly extending central grip 54 to which is keyed for rotation therewith a downwardly extending stud 56. The keying of the stud 56 to the grip 54 may be achieved by a transverse pin 58 which extends through the upper end of the stud and is disposed in an opening 60 formed in the grip 54. The stud 56 passes downwardly from the grip 54 through the opening 38 formed in the lower wall 30 of the well 20 of the cover and terminates beyond the rectangular recess 36 in the boss 32. Surrounding the lower end of the stud is a cam member 62 which has a central cylindrical section 64 and a lower outwardly extending flange 66. A rectangular boss 68 is formed on the upper end of the cylindrical section 64, which is mated with the rectangular recess 36 in the boss 32 on the lower surface of the wall 30 forming part of the well 20. The rectangular boss 68 on the cam member 62 cooperates with the rectangular recess 36 to prohibit rotation of the cam member relative to the cover of the case. The boss 68 and recess 36 limit the cam member to axial movement relative to the cover 10 of the case.

A central opening 70 formed in the cylindrical section 64 of the cam member and through which the stud 56 extends, terminates at its lower end in a chamber or cavity 72. The cavity 72 is shown in FIGS. 2 and 3 to extend upwardly through the flange portion 66 of the cam member into the cylindrical portion 64, and the upper surface of the cavity is formed as a cam face 74. A cam follower 76 in the form of a pin is carried on the lower end of the stud 56 and cooperates with the cam face 74 to move the cam member 62 axially between the positions shown in FIGS. 2 and 3. In FIG. 2 it will be noted that the cam member is in its lowermost position and a substantial gap is shown between the top of the boss 68 on the cam member and the upper wall of the recess 36. In FIG. 3 that gap is shown closed as the cam member 62 is in an elevated position.

The flange 66 of the cam member 62 serves as a keeper for gasket 78. The gasket 78 disposed between the flange 66 and the lower surface of the boss 32 serves two functions; namely, it yieldably urges the cam member 62 to its lower position shown in FIG. 2 and thereby maintains the handle 20 against the bottom wall 30 of the well, and it expands to the condition shown in FIG. 3 and thereby

locks the cover and base of the case closed. In FIG. 2 it will be noted that when the cover and base of the case are closed the cam **78** fits within the collar **44** beneath the neck **48**, and the diameter of the gasket **78** is somewhat less than the diameter of the neck. However, when the cam member **62** is drawn upwardly to the position shown in FIG. 3, it compresses the gasket **78** causing it to expand radially and bear against the lower portion of the tapered surface of the collar **44**. As the diameter of the expanded gasket appreciably exceeds the diameter of the neck **48** of the collar, the expanded gasket prevents the cover from being removed.

In FIGS. 2 and 3 the cam face **74** and the cam follower **76** are shown to be sealed in the cavity **72** by means of disk **80** cemented or otherwise secured in place over the cavity end. Therefore, any particles produced by wear of the follower **76** and/or the cam face **74** are sealed in the cavity and cannot escape into the main compartment of the case which receives the reel.

The structure of the case shown in the drawing is completed by a disk **82** which closes the bottom of the well **24** formed in the base of the case. The disk provides the case with a substantially smooth and unbroken lower surface. The case may also include a sealing gasket (not shown) disposed immediately outside the upstanding side wall **23** of the base which gasket bears against and forms an effective seal with the lower edge of the skirt **18** of the cover. When the base and cover are locked together an appreciable force may be exerted upon the two parts of the case which causes the lower edge of the skirt **18** to bear tightly against the sealing gasket to form a sealed chamber for the reel when the case is locked. The case may also include a pair of flexible rings **84** mounted about the cylindrical walls of the wells of the cover and base, which engage the hub of the reel (not shown) stored in the case to hold the reel firmly and prevent it from turning or chattering in the case.

In use rotation of the handle **20** through approximately 90° from the position shown in FIG. 2 to that shown in FIG. 3 causes the cam follower **76** which rotates with the handle to ride up the inclined surface of the cam face **74** and draw the cam member **62** upwardly to the position shown in FIG. 3. When the cam follower reaches the high point of the cam face, it seats in a shallow trough **86** shown clearly in FIG. 4 to releasably lock the cam follower in the position shown in FIG. 3 with the cam member fully withdrawn. To unlock the case the handle is turned through a sufficient number of degrees to remove the cam follower **76** from the trough **84**. When this is done the gasket **78** serves as a spring urging the cam member outwardly back to the position shown in FIG. 2 and acts upon the cam follower to snap the handle back to its unlocked position. By incorporating stops (not shown) in the well **14** of the cover and cooperating flanges on the handle **20**, the rotational movement of the handle may be limited to approximately 90° which is sufficient to allow the handle to turn between the fully opened and fully closed positions.

It is apparent from the foregoing that the different parts of the case excluding only the gaskets **78** and **84**, stud **56**, pin **58** and cam follower **76** may readily be molded of plastic material. The simple locking mechanism with the integral cam member, cam face and gasket keeper may be fabricated most inexpensively and will render long and dependable service.

Those skilled in the art will appreciate that numerous modifications may be made of this invention without departing from its spirit and that its application extends beyond locks for a reel case. It will also be appreciated that the relatively simple locking mechanism of this invention furnishes complete assurance that no abrasive particles will be produced from the locking device which later could be harmful to the tape carried by the reel in turn stored in the case. Because modifications may be made of this invention without departing from its spirit, it is not intended that the breadth of this invention be limited to the specific embodiment illustrated and described. Rather, it is intended that the scope of this invention be determined by the appended claims and their equivalents.

What is claimed is:

1. A reel case comprising
a cover and a base member,
wells formed in both the cover and base member and having side and end walls,
said end walls lying substantially in face to face contact with one another when the case is closed,
a handle disposed in the well of and rotatable with respect to the cover,
an opening formed in the end wall of the base,
an axially movable and non-rotatable cam member secured to the lower surface of the end wall of the cover and adapted to extend through the opening in the end wall of the base when the case is closed,
said cam member having a recessed cam face directed away from the lower surface,
a gasket surrounding the cam member and engaging the lower surface of the end wall of the well of the cover and urging the cam member away from said lower surface,
a stud connected to and rotatable with the handle and having a cam follower engaging the cam face for moving the cam member against the bias of the gasket toward the lower surface and thereby expanding the gasket to a size greater than the size of the opening in the end wall of the base for releasably locking the cover and base closed,
and a cover extending over and closing the recessed cam face and follower sealing the cam face and follower and any particles produced by their wear in the cam member.

2. In a reel case having a cover and base member,
locking means for the case comprising
an opening in the central portion of one of the members and a handle secured to the other of the members,
a cam member carried by said other of the members,
a gasket carried by the cam member on said other of the members and adapted to extend through the opening in the said one member when the case is closed,
a recess formed in the cam member opening in a direction away from the handle and having a cam face formed at the bottom of the recess and secured to the cam member,
means including a cam follower fixed to the handle extending into the recess in the cam member and cooperating with the cam face for moving the cam member to expand the gasket so that it locks the base and cover members together when disposed in the opening,
and a cover on the recess formed in the cam member enclosing the cam face and follower in the recess within the cam member.

3. In a reel case having a cover and base,
locking means for the case comprising
a circular opening formed in the central portion of the base,
a handle rotatably mounted on the cover,
an annular gasket carried by the cover and having a normal diameter slightly smaller than the diameter of the opening and extending through the opening when the case is closed,
a member having a central body portion lying within the gasket and a flange lying below the gasket, said member when moved upwardly expanding the gasket to a diameter slightly larger than the diameter of the opening,
means forming part of the member for preventing the member from rotating with respect to the cover,

a chamber formed in the member,
and a pair of relatively moving parts within the chamber with one connected to the handle and the other to the member for moving the member upwardly to expand the gasket when the parts are moved in relation to each other,
a cover extending over and sealing the bottom of the chamber for enclosing therein the pair of relatively moving parts,
and means biasing the member downwardly to enable the gasket to assume its normal diameter.

4. In a reel case having a cover and base,
locking means for the case comprising
a circular opening formed in the central portion of the base,
a handle rotatably mounted on the cover,
an annular gasket carried by the cover and having a normal diameter slightly smaller than the diameter of the opening and extending through the opening when the case is closed,
a keeper lying within the gasket for retaining the gasket on the cover,
a chamber provided within the keeper within the gasket,
a cam face formed as an integral part of the keeper within the chamber,
a cam follower secured to the handle and disposed within the chamber and engaging the face causing the keeper to expand the gasket to a diameter exceeding the diameter of the opening when the handle actuates the follower to one position on the cam face and to return the gasket to its normal diameter when the handle actuates the follower to a second position on the cam face,
and a cover closing the chamber sealing the cam and follower in said chamber.

5. In a reel case having a cover and a base,
locking means for the case comprising,
a circular opening formed in the central portion of the base,
a handle rotatably mounted on the cover,
an annular gasket carried by the cover and having a normal diameter slightly smaller than the diameter of the opening and extending through the opening when the case is closed,
a keeper lying within the gasket for retaining the gasket on the cover,
means secured to the keeper preventing it from rotating relative to the cover,
an axially extending chamber provided in the keeper,
an actuator secured to and rotatable with the handle and extending from the handle into the chamber,
a member provided in the chamber and cooperating with the actuator for moving the keeper axially toward and away from the cover,

and a disc extending over and sealing the end of the chamber away from the cover with the member and the end of the actuator in said chamber.

6. A reel case as defined in claim 5 further characterized by
an opening in the end of the keeper toward the cover,
said actuator extending from the handle through the opening into the chamber and closing said opening.

7. A reel case as defined in claim 6 further characterized by
said actuator including a stem extending from the handle into the chamber and a cam follower in said chamber,
said member including a cam face formed as an integral part of the chamber wall within the keeper.

8. A reel case comprising
a cover and a base,
a downwardly extending well in the cover and defined by a cylindrical side wall and a bottom wall,
an upwardly extending well in the base and defined by a cylindrical side wall and a bottom wall,
said bottom walls being in close proximity to one another when the case is closed,
a handle mounted in the cover well for rotation between first and second positions and having a bottom wall and a side wall which cover the cover well bottom wall and side wall, respectively,
a grip extending across the handle over its bottom wall and secured at its ends to opposite portions of the handle side wall,
a noncircular recess provided in the lower face of the cover well bottom wall,
a keeper mounted on said lower face and having a noncircular boss disposed within the recess preventing the keeper from rotating relative to the cover, said keeper also having a central cylindrical portion and a flange at its end away from said lower face,
an annular gasket surrounding the central cylindrical portion of the keeper and retained about the keeper by the flange.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,138,250 June 23, 1964

Frank H. Burgess et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 55, for "FIG. 2" read -- FIG. 1 --; column 3, line 3, for "cam" read -- gasket --; column 6, line 40, for the period read a comma and insert the following:

a cylindrical chamber provided within the central portion of the keeper,
an opening extending through the boss and communicating with the chamber,
an actuator secured to the handle within the grip and rotatable with the handle, said actuator extending through the handle bottom wall, cover well bottom wall, and opening and terminating in the chamber,
means within the chamber in part connected to the actuator and in part to the keeper causing said keeper to move toward the lower face of the cover well bottom wall and compress the gasket causing its diameter to expand when the handle is rotated from its first to its second position in the cover well,
said gasket urging the keeper away from the lower face of the cover well bottom wall to release the gasket and allow it to assume its normal diameter when the handle is in its first position,
a cover over the lower end of the chamber in the keeper in the plane of the flange sealing the lower end of the chamber closed with the means in the chamber,
and an opening provided in the bottom wall of the base well slightly greater in diameter than the normal diameter of the gasket and through which a gasket fits when the case is closed with the cover on the base, said gasket exceeding the diameter of the opening in the base well bottom wall when the handle is moved to its second position to expand the gasket and lock the cover on the base.

Signed and sealed this 3rd day of November 1964.

(SEAL)
Attest:
ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents