Aug. 25, 1970 T. S. KULKA 3,525,427

REEL CLOSURE

Filed March 26, 1968 2 Sheets-Sheet 1

Fig. 1

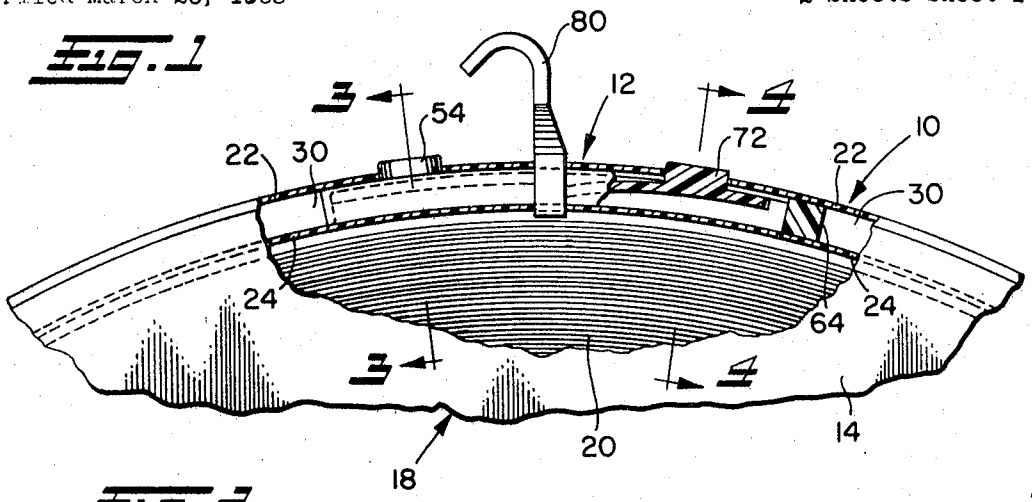
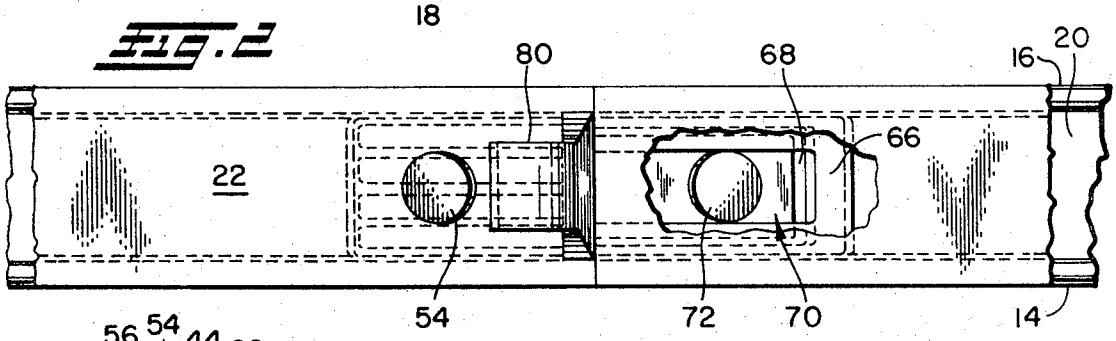


Fig. 2



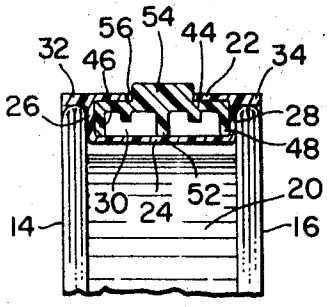


Fig. 3

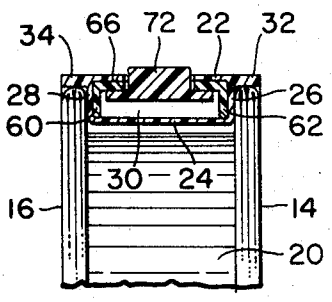


Fig. 4

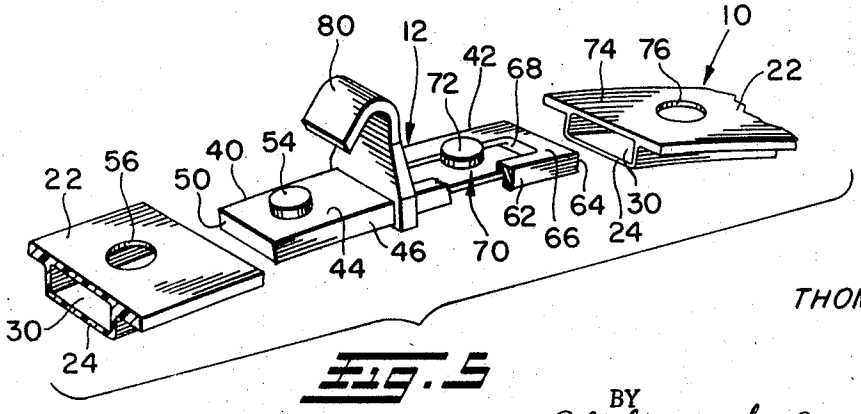


Fig. 5

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REEL CLOSURE

Filed March 26, 1968 2 Sheets-Sheet 2

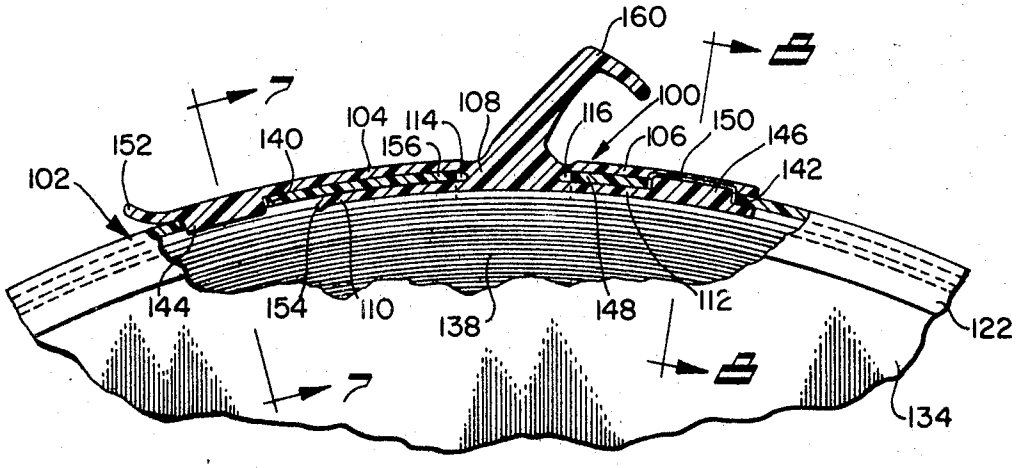


Fig. 6

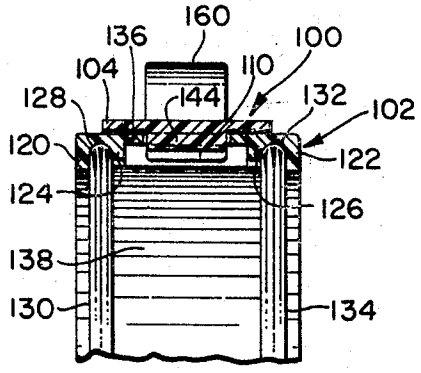


Fig. 7

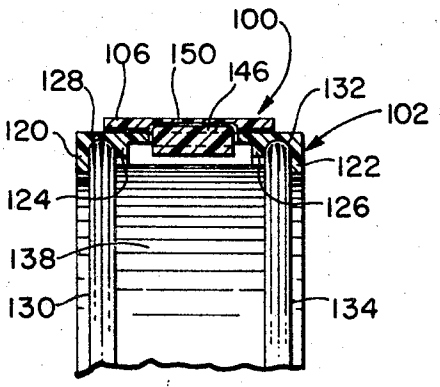


Fig. 8

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3,525,427

REEL CLOSURE

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Int. Cl. B65d 85/67
U.S. Cl. 206—52 10 Claims

ABSTRACT OF THE DISCLOSURE

A reel closure comprising a one-piece hollow plastic band for closing the area between the flanges of a tape reel thereby protecting the tape or film wound on the reel. The band is a plastic extrusion having wall formations of relatively thin cross-section, with the inner wall of the closure disposed between the reel flanges accommodating the decrease in diameter of such inner wall upon the application of the closure to the reel. A latching member is provided, one end of which is permanently attached to the band at one end thereof and the opposite end constructed for temporary latching with the free end of said band. A modified latching member is provided for use where tape diameters prohibit the use of a hollow reel closure.

BACKGROUND OF THE INVENTION

The present invention relates as indicated to a reel closure and more particularly to a protective reel band adapted to enclose the space between the side flanges of a reel thereby protecting the tape or film wound on the reel from dust, dirt and the like.

Reel closures of the type here concerned have been in use for a rather long period of time and for the purpose above indicated. However, the use of tapes in the audio, video and computer fields has increased substantially to the point where storage of such reels presents a problem. Inasmuch as it may be desired to store tapes for relatively long periods of time between use, it is desirable and occasionally necessary that the protective closure means be associated with the reel to prevent the entrance of dirt, dust and other deleterious material into direct contact with the tape or film to avoid damaging the same.

Although essentially any type closure that serves to fully occupy the space between the flanges outwardly of the tape or film will serve to accomplish the above-noted purpose, other factors enter in which make certain types of reel closures more practical to use than others. Perhaps the most important factor is economic, with the cost of the reel closures being relatively high where a large number of reels are required to be stored.

A further consideration is one of function, that is, the ease in which the reel closure can be applied to or removed from the reel flanges, and the degree to which the closure fulfills its intended objective of preventing entrance of deleterious material into the area inwardly of the closure.

SUMMARY OF THE INVENTION

It is accordingly an object of the present invention to provide a protective reel closure than can be manufactured at relatively low cost.

A further object of the present invention is to provide a protective reel closure that can be simply and quickly applied to or removed from the reel flanges. More specifically, the present invention comprises a two-part assembly including an elongated, one-piece reel band and a locking or latching member. The latching member and one end of the band are constructed and arranged to form a substantially permanent connection, and the opposite end of the band and the latching member are designed to provide temporary latching of the band on the reel

flanges when the free end of the band is moved into predetermined aligned engagement with the opposite end of the latching member.

In accordance with a further aspect of the invention, an object of the invention is to provide a modified latching member adapted to be permanently connected to one end of the band and temporarily latched to the other, with such modified latching member finding advantageous use where the diameter of the tape prohibits use of the hollow reel band.

These and other objects of the invention will become apparent as the following description proceeds.

DESCRIPTION OF THE DRAWING

In said annexed drawing:

FIG. 1 is a fragmentary side elevational view of the present invention with certain parts including the side flanges of the reel being broken away to more clearly expose the reel band and latching member;

FIG. 2 is a fragmentary top plan view of the reel band and latching member, with the band being broken away in one section;

FIG. 3 is a sectional view taken along line 2—2 of FIG. 1;

FIG. 4 is a sectional view taken along line 3—3 of FIG. 1;

FIG. 5 is a perspective view of the latching member;

FIG. 6 is a fragmentary side elevational view of a modified form of the invention wherein a latching member of somewhat different construction is temporarily latched to a solid reel band;

FIG. 7 is a sectional view taken on line 7—7 of FIG. 6; and,

FIG. 8 is a sectional view taken on the line 8—8 of FIG. 6.

DETAILED DESCRIPTION

Referring now in more detail to the drawing, wherein like parts are indicated by like reference numerals, and initially to the form of the invention illustrated in FIGS. 1–5, a reel band generally indicated at **10** and a latching member generally indicated at **12**, both constructed in accordance with the invention, are cooperatively engaged in a manner to be presently described so as to enclose the area between the side flanges **14** and **16** of a reel generally indicated at **18**. The reel **18** is per se conventional and forms no part of the present improvements, with the same having tape or film **20** wound thereon in the usual manner, with the outer periphery of the tape **20** terminating radially inwardly of the peripheral edges of the side flanges **14** and **16**.

The cross section of the band **10** throughout the length thereof is best shown in FIGS. 2 and 3. The band thus comprises a ridge or outer wall **22** and an inner wall **24** spaced from wall **22** by continuous web flanges **26** and **28**. The walls **22** and **24** and flanges **26** and **28** thus define a continuous inner opening **30** which traverses the length of the band.

The band **10** further comprises lateral flanges **32** and **34** which form lateral extensions of and are in the same plane as the outer wall **22**. When the reel band **10** is applied to the side flanges **14** and **16** of the reel, the flanges **32** and **34** overlie the periphery of the reel flanges **14** and **16** as shown in FIGS. 2 and 3. In addition, the width of the inner wall **24** of the reel band, as defined by the web flanges **26** and **28**, is such as to be snugly received between the inner faces of the side flanges **14** and **16** of the reel so as to guard against entry of dust, dirt and the like into the area between the inner wall **24** and the tape **20**.

The reel band **10** is preferably extruded from a suitable plastic material, for example, polyethylene or polypropyl-

ene. In the extrusion process, the lateral flanges 32 and 34, which bear against the reel flanges, are made somewhat thicker than the walls 22 and 24. The inner wall 24 inherently accommodates contraction of such inner wall when the band is applied to the reel flanges 14 and 16.

The latching member 12 is preferably made of a harder and denser plastic material and is dimensioned so as to be received within the longitudinal opening 30 formed in the reel band. The latching member 12 includes opposite end sections 40 and 42, the cross sections of which are readily visible in FIGS. 2 and 3, respectively. Thus, the end 40 which is designed for permanent attachment to the reel band, comprises a continuous flat top wall 44, side walls 46 and 48, and end wall 50. The end section 40 further includes a central longitudinally extending rib 52 to rigidify the end section in the area between the side walls.

Attached to the top wall 44 of the end section 40 is a disc or button 54 which is adapted to extend upwardly through an opening 56 formed therefor in the adjoining end section of the reel band 10, with FIG. 3 of the drawing showing the button 54 projecting through such opening to effectively permanently connect the latching member 12 to such end of the reel band.

The opposite end 42 of the latching member is shown in cross-section in FIG. 4 and comprises side walls 60 and 62, end wall 64, FIG. 1, and a top wall 66. As can be seen in FIG. 5, the latter is formed with a longitudinally extending central opening 68, the purpose of which will be presently made apparent.

A resilient latching arm generally indicated at 70 is secured in cantilever fashion to the center section of the latching member 12, with the free end of such latching arm extending in the opening 68 toward the end wall 64 of the end section 42, with the side walls of the latching arm 70 being suitably spaced from the edges of the side walls 60 and 62 to permit actuation of the latching arm 70 without interference.

A button 72 similar to the button 54 is attached to the upper surface of the latching arm 70 generally intermediate the length thereof, with the free end 74 of the reel band 10 being formed with a complemental opening 76 to receive the button 72 when the reel band is applied to the flanges of the reel 18.

In the form shown, the latching member 12 is provided with a hook 80 which permits the reel 18 to be conveniently suspended from a suitable support thereby providing convenient storage of the tape.

The latching member 12, including the buttons 54 and 72, and the hook 80, are preferably made from a relatively hard, suitable plastic material, for example, high density polyethylene or the like.

The latching member 12 is permanently attached to the end 82 of the reel band 10 by inserting the leading end of the end section 40 of the latching member into the opening 30, and moving the latching member 12 into such opening until the button 54 engages the end of the band. The outer wall 22 of the band, being of relatively thin cross-section, is then moved radially outwardly until the button reclears the wall to permit continued movement of the latching member into the opening 30. The inherent resilience of the plastic material will cause the outer wall 22 to move toward, and relatively snugly receive, the top wall 44 of the end section 40. When the button 54 reaches the opening 56, the button 54 will project upwardly through such opening, with the resiliency of the reel band material effectively retaining the button 54 in latched position in the opening 56 thereby substantially permanently connecting the end 40 of the latching member to the reel band. As shown, the button 54 and opening 56 are aligned when the end wall of the reel band engages the hook 80. However, it will be understood that other stop or abutment means could be provided to effect the desired alignment.

When it is desired to apply the reel band to the

flanges 14 and 16 of the reel 18, the inner wall 24 of the band is positioned between the inner faces of the side flanges 14 and 16 of the reel 18 as above described, with the radially inner faces of the side flanges 32 and 34 tightly engaging the peripheral edges of the side flanges 14 and 16. As the reel 18 is thus enveloped by the reel band, the free end 74 of the reel band is telescoped over the free end 42 of the latching member 12. When the leading edge of the reel band engages button 72, which is resiliently biased upwardly above the plane of the top wall 66, as shown in FIG. 4, the button 72 is manually depressed until the top thereof is positioned below the outer wall 22 of the reel band. The reel band is then moved further on the section 42 of the latching member until the leading edge of the band engages the hook 80, which engagement is simultaneous with the alignment of the button 72 with the opening 76 formed in the outer wall 22 of the reel band. When the button 72 is released, the latching arm 70 inherently springs radially outwardly until the top face of the latching arm resiliently engages the under surface of the outer wall 22 of the band and the button 72 projects through the opening 76. The reel band 10 is thus temporarily latched or locked in place on the reel flanges and the reel 18 can be conveniently stored or otherwise handled until further use.

When it is desired to again use the tape or film wound on the reel 18, it is necessary only to manually depress the button 72 and withdraw the free end 74 of the reel band away from the end section 42 of the latching member 12. When these members have become disengaged, the band 10 can be simply removed from contact with the reel flanges, and the reel 18 is ready for further handling.

In certain circumstances the diameter of the tape on the reel may prevent application of the reel band illustrated in FIGS. 1–5 to the reel flanges. There is illustrated in FIGS. 6–8 a modified form of latching member adapted to be used with reel bands of a solid nature and of less transverse dimension than the hollow reel band above described.

Referring to FIGS. 6–8, the modified latching member generally indicated at 100 is adapted to be operatively connected, in the manner presently described, to a reel band generally indicated at 102. The latter is of conventional construction and need not be described in detail.

The latching member 100 comprises upper arms 104 and 106 extending longitudinally from the central section 108. A pair of lower arms 110 and 112 are provided below and spaced from the upper arms 104 and 106, with the arms 104 and 110 thus defining therebetween an elongated opening 114 and the arms 106 and 112 defining an elongated opening 116.

As best seen in FIGS. 7 and 8, the reel band 102 comprises continuous side flanges 120 and 122 and annular ribs 124 and 126. The side flange 120 and rib 124 define an annular slot or groove 128 adapted to receive the reel flange 130, and the side flange 122 and rib 126 similarly define an annular groove 132 for receiving reel flange 134 all in well-known manner. The reel band further comprises an outer solid wall 136 which functions when the band is applied to the reel flanges to fully close the space between the flanges 130 and 134 and thus protect the tape or film 138.

The reel band 102 is formed with openings 140 and 142 relatively adjacent the ends of the band for receiving buttons or discs 144 and 146, respectively, carried by the latching member 100. Specifically, the button 144 is integrally formed with or attached to the inside of the upper arm 104 and is adapted to extend downwardly through the opening 140 for temporary latching the band, as will be presently described. Button 146 is formed integrally with or is attached to the lower arm 112 and is adapted to extend upwardly through opening 142 formed in the end 148 of the reel band. The upper arm 106, in the region thereof immediately above the button 146, is formed with the recess 150 for reception of the

upper portion of the button **146** thereby more securely to lock the reel band to the latching member. As will be apparent, an opening could be formed in the upper arm **106** completely therethrough to receive the button **146** in lieu of the recess **150**.

The reel band **102** can be formed of any suitable material, for example, polyethylene or polypropylene, and the latching member **100** can similarly be formed of a plastic material preferably harder and more dense, for example, high density plypropylene or the like. The specific material employed and the thickness thereof will in part be dictated by the desired flexibility in the upper and lower latching arms **104**, **106**, and **110**, **112**.

The upper latching arm **104** is formed at the end thereof with an upturned flange **152** to facilitate latching and unlatching of the band, and the lower arm **110** is similarly formed with a downturned flange **154** to facilitate entry of the leading free end **156** of the band when the same is latched in place.

The latching member **100** is substantially permanently connected to the end **148** of the reel band in the following manner. The upper and lower latching arms **106** and **112**, respectively, are flexed slightly away from each other to receive the leading end **148** of the reel band with such flexing being sufficient for such leading end to extend over and clear the button **146**. Continued movement of the leading end **148** will bring the opening **142** of the reel band into alignment with the button **146** at which time the arms **106** and **112** are released, with the inherent resiliency of the material effecting a snug reception of the leading end **148** of the reel band between the arms **106** and **112**. To enhance the locking condition, the button **146** is shown enlarged and partially received in the recess **150** formed in the upper arm **106**. When thus assembled, the end **148** of the reel band is firmly locked to the adjacent end of the latching member.

In the described condition wherein the end **148** is thus locked to the latching member **100**, the band can be stored when not in use with a hook **160** being provided for suspending the band if desired.

When the reel band **102** is desired to be applied to the reel flanges **130** and **134**, the reel band is applied to the reel flanges as above described until the free end **156** of the reel band is disposed relatively adjacent the free end of the latching member **100**. At such time, the upper latching member **104** is flexed upwardly by grasping the flange **152** and the leading end **156** of the reel band inserted into the opening **114** between the arms **104** and **110**. The end of the reel band is moved in such opening **114** toward the hook **160** until the opening **140** moves into alignment with the button **144**, at which time the flange **152** is released and the button caused to project through the opening **140**. The free end **156** is thereupon temporarily latched in place until such time as it is desired to remove the reel band from the reel flanges, which removal operation is initiated by raising the upper arm **104** through a manual grasping of the flange **152** to disalign the button **144** from the opening **140**, thereby permitting the end **156** of the band to be withdrawn from the latching member.

Although in the FIG. 6 form the end of the lower arm **110** terminates forwardly of the latching button **144**, it will be understood that the arm **110** could be extended as shown in the permanent locking arrangement at the right of FIG. 6 and formed with an opening or recess for partial reception of the button **144**. This would serve better to secure the band to the latching member in the temporarily latched condition. It will also be understood that the buttons **144** and **146** could be carried by the arms opposite the same, the reversal of FIG. 6, or could both be carried by the upper or lower latching arms, with the only requirement being that means be provided at one end of the latching member for effecting the temporary latching of the reel band thereto. Likewise, an opening could

be formed in the latching arm **106** in lieu of recess **150** for locking the button **146** in place.

It should also be understood that the free end of the reel band, in both the FIGS. 1–5 and FIGS. 6–8 forms thereof, could be formed with a second opening or groove to permit expansion of the band for removing the band from the reel flanges, without completely disengaging the latching member **100** from the reel band. For example, referring to the FIGS. 6–8 form of the invention, the free end **156** of the band **102** could be formed with an opening relatively near the tip of such end, similar in size to opening **140**, for receiving button **144** when the latter is withdrawn from opening **140** and the band expanded. Such expansion would permit the band to be removed from the reel flanges **130** and **134**, while maintaining the reel band and latching member engaged.

It will thus be seen that the objects of the invention have been accomplished. Either form of latching member can be simply and economically manufactured. The substantially permanent connection of one end of the latching member and an adjoining end of the reel band can be quickly effected. The application of the reel band to the side flanges of the reel is similarly effected with little effort, with the free end of the reel band being temporarily latched following manual actuation of the latching arm carried by the latching member.

I claim:

1. A reel band, a latching member for temporarily latching the free end of said reel band around the flanges of a reel, said latching member comprising a pair of flexible upper latching arms extending longitudinally from the central section of said latching member, a pair of flexible lower latching arms extending longitudinally from said central section, said lower latching arms being disposed below and spaced from said upper arms, with each associated pair of upper and lower latching arms defining therebetween an opening receiving the associated end of said reel band, first means substantially permanently connecting one end of said latching member to one end of said reel band, and second means at the opposite end of said latching member temporarily latching the other end of said reel band to said latching member when said other end of said reel band is disposed in said opening defined by the adjacent, associated pair of upper and lower latching arms.

2. The latching member of claim **1** wherein said first and second means comprise a pair of latching buttons each of which is carried by one of said upper or lower arms of an associated pair of arms, said buttons being adapted to extend through complemental openings formed in said reel band for latching said reel band on the flanges of a reel.

3. The latching member of claim **1** wherein said first means for permanently connecting said latching member to one end of said reel band comprises a latching button carried by one of said lower latching arms of an associated pair of upper and lower latching arms, said button being adapted to extend through an opening formed in a reel band when an end of the latter is inserted between said flexible upper and lower latching arms, for permanent connection of said one end of said band to said latching member, said upper arm being formed with a recess for receiving the top of said button for supplementing the permanent connection of said band.

