Jan. 22, 1963 F. H. BURGESS ETAL 3,074,546

REEL CASE

Filed June 14, 1962

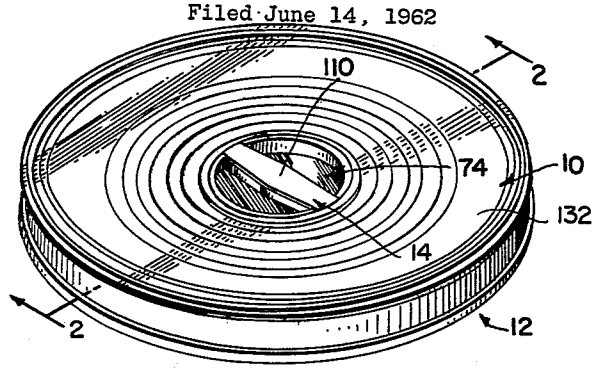


FIG.1

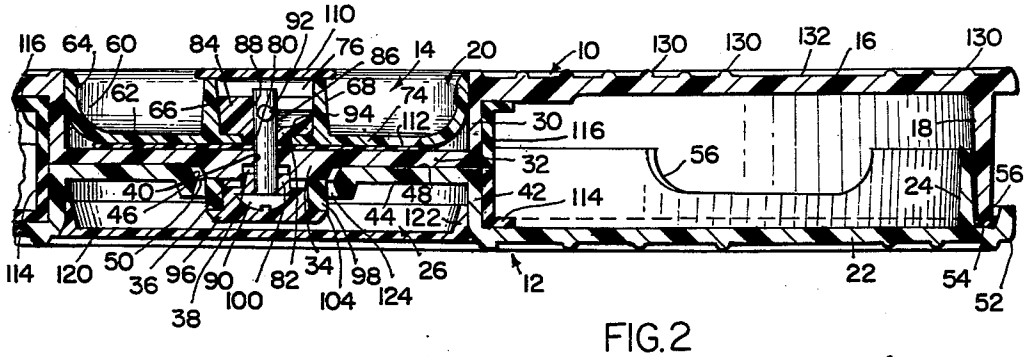


FIG.2

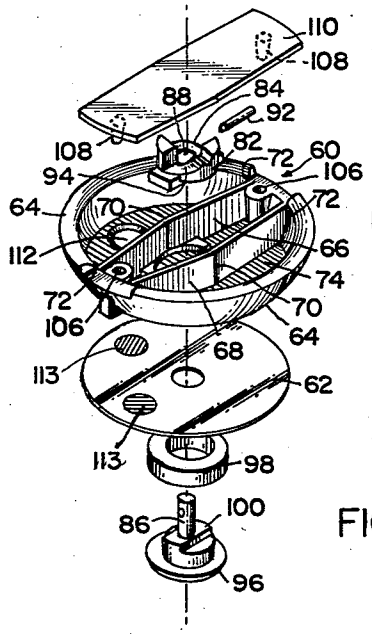
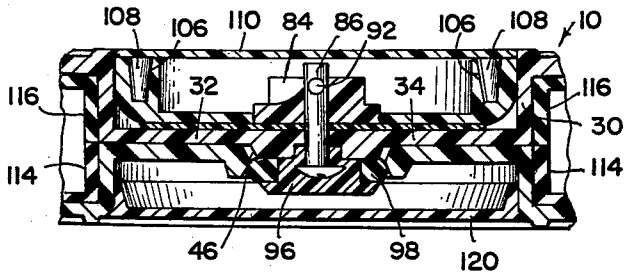


FIG.3

FIG.4



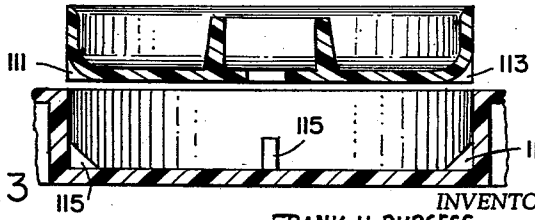


FIG.5

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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 developed in the computer field for reels and reel cases for storing magnetic tape. It is most desirable that the cases for storing the tape reels provide a sealed chamber to protect them particularly when the tapes are stored for prolonged periods. It is essential that the cases have a reliable locking device to prevent them from accidentally opening and dropping the enclosed reel. Several reel cases are now available which generally perform the functions described above. However, all have certain limitations that most frequently relate to the locking device. Typically, the locking devices employed in other cases include parts which as they wear, produce and discharge into the cases chips or abrasive dust harmful to the tapes stored in them.

One important object of this invention is to provide a reel case having a lock which does not deposit abrasive particles created by wear in a region where they may pass into the case interior.

Another important object of this invention is to provide a reel case having means which indicates whether the case is locked or unlocked.

Another important object of this invention is to provide a lock handle which protects the fingers of the user from being pinched against the case when the handle is actuated.

Still another object of this invention is to provide means in the case which facilitate removal of the reel.

To accomplish these and other objects the reel case of this invention comprises a base and cover having peripheral rims which mate when the case is closed to seal the interior. A handle secured to the cover has a sealed cavity which contains most of the locking mechanism including a cam and follower that move relative to one another to open and close the lock. Extending from the cover and forming part of the lock is a gasket that fits within an opening formed in the base of the case and which expands behind the opening upon actuation of the handle to lock the cover and base together. Because the wearing parts of the lock are restricted to and sealed within the handle cavity they cannot harmfully effect the tape or film stored on the reel within the case.

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 of the case shown in FIG. 1 with the lock unlatched;

FIG. 3 is an exploded view illustrating the details of the several parts which make up the lock of the case; and

FIG. 4 is a fragmentary cross-sectional view of the case with the lock in its locking position.

The reel case shown in the drawing includes a cover 10, a base or bottom 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 a major part of the lock 14. The base 12 includes a generally flat bottom wall 22, a peripheral upwardly extending wall 24 and a well 26 formed in the center of the bottom wall that receives a part of the lock 14 mounted in the well 20 of the cover.

The well 20 formed in the cover is defined by a cylindrical wall 30 and a bottom wall 32. A thickened plate or boss 34 is formed on the lower surface 36 of the wall 32 at its center, and an elongated recess 38 generally rectangular in shape extends upwardly from the lower surface of the boss 34 and receives a portion of the lock 14. A circular hole 40 extends through the wall 32 from the top of the recess 38.

The upwardly extending well 26 provided in the base 12 of the case is defined by a cylindrical wall 42 and a flat upper wall 44 that has a downwardly extending open collar 46 formed at its center. The diameter of the inner surface of the collar reduces from the upper surface 48 of the top wall 44 to a neck 50 and then gradually increases from the neck to the bottom of the collar.

Surrounding and spaced from the upwardly extending wall 24 at the periphery of the base 12 is a circular flange 52 which defines with the wall 24 a seat for a rubber gasket 54. The gasket 54 as shown in the drawing engages the bottom 56 of the skirt 18 of the cover 10, and when the cover and base are pressed together a seal is formed at the periphery of the case to close its interior. It will be noted in FIG. 2 that the wall 24 of the base is cut away at a few locations about the periphery of the case. Three such cut away portions 56 may be conveniently formed and equidistantly spaced about the wall 24 which allows the fingers to be slipped under one flange of a reel in the base 12 of the case so that it may easily be lifted from the base and eliminate the need of inverting the base to remove it. However the cut aways 56 do not in any way impair the seal formed between the bottom 56 of the skirt 18 and the gasket 54 as they lie inside of the seal.

In FIGS. 2–4 the lock 14 for the case is shown in detail. The lock includes a dish-shaped handle 60 which sits within the well 20 in the cover 10. The dish-shaped handle 60 is shown to sit upon a nylon washer 62 on the bottom wall 32 of the well 20, to reduce the friction between the handle and that wall. It will be noted in the drawing that the side wall 64 of the handle is virtually the same height as the cylindrical wall 30 of the well and that the handle therefore covers the entire inner surface of the well. A pair of vertical walls 66 and 68 slightly shorter than the side wall 64 extend across the handle diameter and diverge slightly from one another from their ends toward the center. Thus, at their centers 70 the walls 66 and 68 are slightly farther apart than at their ends 72 where they emerge from the wall 64. The walls 68 and 70 define with the bottom wall 74 of the handle a trough-like cavity 76 which houses part of the locking mechanism. A rectangular opening 80 is formed in the bottom wall 74 between handle walls 66 and 68, and receives the base 82 of a cam 84 seated in the cavity 76. The rectangular configuration of the base of the cam and the opening 80 prevent relative twisting of the handle 60 and the cam. Rather, when the handle turns in the well 20, the cam 84 within handle cavity 76 turns with it.

A cam stud 86 extends from the interior of the cavity 76 through a central bore 88 in the cam 84 and through the opening 40 and slot 38 in the bottom wall 32 of the well 20 of the cover and terminates at its lower end in a slotted head 90. The upper end of the stud 86 is pierced by a cam follower 92 oriented perpendicular to the stud

and which rests upon the upper or cam surface 94 of the cam 84. From the configuration of the cam shown in FIG. 3 it will be appreciated that when the cam 84 is rotated with respect to the stud, the stud moves axially up and down as viewed in FIGS. 2 and 3 in accordance with the contour of the cam surface. In FIG. 2 the cam follower 92 is shown seated on the lowest surface of the cam, and when the cam is rotated 90° with respect to the stud (see FIG. 4) the follower rides up on the cam surface 94 and seats on its high point, and the stud 86 is displaced axially (upwardly) from the position shown in FIG. 2.

The stud 86 carries a bushing 96 molded about the head 90, which in turn supports a gasket 98 against the lower surface of the boss 34 in lower wall 32 of well 20. The bushing 96 includes an upstanding generally rectangular collar 100 that fits within the recess 38 in the boss 34. The recess 38 guides the movement of the bushing 96 under the influence of the stud 86 by its engagement with the collar. In FIG. 2 it will be noted that the bushing 96 and its collar 100 are spaced from the lower surface of the boss 34 and the bottom of the recess 38, respectively. This spaced relationship between the bushing and the boss enables the stud 86 to be actuated in an upwardly direction to the position shown in FIG. 4 when the cam 84 rotates. In that position the bushing 96 lies against the lower surface of the boss and the collar 100 fits tightly against the top wall of the recess 38. The gasket 96 disposed between the shoulder 104 of the bushing 96 and the lower surface of the boss is compressed and swells in a radial direction with respect to the stud 86. When the stud is in the lower position of FIG. 2 the outer diameter of the gland or gasket is the same as that of the bushing and fits easily within the neck 50 in the collar 46 of the base.

In FIG. 3 it will be noted that the ends of the cavity 76 are provided with a pair of tapered holes 106 which receive a pair of mating pins 108 extending downwardly from the lower surface of the handle cap 110. The pins 108 may be cemented or otherwise retained in place in the holes so that the cap 110 covers the handle to form a complete closure for the cam 84, its follower 92, and the end of stud 86. It will also be noted that an opening 112 is provided in the bottom wall 74 of the handle 60 to expose a portion of the upper surface of nylon washer 62. The nylon washer 62 preferably is provided with different colored portions 113 which may be viewed through the opening 112 in the wall 74 of the handle to indicate the condition of the lock mechanism. When the locking mechanism 12 is in the open condition shown in FIG. 2 so that the cover 10 may be lifted from the base of the case, a bright color visible through opening 112 would indicate that condition, and when the handle is turned 90° so that the stud 86 moves axially upward to compress and thereby radially expand the gasket 98 to lock the case, the opening 112 would expose a different portion of the washer 62 bearing another color, which would indicate to the user that the lock is closed.

In FIG. 5 it will be noted that the dish-shaped handle 60 carries a pair of depending ears 111 and 113 adjacent the base of its side wall 64, and the well 20 is provided with a plurality of flanges 115 at the junction of its side and bottom walls 30 and 32 in the path of travel of the ears 111 when the handle 60 is rotated. The ears and flanges cooperate to serve as stops to limit the arc through which the handle may turn and relieve the stress otherwise exerted on the stud 86 and pin 92 when inadvertently an effort is made to turn the handle beyond the limit established by the cam 84. The ears 111 and 113 may be spaced 180° apart on the handle 60 and preferably four flanges 115 are provided in the well, each approximately 90° apart and cooperating in pairs with each of the ears.

In FIG. 2 a pair of rubber rings 114 and 116, L-shaped in cross section, are shown to surround the outer surfaces of the cylindrical walls of the wells of the base and cover respectively. The diameter of the rings 114 and 116 are such that they will enter the hub of the reel in the case and prevent the reel from turning or vibrating in the case and unwind the film or tape carried on it.

In FIG. 2 the well 26 formed in the base 12 is shown to be covered by a cap 120 which is circular in shape and has an upwardly extending rim 122 which fits snugly within the cylindrical wall 42 of the well. Thus, a continuous uninterrupted lower surface is provided for the base across the entire diameter of the case.

When the cover is assembled on the base of the case, the boss 34 fits within the upper tapered portion of the collar 46. The lower end of the stud bushing 96 is tapered to guide the depending portion of the locking mechanism 14 through the collar 46 and into the well of the base closed by cap 120. The cover and base are axially aligned when the gasket 98 is expanded, as it engages the inclined surface 124 of the collar and positions the two parts together. This arrangement is clearly shown in FIG. 4.

From the foregoing description it will be recognized that the several objects of this invention set forth in the introduction are achieved. Of primary consideration is the fact that the cam 84 and follower 92 are confined to the cover and within the cavity 76 defined by the walls 66, 68 and 74 of the handle, and the handle cap 110. Thus, any wear of the cam caused by its frictional contact with the cam follower 92 will not produce particles which may fall into the chamber of the case housing the reel. Rather, any such particles which are produced remain in the sealed cavity in the handle.

While only the material from which the washer 64 is made has been suggested above, it will be appreciated that the configurations of the parts are such that they may readily be molded from plastic material. When so made, the cover and/or the base of the case may be decorated and styled into a very attractive package. In FIG. 2 it will be noted that a number of concentric ribs 130 are formed on the upper surface of the cover 10 which although decorative in nature, form spacers on the cover to separate it from the base of another case stacked beside or above it. Also, it will be noted that the ribs are spaced apart a greater distance near the periphery of the case to form a wide band 132 which may be used as a marking area to indicate the contents of the tape or film in the case.

While we have described but a single embodiment of this invention, it will be appreciated that numerous modifications may be made of it, which are within the scope of the invention. For example, while we have described a nylon disc or washer 62 being disposed beneath the handle above the bottom wall of the well in the cover, it will be appreciated that the handle itself may be molded of nylon or other self-lubricating or low friction material to eliminate the need for the disc. In such a case, the color coding may be applied to the upper surface of the lower wall 32 of the well in the cover and be viewed through the opening 112 in the handle to indicate the condition of the lock. As such modifications will suggest themselves to the reader, it is obviously not intended that the breadth of this invention be limited to the single embodiment illustrated and described. Rather, the breadth of this invention is to be determined by the appended claims and their equivalents.

What is claimed is:

1. A reel case comprising

a cover member,

a downwardly extending well defined by a cylindrical side wall and a flat bottom wall provided in the center of the cover member,

a base member,

an upwardly extending well defined by a cylindrical wall and flat top wall provided in the center of the

base member with the flat walls of the two wells disposed face to face when the case is closed,
a central opening formed in the flat wall of one of the wells,
a handle disposed in the other of the wells,
a cam disposed within and movable with the handle,
a stud operatively connected to the handle and extending from the handle through the opening and into the well in the other member,
a cam follower secured to the stud and operatively connected to the cam causing the stud to move axially toward and away from the handle when the handle and cam are turned,
and a gasket mounted on the end of the stud which extends through the opening in the well of the other member,
said gasket expanding to a diameter exceeding that of the opening when the stud is moved axially toward the handle and having a diameter less than the opening when the stud is moved axially away from the handle.

2. A reel case comprising,
a base and a cover having peripheral rims which mate when the case is closed,
an opening formed in the central portion of the base,
a turnable handle secured to the central portion of the cover,
a stud connected to the cover and extending through the opening in the base when the case is closed,
a gasket normally smaller than the opening and mounted on the end of the stud which extends through the opening,
a cam follower connected to the other end of the stud and disposed within the handle,
a cam secured to the handle and turnable therewith,
said cam causing the stud to move axially toward and away from the handle by engagement with the cam follower when the handle is turned,
and means secured to the stud and engaging the gasket causing the gasket to swell to a diameter larger than the diameter of the opening when the stud is moved axially in one direction and releasing the gasket to its natural diameter when the stud is moved in the other direction.

3. A reel case comprising
a base and a cover,
wells formed in both the base and cover and terminating in end walls that lie face to face when the case is closed,
an opening in one of said end walls,
a handle plate seated in the well of the other end wall and rotatable thereon,
gripping walls attached to the handle plate and providing on the handle plate an enclosed cavity,
a cam seated in the cavity and rotating with the handle plate,
a locking stud extending from the interior of the cavity through the opening in said one end wall,
a gasket on the end of the stud extending through the opening and being normally of smaller diameter than the opening,
means restricting said stud to axial movement,
a cam follower mounted on the stud and disposed on the cam within the cavity and moving said stud axially in a direction out of the opening when the handle plate is rotated in one direction,
means mounted on the stud and engaging the gasket and causing the gasket to swell within the opening and engage the margin of the opening and lock the case and cover together when the stud is moved in said one direction,
the last-named means releasing the gasket causing it to return to its normal size when the stud is moved in the other direction.

4. A reel case comprising
a base and a cover having peripheral rims that mate when the case is closed,
wells formed in the centers of the base and cover and being disposed adjacent one another when the case is closed,
a handle disposed in the well in the cover and providing a finger grip protected from the well walls,
a stud extending from the handle and terminating in the well of the base when the case is closed,
gripping means secured to the end of the stud within the base well,
and actuating means disposed within the well in the cover and connected to the handle and causing the gripping means to operate when the handle is turned in one direction to lock the base and cover together and rendering the gripping means inoperative when the handle is turned in the other direction.

5. A reel case as defined in claim 4 further characterized by
indicating means provided at the handle for indicating whether the gripping means is operative.

6. A reel case as defined in claim 4 further characterized by
openings formed in the peripheral rim of the base for enabling the fingers to be inserted in the base and remove a reel disposed therein.

7. A reel case comprising
a cover member,
a downwardly extending well defined by a cylindrical side wall and a flat bottom wall provided in the center of the cover member,
a base member,
an upwardly extending well defined by a cylindrical wall and flat top wall provided in the center of the base member with the flat walls of the two wells disposed face to face when the case is closed,
a central opening formed in the flat wall of one of the wells,
a handle disposed in the other of the wells,
stop members mounted on the handle and in said other of the wells and cooperating to limit the number of degrees the handle may turn,
a cam disposed within and movable with the handle,
a stud operatively connected to the handle and extending from the handle through the opening and into the well in the other member,
a cam follower secured to the stud and operatively connected to the cam causing the stud to move axially toward an away from the handle when the handle and cam are turned,
and a gasket mounted on the end of the stud which extends through the opening in the well of the other member,
said gasket expanding to a diameter exceeding that of the opening when the stud is moved axially toward the handle and having a diameter less than the opening when the stud is moved axially away from the handle.

8. A reel case comprising
a base and a cover having peripheral rims that mate when the case is closed,
wells formed in the centers of the base and cover and being disposed adjacent one another when the case is closed,
a handle having an interior chamber disposed in the well in the cover,
a stud extending from the handle and terminating in the well of the base when the case is closed,
gripping mean ssecured to the end of the stud within the base well,
and actuating means disposed within the interior chamber of the handle and causing the gripping means to operate when the handle is moved in one direction to lock the base and cover together and render-

ing the gripping means inoperative when the handle is moved in another direction.

9. A reel case comprising

a base and a cover having periphery rims that mate when the case is closed,

wells formed in the centers of the base and cover and being disposed adjacent one another when the case is closed,

a handle in the well of the cover and turnable in the well,

stop means in the well limiting the arc through which the handle may turn in the well,

a stud extending from the handle and terminating in the well of the base when the case is closed,

gripping means secured to the end of the stud within the base well,

actuating means disposed in the handle and engaging the stud causing the gripping means to operate when the handle is turned in one direction to lock the

base and cover together and rendering the gripping means inoperative when the handle is turned in the other direction,

and indicating means operatively connected to the handle for indicating whether the gripping means is operative.

10. A reel case as defined in claim 9 further characterized by

walls secured to the handle and lining the interior of the well in the cover and turning with the handle for preventing the fingers of the operator from being pinched against the sides of the well.

References Cited in the file of this patent

UNITED STATES PATENTS

1,314,269	Kempter	Aug. 26, 1919
1,365,659	Carter	Jan. 18, 1921
2,030,465	Nist	Feb. 11, 1936

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,074,546 January 22, 1963

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 67, strike out "and"; line 69, for "position." read -- position; and --, also, add the following:

FIG. 5 is a fragmentary cross-sectional view of the cover and handle of the case.

column 2, line 57, for "68 and 70" read -- 66 and 68 --; column 3, line 50, for "12" read -- 14 --; column 6, line 50, for "an" read -- and --.

Signed and sealed this 3rd day of November 1964.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents