LOCKING DEVICE FOR REEL CONTAINER

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ABSTRACT OF THE DISCLOSURE

A locking mechanism for containers for computer tape reel which may be opened and closed by one-hand operation only. The locking mechanism for the reel container has a locking element on the base, another locking element on the cover of the reel container, and means are provided for normally maintaining these elements in an interlocking engagement. Means axially slidable within the cover are provided for disengaging the first and second locking elements so as to permit separation of the cover portion and the base portion and to permit access to the reel contained within the container.

REFERENCE TO RELATED CASES

This invention is a continuation-in-part application of my co-pending application Ser. No. 632,337 filed Apr. 20, 1967, now abandoned.

BACKGROUND OF THE INVENTION—FIELD OF THE INVENTION AND DESCRIPTION OF THE PRIOR ART

This invention relates to an improved locking mechanism for containers for storing computer tape reels.

Computer tape is highly sensitive to any impurities which may come in contact with the tape. Computers themselves are normally operated in rooms having very carefully controlled temperature and humidity conditions while being maintained in a substantially dust-free atmospheric condition. The tape reels themselves are normally kept in containers which store the tape in dust-sealing relationship from the atmosphere.

It is extremely important that the tape stored on the reel be free of dust or other impurities which may cause "drop-outs" or errors in reading of the tape when the tape is being used on a computer. Computer manufacturers are necessarily highly sensitive to the manner in which tape reels used on their computers are stored. The manufacturers require that the tapes not only be stored in dust-sealing containers, but they also require that the locking mechanism which secures the reel container in a locked condition must not produce any wearing of the parts resulting in generation of dust or impurities which may come in contact with the tape stored on a reel.

One of the most common types of computer tape reel containers used today is the type shown in Hultgren Patent No. 3,208,585 wherein the container includes a cover portion and a mating base or bottom portion. The bottom container half includes a central aperture whereina gasket, secured to the cover portion of the container, is inserted. A handle on the cover is rotated by one hand while the other hand holds the bottom half. This rotation causes the gasket to be disengaged outwardly into dust-sealing engagement with the inner periphery of the central aperture in the base portion. This prior art construction although highly successful, has certain disadvantages.

One of the disadvantages of the construction shown in Hultgren et al. Patent No. 3,208,585 is that to open and close the container, it is necessary that the operator use two hands, as described above. A locking mechanism, which is simple and fast in operation, wherein the tape reel container could be opened and closed by single-hand operation would be highly desirable.

As in any device which is competitive with other devices, it is important that the construction be as economical as possible while providing a product of a high quality. Although the mechanism shown in Hultgren et al. Patent No. 3,208,585 is relatively economical, any reduction in the number of parts, simplification of assembly costs, and overall reduction in manufacturing costs would be highly desirable.

Also, the lock of Hultgren et al. Patent No. 3,208,585 provides no axial force pulling the container halves together. Thus, once the container halves are positioned together and the lock closed, there is no assurance that the periphery of the container halves is in dust-sealing relationship because there is no axial force pulling the container parts together.

SUMMARY OF THE INVENTION

It is therefore an important object of this invention to provide an improved locking mechanism for a container for a computer tape reel wherein the locking mechanism may be easily manipulated by one hand only, merely by depressing a button to disengage the locking elements of the mechanism.

It is also an object of this invention to provide an improved computer tape reel container which has a locking mechanism operable by one-hand manipulation only which at the same time provides for a quick and simple opening for the container.

It is a further object of this invention to provide an improved lock for containers for computer tape reels wherein the locking mechanism has substantially no wearing of parts to cause undesired generation of particles which could come in contact with the tape.

It is yet another object of this invention to provide an improved locking mechanism for a computer tape reel wherein the locking mechanism is particularly characterized by its simplicity and economy in construction and manufacture.

It is still another object of this invention to provide an improved locking mechanism for a computer tape reel wherein substantially the entire construction is made of molded plastic parts.

Still a further object of the invention is the provision of a lock for a computer tape reel container wherein the lock axially pulls the container halves together into dust-sealing relationship.

Further purposes and objects of this invention will appear as the specification proceeds.

In one aspect of the invention, the improved lock for a computer tape reel container generally includes a locking element secured to the top half of the container, another locking element secured to the bottom half of the container, the two locking elements being in interlocking engagement to secure the container halves together, and an axially slidable pushbutton for permitting disengagement of the two locking elements so that the container halves can be separated. In another aspect of the invention, the top of the container has finger grips proximate to the pushbutton so that an operator can lift upwardly on the finger grips to raise the top container half while the operator depresses the pushbutton to disengage the locking elements so that the container halves may be separated with one hand only.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to the accompanying drawings, there are illustrated various preferred embodiments of the present invention, wherein:

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FIGURE 1 is a top plan view of a container having my improved locking mechanism for storing a computer tape reel;

FIGURE 2 is an enlarged cross-sectional view of the container and locking mechanism of FIGURE 1 taken along the line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged fragmentary sectional view taken along the line 3—3 of FIGURE 1, particularly showing the internal construction of one preferred form of the improved locking mechanism while in the locked position;

FIGURE 4 is an enlarged fragmentary sectional view, similar to FIGURE 3, showing the locking mechanism as the actuating pushbutton disconnects the locking elements of the locking element;

FIGURE 5 is another enlarged fragmentary sectional view, similar to FIGURES 3 and 4, showing the actuating pushbutton in the depressed position with the locking elements disengaged;

FIGURE 6 is a transverse sectional view through the locking mechanism taken along the line 6—6 of the embodiment of FIGURE 3;

FIGURE 7 is another transverse cross-sectional view through the locking mechanism taken along the line 7—7 of the embodiment of FIGURE 3;

FIGURE 8 is a top plan view of an alternate embodiment for the finger grips on the cover portion of the reel container of FIGURE 1;

FIGURE 9 is an enlarged fragmentary sectional view, similar to FIGURE 3, showing an alternate embodiment of my improved locking mechanism for a computer tape reel container;

FIGURE 10 is a transverse cross-sectional view through the alternate locking mechanism taken along the line 10—10 of FIGURE 9;

FIGURE 11 is an enlarged fragmentary sectional view, similar to FIGURES 3 and 9, showing still another alternate embodiment of my improved locking mechanism for a reel container;

FIGURE 12 is an enlarged fragmentary sectional view, similar to FIGURE 11, showing the locking elements in the disengaged position;

FIGURE 13 is a transverse cross-sectional view through the embodiment of FIGURE 11 taken along the line 13—13 of FIGURE 11;

FIGURE 14 is an enlarged fragmentary sectional view, similar to the embodiment shown in FIGURE 3, showing the internal construction of a preferred embodiment of the locking mechanism while in the locked position, including flexible means for positively moving the container halves apart; and

FIGURE 15 is a view similar to FIGURE 14, showing the flexible means as it moves the container halves apart.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings and particularly to FIGURES 1 and 2, an enclosed container, generally 20, for storing a computer tape reel R, shown in phantom view in FIGURE 2, includes a bottom portion or half 22 and a top or cover portion or half 24.

The bottom container half 22 includes a planar circular base 26 having an upright outer cylindrical wall 28 extending from the base portion 26. The outer periphery of the solid base 26 includes a relatively short, peripheral upright flange 30 substantially parallel to the circular container wall 28. A compressible gasket 32 is confined in the channel defined between the upright flange 30 and the upright wall 28. The interior central area of the continuous base 26 includes an upright annular shoulder 34 which is spaced inwardly from and is substantially parallel to the outer container wall 28. A circular gasket 36, L-shaped in cross section, extends around the shoulder 34 and extends outwardly therefrom to provide for dust-sealing engagement with the inner periphery of the hub H on the reel shown in FIGURE 2. The bottom half 22 of the container 20 is preferably molded of a rigid, clear, high impact plastic, such as high impact styrene.

The top half 24 of the container 20 includes an annular planar portion 38 and a cylindrical wall 40 at the outer periphery which extends from and is substantially perpendicular to the planar portion 38. The wall 40 telescopes around the wall 28 of the bottom portion 22. The bottom edge 42 of the wall 40 is pressed in dust-sealing relationship with the gasket 32 in the bottom container half 22. The cover 24 includes a central depression 44 and a central substantially cylindrical raised portion 46, the raised portion 46, raised portion 46, and wall 40 are integrally formed with the planar portion 38. An upright wall 48 defines the outer portion of the central depression 44. The wall 48 has an L-shaped gasket 50 secured around its inner surface at the place of meeting the inner surface of the annular upper surface 82. A tapered gasket 50 also extends inwardly along the inner surface of the planar portion 38. The gasket 50, like the gasket 36, provides dust-sealing engagement for the hub H of the reel R within the container 20. Referring to FIGURE 2, when the container is in the closed position, the reel R is held in dust-sealing relationship with the opposite sides of the inner peripherals of the hub H engage the gaskets 36 and while the outer periphery of the container 20 is sealed by abutment of the bottom edge 42 of the wall 40 with the gasket 32.

Referring particularly to FIGURES 3—7, one preferred form of my improved locking mechanism, generally 52, is shown in detail. The locking mechanism 52 is generally coextensive with the central portion 46 of the cover 24. The locking mechanism 52 includes certain portions which are permanently secured to the bottom container half 22 while other portions are permanently secured to the top half 24 of the container 20.

An upright rigid locking post 54 is fixedly secured to the bottom container half 22. An aperture 56 is provided at the center of the base 26. The upright post 54 includes a reduced lower cylindrical end 58 which is snugly received within the aperture 56. Since the upright post 54 is preferably constructed of a suitable rigid molded plastic material, such as nylon, a suitable plastic cement or solvent may be used to rigidly secure the post 54 to the bottom container half 22. The locking portion of the post 54 has an enlarged upper end or head portion 60. A tapered or frusto-conical surface 62 extends outwardly from the shank 64 of the post 54 to the outer cylindrical periphery of the upper head 60. The upper frusto-conical surface 62, as will be hereinafter described in greater detail, cooperates with flexible locking fingers 66 which are secured to the top container half 24.

A collar 68 is reciprocally slidable received around the shank 64 of the locking post 54. The collar 68 is slidably confined between the upper surface of the base 26 and the enlarged head 60 at the upper end of the post 64. The collar 68 has an important provision of an annular recess 70 which is defined between the rigid locking post 54 and an outer upright annular wall 72 of the collar 68. The collar 68 has a downwardly extending annular wall 74 which acts as a stop to limit the downward movement of the collar 68.

A spring 76 is mounted around the shank 64 of the rigid locking post 54 and is axially confined between the collar 68 and the base portion 26 of the bottom container half 22. The spring 76 is coextensive with the collar 68 and normally biases or urges the collar 68 upwardly towards the enlarged head portion 60 of the locking post 64.

The central raised portion 46 of the container top half 24 includes an annular upright integral wall 78 which terminates with an upper edge 80 defining an opening therearound. A flexible locking element, generally 82, of the locking mechanism 52 is secured to the annular upper edge 80. The flexible locking portion 82 includes an
annular planar portion 84, the lower surface of the outer periphery being secured to the upper edge 80 of the wall 78. The parts are desirably rigidly secured by a suitable plastic cement or solvent.

It is important that the annular portion 34 has the downwardly extending flexible fingers 66 integral therewith. The flexible fingers 66 provide locking engagement with the enlarged head portion 60 of the locking post 54. It is important that sufficient flexibility be provided for the fingers 66, since they must flex around the head 60. A suitable strong, yet flexible, molded plastic, such as nylon, is used for the flexible locking element 82. Elongated slots separate a plurality of flexible fingers 66, such as four, from each other. The lower ends 86 of the flexible fingers 66 include generally arcuate inwardly projecting portions or beads 88 which engage the sloped locking surface 62 of the locking post 52 to maintain the top and bottom container halves 22 and 24 in the desired interlocking engagement. The inwardly projecting beads 88 are, when maintained in the closed position, in abutment with the sloped locking surface 62 of the enlarged head 60. The inwardly projecting beads 88 of the locking fingers 66 are confined in the annular recess 70 between the collar wall 72 and the enlarged head 60. Since the rigid locking element 54 and the flexible locking element 82 are both of suitable molded plastic, there is no wear therebetween when the parts are moved in and out of locking engagement, thereby avoiding the undesired generation of particles.

An actuating member or pushbutton 90 is slidably carried axially of the container 20 by the planar connecting portion 84 of the flexible locking member 82. A plurality of apertures 92 are provided in the planar portion 84 and slidably receive downwardly extending actuating fingers on the pushbutton 90. A circular top 96 is provided on the pushbutton 90 and is integral with the actuating fingers 94.

The lower ends of the actuating fingers 94 are in abutting relationship with the upper end of the annular wall 72 of the collar 68. The spring 76 biases the collar 68 and thereby the button member upwardly. An outwardly extending annular flange 98 is provided at the upper end of the button 90. A cap 100 is secured, as by adhesive or solvent, to the outer upper portion of the upright central wall 78 of the container central portion 46. The cap 100 includes a central aperture coextensive with the opening defined by the wall 78. The pushbutton 90 is slidably contained within these apertures. It is important to have the cap 100 include a continuous inwardly projecting peripheral lip 102 which abuts the annular shoulder 98 of the button 90. The spring 76 thereby biases the button 90 upwardly into abutting relationship with the annular lip 102 of the cap 100.

It is important for the cap 100 to have an outwardly projecting radial ridge 106. The continuous ridge 106 provides a place for an operator to place his fingers thereunder and thereby open and close the container 20 by the use of one hand only. The fingers are inserted downwardly into the annular depression 44 of the top container half 24 and under the annular ridge 106 while the actuating button 90 is depressed by thumb pressure.

Although it is believed that the manner of using the locking mechanism 52 is apparent from the foregoing description, a brief description of the operation will more clearly explain the invention. Referring to FIGURE 3, the locking mechanism 52 is shown in the closed position, locking the bottom container half 22 to the top container half 24. In this position, the flexible locking fingers 66 have their inwardly projecting beads 88 in locking engagement with the frusto-conical surface 62 at the enlarged upper end of the rigid locking post 54. The annular wall 72 of the collar 68 acts to maintain the flexible fingers 66 in locking engagement with the enlarged head 60. The spring 76 urges the collar 68 upwardly to confine the locking beads 88 in the recess 70. Without depressing the actuating button 90, it is impossible to separate the bottom container half 22 from the top container half 24 because of the locking engagement between the rigid post 54 and the flexible fingers 66. The axial force is exerted from the place where the locking engagement of the flexible fingers 66 and the locking post 54 is in an axial direction and resists separation of the container halves. The axial force also pulls the two container halves together in an axial direction so that the gasket 32 is positively held in sealing engagement with the bottom edge 42 of the outer container wall 60. This axial force also assures that the hub H of the reel R is held in snug, sealing engagement with the L-shaped gaskets, 50 and 56. The spring 76 not only serves the function of maintaining the collar 68 in position to maintain the flexible fingers 66 in interlocking engagement with the rigid locking post 54, but the spring 76 also forces the actuating fingers 94 and thereby the actuating button 90 upwardly. This upward force drives the annular shoulder 98 of the pushbutton 90 into contact with the peripheral lip 102 of the cap member 100, to thereby substantially provide dust-sealing engagement between the cap 100 and the button 90. When the container is in the closed position, there is substantially no opportunity for dust or other particles of any type to pass to the interior of the container.

Referring to FIGURE 4, when it is desired to open the container, it is merely necessary for an operator to place two fingers underneath the gripping ridge 106 of the cap 100, which is secured to the top container half 104, and then depress the actuating button 90 with the thumb of the same hand. As shown in FIGURE 4, as the actuating button 90 is depressed downwardly, the actuating fingers 94 drive the collar 68 downwardly. When this occurs, the annular collar wall 72 no longer confines the lower ends of the flexible locking fingers 66 in the recess 70 between the wall 72 and the rigid post 54.

Reverting to FIGURE 5, to separate the container halves 22 and 24, the operator merely lifts upwardly with his fingers under the gripping ridge 106 while the thumb maintains pressure on the actuating button 90. The locking beads 88 on the flexible fingers 66 slide along the sloped locking surface 62 of the rigid post 54 upon flexing of the fingers 66. The locking engagement between the flexible fingers 66 and the enlarged locking head 60 of the rigid post 54 is thereby released so that the container halves may be readily separated.

In order to reclose the container 20, downward pressure is applied to the cap 100 and the container halves are pushed together. This downward force activates the collar 68 since the lower ends of the flexible fingers 66 engage the top of the wall 72 to force the collar 68 downwardly. When this occurs, the flexible fingers 66 flex outwardly to permit their locking beads 88 to slide under and into engagement with the locking surface 62 of the rigid locking post 54. When the locking beads 88 are in engagement with the post 54, the spring 76 biases the collar 68 upwardly so that the flexible fingers 66 are trapped in the recess 70 between the annular wall 72 and the rigid post 54. The container is now in the closed position.

The locking device 52 enables an operator to handle the opening and closing of the container with one hand only. There is substantially no wear between the various parts including the rigid locking post 54 and the flexible fingers 66, at least partially due to the molded plastic structure for most parts. Although there is sliding engagement between the flexible fingers 66 and the rigid head 60, tests have failed to show any wear of the parts. Also, the locking mechanism 52 is simple and economical in cost of parts and in assembly costs. There are only three parts required for the upper container half and only three parts required for the lower container half, and the assembly of these parts on each half is simple. The economy of the lock 52 is enhanced by the use of molded plastic parts. No fasteners are required in the
device 52. Since the connected parts are preferably of molded plastic, a rigid connection is accomplished by the use of a suitable solvent or plastic cement. The lock 52 also connects the container halves together to provide a positive dust-seal for the container.

Referring to FIGURES 14 and 15, there is shown an alternate embodiment similar to the embodiment of FIGURES 3-7 except for the addition of a part for moving the container halves apart. When the container 20 is in the closed position, and particularly when there is no reci in the container, the container halves 22 and 24 sometimes do not separate as readily as desired and the operator may be required to use two hands to pull the container halves 22 and 24 apart. In order to positively force the container halves apart, a compressible element 103 is inserted in the space defined between the upper end of the rigid stud 54 and the lower surface of the actuating button 90 and the interior of the flexible legs 94. As shown in FIGURE 14, when the container 10 is in the closed position, the compressible element 103, preferably a hollow button-like member made of a molded flexible material, such as rubber, is held between the upper end of the stud 54 and the actuating button 90. As shown in FIGURE 15, when the actuating button 90 is depressed to move the collar 68 downwardly, the button-like member 103 compresses and deforms so as to normally bias the top and bottom container halves 20 and 22 apart and positively forcing the container halves 22 and 24 apart, assuring that the container 20 may be opened and closed by one-hand manipulation only.

Referring to FIGURE 8, there is shown an alternate embodiment for gripping the top container half 24 with one hand while operating the locking mechanism with one hand. In the embodiment of FIGURES 1-7 an annular gripping ridge 106 is used. In the embodiment of FIGURE 8, the locking mechanism 52 is substantially the same as that shown in FIGURES 1-7, but the gripping is accomplished by a rigid molded plastic bar 108 passing diametrically across the annular depression 54 of the top container half 24 and being secured to the central portion 46. As in the previous embodiment, it is merely necessary for the operator to place two fingers underneath the gripping bar 108 while pressing the button 90 downwardly to effect release of the top and bottom container halves.

Referring to FIGURES 9 and 10, an alternate embodiment locking mechanism 110 is shown in detail. The locking mechanism 110 of the embodiment of FIGURES 9 and 10 is similar in construction to the embodiment 52 shown in FIGURES 1-7. The primary difference is that the locking mechanism 110 has the flexible portion of the locking device secured to the bottom container half 22, while the rigid locking element is secured to the top container half 24.

The locking mechanism 110 includes a cup-shaped flexible locking element 112 secured to the center of the interior of the base 26 of the container half 22. A rivet 114 secures the locking element 112 to the base 26 and passes through aligned apertures in the center of the base 26 and in the circular planar base portion 116 of the flexible element 112. A plurality, as four, of upwardly flexible locking fingers 118 extend upwardly from the base portion 116. The fingers 118 include inwardly projecting beads 120 at their upper ends. The flexible fingers 118 are separated by elongated slots so as to provide the necessary flexibility. Preferably, the flexible locking element 112 is molded of a suitable plastic material, such as nylon or Delrin.

As in the embodiment of FIGURE 2, a collar 122 is reciprocally slidably carried around the outer periphery of the flexible fingers 112. An annular recess 124 is defined between the flexible fingers 112 and the annular upright wall 126 of the collar 122. A recess 128 is also provided in the lower end of the collar 122. An annular downward extending wall 130 on the collar 122 acts as a stop to limit the downward movement of the collar 122.

A spring 132 is positioned around the flexible fingers 118 within the recess 128 and is interposed at its upper and lower ends between the collar 122 and the base 26 of the container half 22. The compression spring 132 urges or biases the collar 122 upwardly so that the recess 124 normally confines the outward flexing movement of the flexible locking fingers 118 so as to maintain them in a locking position. The flexible fingers 118 include outwardly projecting peripheral flanges 134 which engage the inner surface of the upright annular wall 126 of the collar 122.

A rigid locking element, generally 136, is fixedly secured to the upper edge 80 of the upright central wall 78 of the top container half 24. The planar annular portion 138 of the locking element 136 is secured, as by cement or solvent, to the upper surface of the edge 80. The annular connecting portion 138 has an integral downwardly extending hollow rigid post 140. An enlarged lower end or head 142 is provided on the post 140. The locking beads 120 of the flexible fingers 118 are normally engaged in the curved walls 122 and 24 and the edge of the bottom head 142 of the rigid element 136.

An actuating pushbutton, generally 144, is similar in construction to the actuating button 90 of the embodiment 52. The button 144 includes a planar top 146 and downwardly projecting actuating fingers 148. The actuating fingers 148 are aligned to abut the upper edge of the annular wall 126 of the collar 122. The actuating fingers 148 slidable pass through apertures 150 provided in the annular connecting portion 138 of the rigid locking element 136. The uppermost sliding portion of the locking button 144 is provided by the inwardly projecting peripheral lip 152 on the annular gripping ridge 154 secured around the upright wall 78. As in the embodiment of FIGURES 1-7, the lip 152 limits the upward movement of the button 144 by engagement with an outwardly extending peripheral ridge 156 on the actuating button 144. The spring 152 normally biases the collar 122 and the button element 144 upwardly so that there is substantial dust-sealing engagement between the lip 152 and the ridge 156.

Although it is believed that the foregoing description clearly shows the manner of using the device, a brief description of the operation of the locking mechanism 110 will be provided for a more clear understanding of this particular embodiment of the invention.

In FIGURE 9, the locking mechanism 110 is shown in the locked position. In this position, the spring 132 normally biases the collar 122 upwardly so that the wall 126 engages the lower ends of the actuating fingers 148 of the actuating button 144. Dust-sealing engagement is thereby provided between the locking beads 120 of the flexible fingers 118 and the annular circumference of the wall 126 so as to maintain the parts in a normally locked position.

When the operator desires to open the container, two fingers are placed under the gripping ridge 156 and the thumb is used to depress the actuating button 144 downwardly. This drives the collar 122 downwardly in opposition to the biasing force of the spring 132. The annular collar wall 126 moves upwardly out of contact with the ridge 134 on the flexible fingers 118. When the operator lifts upwardly with his fingers, the enlarged lower end 142 slips around the beads 120 and causes outward flexing of the fingers 118 to thereby permit separation of the container halves.