4. The latching member of claim **1** wherein said temporary latching means comprises a latching button formed on and extending downwardly from the upper arm of an associated pair of flexible upper and lower latching arms, said button being adapted to extend through a complemental opening in the associated end of said reel band for temporarily latching the same in place when said band has been inserted between said upper and lower latching arms, and means on said upper latching arm to permit manual grasping of said arm for moving the same relative to said associated lower latching arm to permit in-

sertion of said reel band and for temporarily latching the same on removal of said reel band from the reel flanges.

5. The latching member of claim 1 wherein said first means for permanently connecting said latching member to one end of said reel band comprises a latching button carried by one of said lower latching arms of an associated pair of upper and lower latching arms, said button being adapted to extend through an opening formed in a reel band when an end of the latter is inserted between said flexible upper and lower latching arms, for permanent connection of said one end of said band to said latching member, said upper arm being formed with an opening for receiving the top of said button for supplementing the permanent connection of said band.

6. The latching member of claim 1 wherein said temporary latching means comprises a latching button carried by one of said latching arms, said button being adapted to extend through a complemental opening in the associated end of said reel band for temporarily latching the same in place between said upper and lower latching arms, said end of said band being formed with a second opening spaced further toward the tip of said end of said band for temporarily latching said band when the same has been expanded thereby to permit said band to be removed from the flanges of said reel without disengaging said band from said latching member.

7. A reel band, a latching member for temporarily latching the free end of a reel band around the flanges of said reel, said latching member comprising a pair of upper latching arms extending longitudinally from the central section of said latching member, a pair of lower latching arms extending longitudinally from said central section, said lower latching arms being disposed below and spaced from said upper arms, with each associated pair of upper and lower latching arms defining therebetween an opening receiving the associated end of said reel band, first means operatively engaging one end of said latching member to one end of said reel band, and second means at the opposite end of said latching member operatively engaging the other end of said reel band to said latching member when said other end of said reel band is disposed in said opening defined by the adjacent, associated pair of upper and lower latching arms.

8. The latching member of claim 7 wherein said first and second means comprise latching buttons carried by certain of said upper and lower latching arms.

9. The latching member of claim 8 where the latching arms of each associated pair of upper and lower latching arms opposed to said arms carrying said latching buttons are provided with recesses for receiving said buttons, said band being formed with spaced openings through which said buttons extend when said latching member operatively engages said reel band.

10. A reel band for closing the space between the side flanges of a reel thereby protecting the tape or film wound

thereon, said band being of one-piece plastic construction and of a length to extend fully circumferentially around said reel, said band having continuous outer, inner, and connecting side walls all of which define a rectangular opening throughout the length of said band, said band comprising laterally extending annular flanges extending outwardly from and lying in the plane of said outer wall for engaging the outer peripheral edges of the side flanges of said reel, a latching member, said latching member being dimensionally smaller in cross-section than said rectangular opening so as to be telescopically received therein, means for effecting a substantially permanent connection between adjacent ends of said band and said latching member when the latter is telescopically positioned within said band, said permanent connection comprising a button formed on said latching member, the outer wall of said band being formed with a complemental opening adapted to receive said button when said band is telescoped over the adjacent end of said latching member, said adjacent end of said latching member tightly engaging the outer, inner and side walls of said band when said button is received in said opening, thereby establishing a substantally permanent connection therebetween, and means for effecting a temporary latching of the free end of said band and the other end of said latching member when said free end has been moved so as to telescopically receive said other end of said latching member, thereby retaining said band on said reel flanges, said temporary latching means comprising a latching arm connected at one end to the central portion of said latching member and having a free end extending longitudinally toward an end of said latching member, said latching arm being disposed entirely below the top wall of said end of said latching member and being provided with a latching button extending upwardly through an opening formed therefor in said top wall, the outer wall of the adjacent end of said band being formed with an opening for receiving said latching button, depression of said latching button permitting telescoping application of said band on said end of said latching member, with release of said button effecting projection of said button through said opening thereby temporarily latching said band on said reel flanges.

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U.S. Cl. X.R.

24—230