Oct. 31, 1967 R. C. J. PALSON ET AL 3,349,898

REEL CASE WITH ROTATABLE LOCK

Filed May 18, 1966 2 Sheets-Sheet 1

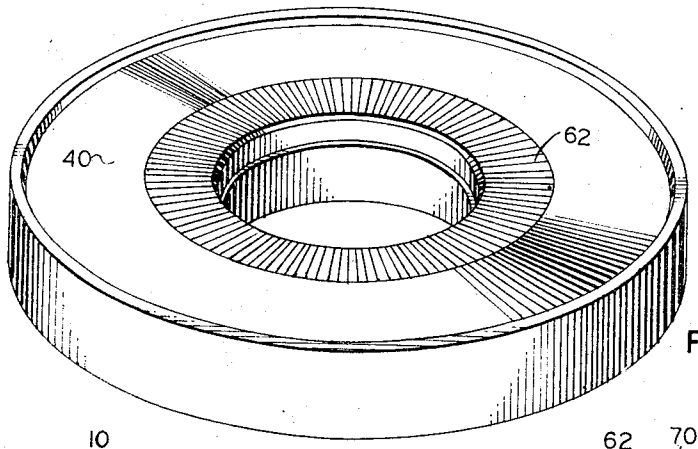


FIG. 1

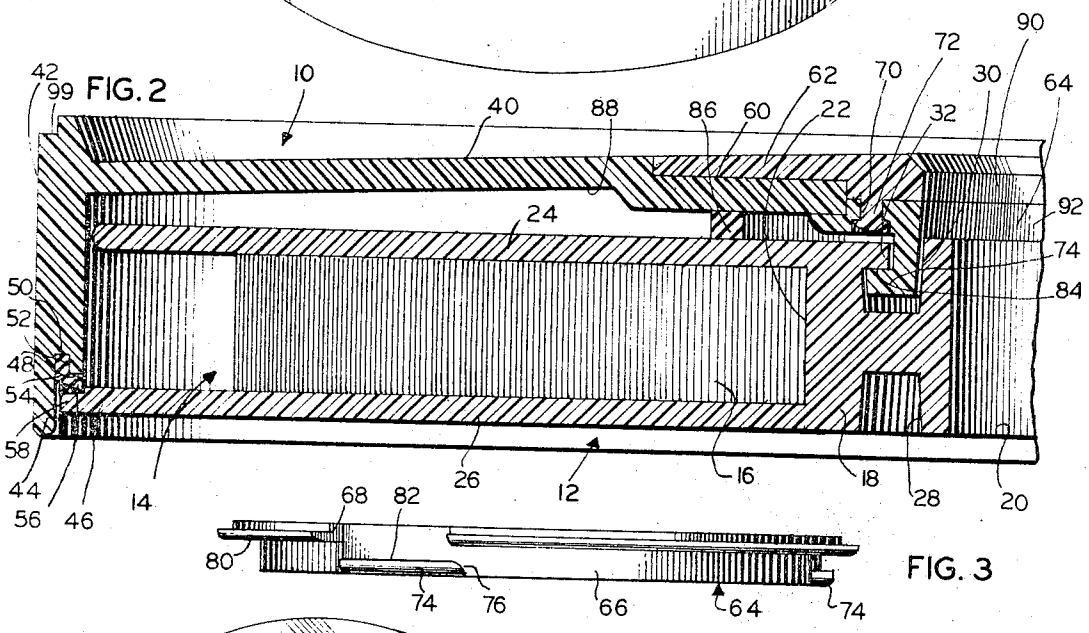


FIG. 2

FIG. 3

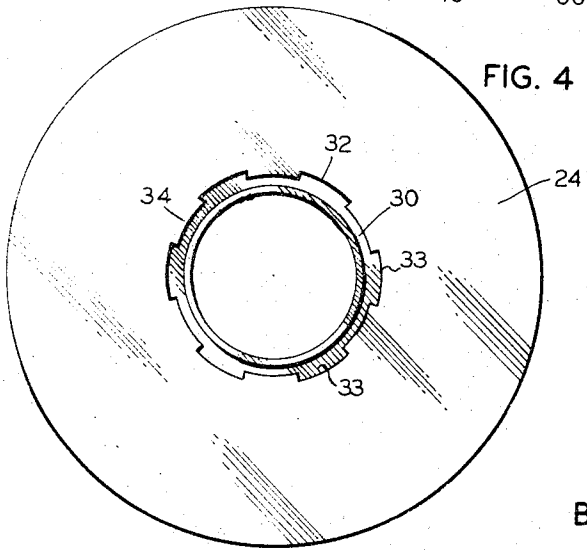


FIG. 4

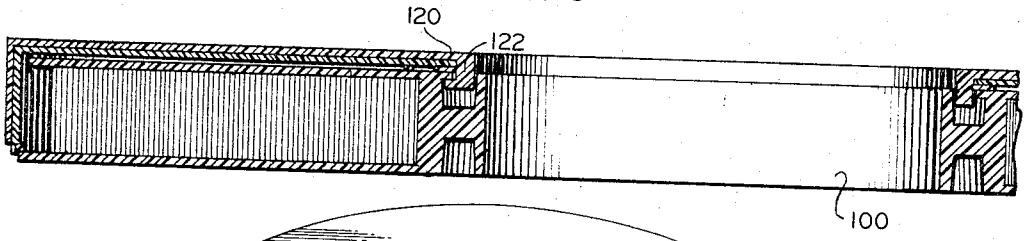
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FIG. 5



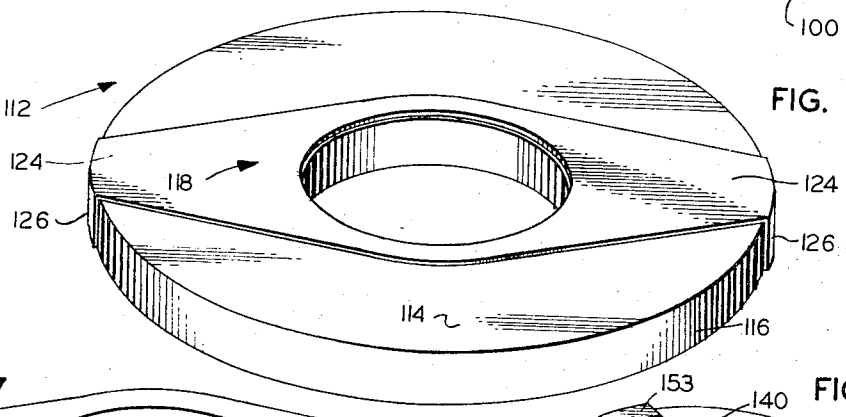


FIG. 6

FIG. 7

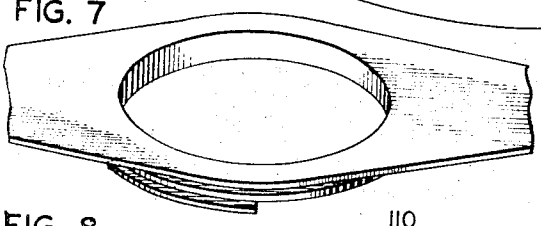


FIG. 9

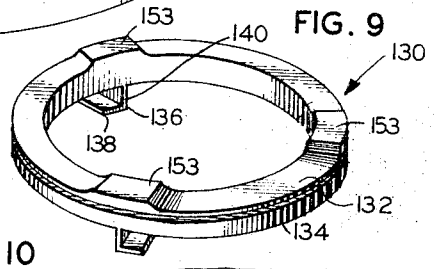


FIG. 8

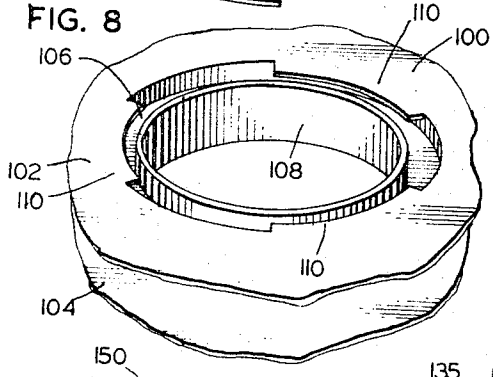
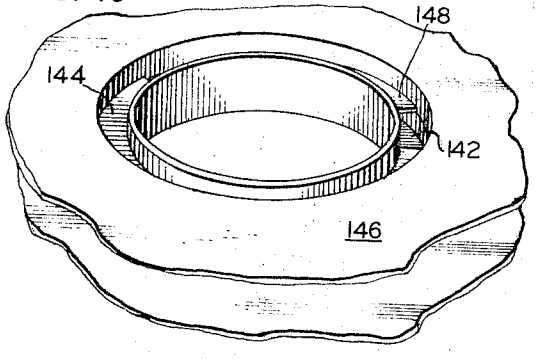


FIG. 10



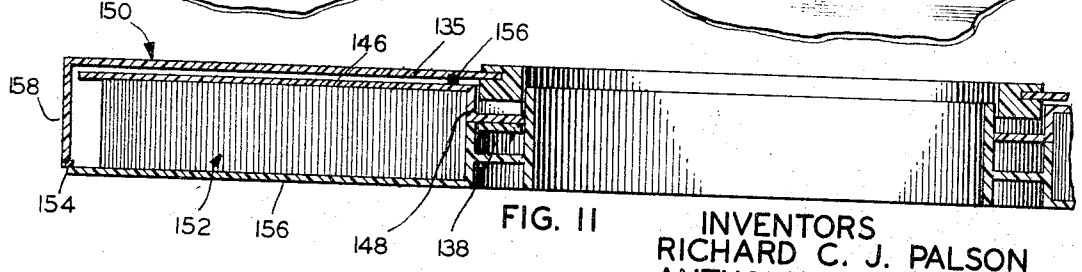


FIG. 11

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3,349,898

REEL CASE WITH ROTATABLE LOCK

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Filed May 18, 1966, Ser. No. 551,085
10 Claims. (Cl. 206—52)

This invention relates to reel closures and more particularly comprises a one-piece case which forms a sealed closure for magnetic tape reels.

At the present time there are generally two types of tape reel closures on the market; namely, reel cases composed of a base and cover which lock together to form a complete container for the reels, and the so-called wrap-around closures which are in the general shape of a band that extends about the reel periphery to form a seal at the periphery of the reel flanges. Each of these closure types has certain advantages, and it is the object of the present invention to combine many of the advantages of each in a new form of closure.

A more specific object of this invention is to provide a reel closure which may be mounted on and removed from a reel while the reel is supported on the chuck or spindle of the machine on which it is used.

Another important object of this invention is to provide a reel closure which may be locked and unlocked on the reel by a very simple turning operation and without overcoming the considerable friction of a gasket moving over the surface of a stationary member.

To accomplish these and other objects, the reel closure of this invention is generally in the shape of an annular plate with a peripheral skirt that together form a tray with a hole in the center. The hole in the center is approximately equal in diameter to the opening in the hub of the reel and the two are aligned when the reel is in the closure. Sealing gaskets are provided in the closure on the inner face of the annular plate and adjacent the outer edge of the skirt so that when a reel is placed in the tray the outer reel flange engages the gasket on the skirt and the periphery of the inner reel flange engages the gasket on the annular plate. A locking device is carried by the plate and is rotatable with respect to it, and it is designed to engage a mating locking device on the reel so that when the locking device is actuated, the reel is drawn against the gaskets to form a tight closure.

These and other objects and features of this invention along with its incident advantages, will be better understood and appreciated from the following detailed description of several embodiments thereof, selected for purposes of illustration and shown in the accompanying drawing, in which:

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

FIG. 2 is an enlarged fragmentary cross-sectional view of the reel and closure shown in FIG. 1;

FIG. 3 is a side view of one component of the closure shown in FIGS. 1 and 2;

FIG. 4 is a top view of the reel shown in FIGS. 1 and 2;

FIG. 5 is a fragmentary cross-sectional view of another embodiment of this invention;

FIG. 6 is a perspective view of the reel and closure shown in FIG. 5;

FIG. 7 is a fragmentary perspective view of a portion of the locking mechanism on the closure of the embodiment of FIGS. 5 and 6;

FIG. 8 is a fragmentary perspective view of the complementary portion of the locking mechanism formed on the reel of FIGS. 5 and 6;

FIG. 8 is a fragmentary perspective view of the complementary portion of the locking mechanism formed on the reel of FIGS. 5 and 6;

FIG. 9 is a perspective view of a closure locking mechanism of another embodiment of this invention;

FIG. 10 is a fragmentary perspective view of the complementary portion of the reel that receives the locking mechanism of FIG. 9; and

FIG. 11 is a fragmentary cross-sectional view of the reel and closure employing the locking mechanism of FIGS. 9 and 10.

The embodiment of this invention shown in FIGS. 1–4 includes a closure **10** and a reel **12** which together define a sealed chamber **14** for tape **16** wound about the hub **18** of the reel. The reel shown is exemplary of reels used for computer tape, but it is to be understood that the principles of this invention may be embodied in other forms of reels such as are used for audio tape, film and other kinds of strip material.

The reel **12** includes a hub **18** having an inner flange **20** adapted to fit on the chuck or spindle of a machine and an outer flange **22** upon which the tape **16** is wound. The reel also includes a pair of flanges **24** and **26** secured to the hub and which with the flange **22** of the hub define the chamber **14**. The hub **18** and the flanges **24** and **26** may be made of either plastic or metal, or some other material suitable for this particular purpose and may be composed of one or more parts fabricated separately and subsequently secured together to form the complete reel. A typical reel construction into which this invention may be embodied is shown in Burgess et al. Patent No. 3,229,928, issued Jan. 18, 1966.

The hub **18** in the embodiment shown includes a recess **28** which is conventionally found in magnetic tape reels for receiving a lockout ring (not shown). The recess **28** is located on the rear side of the reel customarily facing the machine upon which the reel is mounted, and a second recess **30** is provided on the front face of the reel, which recess is not conventionally provided. In the reel shown, the recess or slot **30** is defined in part by the inner hub flange **20** and the inner edge **32** of the front reel flange **24**, but it is to be understood that this slot may be defined by the outer hub flange **22** or by some other reel part. For example, the slot may be molded as an integral part of the hub, whether the hub be made of plastic, aluminum, a combination of these materials, or some other material or materials.

In FIG. 4 the inner edge **32** of the flange **24** is shown provided with a plurality of tabs **34** that overhang the outer margin of the slot **30** at spaced intervals about the annular slot. The tabs **34** define gaps **33** of approximately the same width between them. In FIG. 4 six such tabs are shown. As will be apparent below, these tabs **34** comprise one part of the locking mechanism for securing the closure **10** on the reel.

The closure **10** in the embodiment shown in FIGS. 1–3, is composed of an annular wall **40** substantially equal in diameter to the reel flanges **24** and **26**, and an outer skirt **42** which is somewhat greater in axial extent than the

thickness of the reel **12**. The free end **44** of the skirt **42** disposed adjacent the periphery **46** of the inner reel flange **26** is provided with a step defined by shoulder **48**, which shoulder has a recess **50** at its outer diameter that receives gasket **52**. Gasket **52** includes a cylindrical portion **54** and a bent over tab portion **56**. The cylindrical portion **54** of the gasket is seated in the recess **50** while the tab portion **56** is positioned to engage the inner face of the periphery **46** of the reel flange **26** to form a seal at that location when the reel is placed within the closure. It will be noted in FIG. 2 that the inner peripheral edge of the reel flange **26** includes a shallow step **58** that defines a seat for the tab portion **56** of the gasket. It will also be noted in the embodiment that the diameter of rear reel flange **26** is slightly greater than the diameter of front flange **24** so that when the reel is placed in the closure the front flange clears the gasket **52** while the rear flange engages it to form the seal.

A shallow well **60** is provided on the outer face of the annular wall **40** of the closure **10** on which is mounted a bezel **62**. The outer surface of the bezel **62** is preferably ribbed or otherwise provided with an irregular texture so as to enable the bezel to be turned easily by the thumbs in the well **60**. The bezel **62** carries a collar **64** which is shown in detail in FIG. 3. The collar **64** forms the male portion of the locking mechanism and cooperates with a slot **30** in the reel to retain the closure in place.

The collar **64** includes a cylindrical wall **66** that fits into the recess **30** and an annular flange **68** which is secured to the bezel **62** and lies outside the slot **30** when the closure is mounted on the reel. A plurality of holes **70** (one shown in FIG. 2) are provided in the annular flange **68** and receive pins **72** that may be formed as an integral part of the bezel to secure the bezel and collar together. The outer end of the pin **72** is shown to be enlarged over the shoulder in the hole **70**, which may be achieved by causing the pin material to flow after the two parts have been assembled on the main annular wall **40** of the closure. It is to be understood that several such holes **70** and pins **72** are spaced about the bezel collar assembly to keep the two in the assembled relationship sandwiched over the inner edge of the wall **40**.

Three ribs **74** of a circumferential length substantially equal to or slightly less than the width of the gaps **33** at the annular slot **30** are carried on the inner end of the cylindrical wall **66** of the collar **64**, and one end **76** of each rib is beveled at the top. The space between the lower surface **80** of the annular flange **68** and the upper surface **82** of the ribs **74** exceeds the thickness of the tabs **34** on the reel flange **24** so that the ribs **74** may be turned beneath the tabs **34** and cooperate with their lower surface **84** to hold the closure in place on the reel.

As indicated above, the bezel is rotatable on the seat **60**, and rotation of the bezel causes rotation of the collar **64**. Therefore, in order to secure the closure **10** on the reel **12** it is only necessary to align the ribs **74** with the gaps **33** so that the ribs may drop in the slots beneath the level of the tabs **34**. Thereafter, rotation of the bezel through approximately 30° will axially align the ribs **74** with the tabs **34** in overlapped relationship, which achieves locking of the closure on the reel.

The gasket **52** defines a seal at the periphery **46** of the inner reel flange **26**, and a second gasket **86** secured to the inner face **88** of the annular wall **40** defines a seal between the closure and the outer surface of the outer reel flange **24**. It is apparent that if the gaskets **52** and **86** are pressed firmly against the respective parts of the reel, the chamber **14** which houses the tape is sealed completely enclosed. Therefore, no contaminants such as dust can reach the tape **16** when the closure **10** is mounted as shown.

It is evident that the collar **64** may be dimensioned so as to cause the outer flange of the reel to compress the gasket **86** and the inner flange **26** of the reel to compress the gasket **52** when the collar is turned so that the ribs **74** lie beneath the tabs **34**. That is, the parts may be so dimensioned that the locking operation of the bezel and collar draws the reel into the skirt **42** of the closure and forms effective seals at the locations of the two gaskets.

In FIG. 2 it will also be noted that the inner edge **90** of the bezel **62** and the inner surface **92** of the collar **64** are coplanar with or slightly outside the inner surface of the hub flange **20**. Therefore, when the reel **12** is mounted on the chuck or spindle of a machine, the closure **10** may be mounted on the reel. That is, the closure **10** does not interfer with the mounting of the reel on a chuck or spindle. Consequently, the closure **10** permits an operator to mount the reel in place on a machine while the closure is in place on the reel, and thereafter the operator may remove the closure to expose the tape **16** to thread it through the machine. Similarly, after the operator is through with the reel, he may place the closure **10** over it, turn the bezel **62** with his thumbs so as to close the lock, and thereafter remove the tape reel in the sealed condition within the closure from the machine. Thus, the reel may be transported from the point of storage to the machine and from the machine back to the point of storage while the tape chamber is completely sealed.

The use of ribs **74** of relatively short circumferential length and providing a greater number of tabs **34** facilitates the alignment of the ribs with the gaps **33**. It is evident that the ribs **74** in the embodiment shown can only be 15° out of alignment with the gaps **33** when the parts are brought together. The operator need only turn the bezel clockwise or counterclockwise at most through 15° to achieve alignment, and subsequently locking may be accomplished by turning the bezel only 30° with the ribs **74** beneath the tabs **34**.

It is evident from the foregoing description that the combination reel and closure shown in FIG. 1 may be handled readily by grasping the closure at approximately opposite parts of the skirt **42** with the thumbs over the annular wall **40**. By placing the thumbs on the surface of the bezel **62**, the operator can conveniently spin the bezel in place to manipulate the lock.

For nesting, a seat **99** is provided at the upper edge of skirt **42**, which receives the lower edge of the skirt of an identical closure placed on it. The shoulder on the inner edge of the seat holds the stack of closures in axial alignment.

The embodiment of FIGS. 5–8 differs only slightly from the embodiment of FIGS. 1–4. In fact, the reel may be of exactly the same configuration. The reel **100**, the hub region of which is shown in detail in FIG. 8, includes a front flange **102**, rear flange **104**, and locking slot **106** between the inner hub flange **108** and the inner edge of the outer flange **102**. For convenience, but three tabs **110** are shown in the margin of the slot **106** but it is to be understood that any number may be employed. The closure **112** includes an annular wall **114** and a skirt **116**. The locking member **118** of the closure is schematically shown in FIG. 5 to be composed of a bezel portion **120** and a collar portion **122** that fits within the slot **106**. It is to be understood that while these are shown as a unitary structure in FIG. 5 they may be made in separate parts just as in the embodiment of FIGS. 1–4.

The bezel in this embodiment, however, includes a pair of outwardly extending arms **124** that reach the periphery of the closure **112** and in fact include handle flanges **126** that overlie the outer surface of the closure skirt **116**. The handles **124** formed as an integral part of the bezel are provided to facilitate manipulation of the locking member. It will be appreciated that the longer handle will make it easier for the operator to turn the collar **122** in the slot **106** when actuation of the lock is desired. It may be somewhat more convenient for the operator to turn the bezel by means of the handles **124** than by use of the bezel configuration shown in the embodiment of FIGS. 1–4 which is normally actuated by the thumbs. However, the convenience of the particular user will dic-

tate whether handles of the type shown in FIGS. 6 and 7 are provided.

The embodiment of FIGS. 9–11 also differs slightly from the embodiment of FIGS. 1–4. In this embodiment the position of the ribs on the locking collar is changed, but otherwise the locking arrangement is substantially the same. Note in FIGS. 9 and 11 that the locking mechanism **130** carried on the closure includes a bezel **132** and a collar **134** that lie on either side of the inner margin of the annular wall **135** to sandwich that inner edge so that the collar and bezel together may rotate on it. While the two are shown to be formed as an integral part in the drawing, it is to be understood that the two may be formed separately and be secured together in place on the inner edge of the annular wall, typically in the manner of the embodiment of FIGS. 1–4.

Extending downwardly from the lower surface of the collar **134** are three hook-shaped members **136** that include ribs **138** and supports **140**. The hook-shaped members **136** are adapted to fit into openings **142** provided in the base of annular slot **144** at the inner edge of outer reel flange **146**. In FIG. 11 the slot is shown to be defined by a step **148** provided at the inner edge of the outer reel flange **146**. The openings **142** may be formed by circumferential breaks or gaps in the lower surface of the steps **148**. It is evident that to lock the closure **150** on the reel **152** the hook-shaped members **136** are positioned in the slots **142** and the bezel is thereafter turned in a counterclockwise direction as viewed in FIG. 9 so as to place the rib portions **138** of the hook-shaped members under the margin of the openings **142**.

It will be noted that in this embodiment gaskets **154** and **156** are provided at the inner edge of the cylindrical wall **158** and the inner surface of the annular wall **136** of the closure member **150**, and these gaskets are compressed to form seals at the periphery of the inner reel flange **160** and the outer surface of the outer reel flange **146** when the lock is closed and draws the closure tightly onto the reel. That is, the closure in this arrangement serves to draw the reel into the closure within the skirt **158**. Similar gaskets are also provided in the embodiments of FIGS. 5–8 for this same purpose. The upper surface of bezel **132** carries ribs **153** to facilitate turning. It should be understood that the bezel may be provided with handles **124** of the type shown in FIGS. 5–8 if desired.

From the foregoing description it will be appreciated that a new form of closure is provided that has many of the attributes of both the wrap-around closure and the case having a separate base and cover. It may be made of plastic material and molded in attractive colors with ornamental designs. In all of the embodiments of this invention, the reel may be mounted on and removed from the chuck or spindle of the machine while the closure is in place. The closure is in the form of a tray which receives the reel, and the locking mechanism which is rotatably mounted on the tray cooperates with the mating locking slots in the reel to draw the two close together and compress the sealing gaskets on the closure. It is to be understood that the gaskets may be provided on the reel as opposed to the closure and the same function may be performed.

Because numerous 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 several embodiments 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 and closure for magnetic tape comprising
a reel having a hub and a pair of generally parallel front and rear flanges, said hub having a central cylindrical hub wall for receiving the spindle of a machine on which the reel is to be used,

a recess provided in the front side of the reel radially outwardly of the cylindrical hub wall,
a closure for the reel having a cylindrical wall of a width at least substantially equal to the width of the reel measured at the periphery of the flanges,
sealing means engaging one edge of the cylindrical wall and the periphery of the rear flange of the reel to seal the two together when the closure is on the reel,
an annular wall as part of the closure secured at its periphery to the other edge of the cylindrical wall,
sealing means engaging the annular wall of the closure and the front flange of the reel to seal the two together when the closure is on the reel,
and locking means carried by and movable with respect to the annular wall and cooperating with the recess for releasably locking the closure on the reel with the sealing means operative so that the closure forms a seal about the reel.

2. A reel and closure as defined in claim **1** further characterized by said locking means including
a collar rotatably mounted on the inner edge of the annular wall,
gripping means carried by the collar,
and means provided in the margin of the recess and adapted to be engaged and released by the gripping means when the collar is in its locking and releasing positions.

3. A reel and closure as defined in claim **2** further characterized by said gripping means including a plurality of wings that extend radially outward on the collar,
and the last named means including a plurality of additional wings secured to the outer margin of the recess and extending radially inward therefrom and when circumferentially aligned with the first recited wings holding the closure on the reel.

4. A reel and closure as defined in claim **2** further characterized by said gripping means including a plurality of hook-like members carried by the collar and extending in the direction of the rear flange,
said last named means including a plurality of slots in the bottom of the recess and engaged by the hook-like members when the collar is in the locked position.

5. A reel and closure as defined in claim **2** further characterized by
the inner diameter of the collar being at least as large as the inner diameter of the cylindrical hub wall.

6. A reel and closure for magnetic tape comprising
a reel having a hub and a pair of generally parallel front and rear flanges, said hub having a central cylindrical hub wall for receiving the spindle on a machine on which the reel is to be used,
a closure for the reel having a cylindrical wall of a width at least substantially equal the width of the reel measured at the periphery of the flanges,
sealing means engaging one edge of the cylidrical wall and the periphery of the rear flange of the reel to seal the two together when the closure is on the reel,
an annular wall as part of the closure secured at its periphery to the other edge of the cylindrical wall,
sealing means engaging the annular wall of the closure and the front flange of the reel to seal the two together when the closure is on the reel,
and locking means movably mounted on the annular wall and releasably engaging the hub causing the closure to form a seal about the reel when the locking means is moved on the annular wall.

7. A reel and closure as defined in claim **6** further characterized by
said locking means including a collar rotatably mounted on the annular wall and being movable rotatably between locked and unlocked conditions, said reel and wall remaining in the same circumferential relation when the collar is rotated to lock and unlock the closure from the reel.

8. A reel and closure as defined in claim 7 further characterized by

a bezel connected to the collar and disposed on the outer face of the annular wall for rotating the collar on that wall.

9. A reel and closure as defined in claim 8 further characterized by

handle means connected to the bezel and extending to the periphery of the closure for facilitating rotation of the bezel and collar on the closure.

10. A reel and closure as defined in claim 6 further characterized by

each of the sealing means being mounted on the closure.

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