To reclose the container 20, since the spring 132 normally biases the collar 122 upwardly into engagement
with the ridges 134 on the flexible fingers 118, it is necessary for the operator to depress the actuating button 114 and place fingers under the gripping ring 156. Depression of the actuating button 144 moves the annular wall 126 downwardly out of contact with the ridges 134 when the container halves are being locked together. With the button 144 depressed, the enlarged lower end 142 of the rigid element 136 flexes the fingers 118 outwardly and the end 142 passes out of the locking bearing 120. Pressure is released from the button 144 and in the spring 132 slides the collar 122 upwardly so that the annular wall 126 confines the locking beads 120 of the flexible fingers 118 in engagement with the enlarged locking portion 122 of the rigid locking element 136.

As in the embodiment of FIGURES 1-7, the locking mechanism 110 of FIGURES 9-10 is highly economical and simple to manufacture. All of the parts, except for the spring 132 and possibly the rivet 114, are made of molded plastic materials, such as nylon or Delrin. The rivet 114 shown in the construction of FIGURES 9-10 could be replaced by providing a construction similar to that shown for locking the rigid post 54 to the base 26 in the embodiment of FIGURES 1-7. The locking mechanism 110 also has substantially no wear between moving parts. The locking mechanism 110 further provides an axial force for pulling the container halves into positive sealing engagement.

Referring to FIGURES 11-13, still another embodiment of any invention is shown in detail. The locking mechanism 158 shown in FIGURES 11-13 is even simpler in construction than the previous embodiments. The bottom container half 22 has a flexible locking element, generally 160, secured to the center of the inner surface of the base 26. Although a suitable solvent or cement may be used for securing the element 160, in the embodiment of FIGURES 11-13, a screw 162 passes through the center of the base 26 and is threadedly received by a threaded aperture in the center of the circular planar base 164 of the flexible locking element 160. The base 164 includes a plurality of three, upwardly flexing, locking legs 166. The flexible locking legs 166 are spaced about 120° apart and extend straight out from the outer periphery of the circular base 164. The locking element is preferably of a molded plastic, such as nylon or Delrin, as with other operating parts described before.

In the embodiment of FIGURES 11-13, the rigid locking element is secured to the top container half 24. The top container half 24 is somewhat different in construction than the embodiments shown in FIGURES 1-10. An upstanding central annular wall 168 surrounds a central well 170 at the center of a depressed central annular portion 172 in the top container half 24. The wall 168 is substantially cylindrical and includes an outwardly project peripheral flange 174 at its upper end. An inwardly projecting peripheral edge 176 is defined at the lower end of the central aperture 170. A channel-shaped plastic insert 177 is received on the edge 176. The insert is of a plastic, such as nylon, not subject to flaking such as the styrene edge 176. It is to be understood, however, that the insert is preferable only to increase the wear resistance of the device. The insert can be replaced by the integral edge 176 having a suitable dimension. The locking insert 177 has its innermost edge at a diameter less than the outer diameter of outwardly projecting locking elements 180 at the upper ends of the flexible fingers 166. The locking elements 180 include peripheral locking shoulders 182 which engage the planar upper surface of the inwardly projecting locking edge 176, as shown best in FIGURE 11. The peripheral upper edge 184 of each of the flexible legs 166 is substantially less than the outermost diameter of the locking shoulders 182 of the flexible legs 166. As shown in FIGURE 11, in the locked position, the sloped edge 192 of the button 186 normally rests upon the upper slanted surfaces 188 of the flexible legs 166. The shoulders 182 of the legs about the upper surface of the locking edge 176.

In order to maintain the pushbutton 186 in sliding engagement with the cover portion 24, whether in the open or closed position, an upper ring 194 is secured by solvent or cement to the upper surface of the rib 174. The inner diameter of the ring is greater than the outside diameter of the outwardly projecting stop ridge 196 along the outer periphery of the upper portion of the actuating button 186. The inner cylindrical surface of the central wall 168 has an outwardly projecting flange 98 which acts as a stop to prevent downward motion of the button 186, since the flange 198 has an inner diameter greater than the outer diameter of the ridge 196 of the button 186. The reciprocating sliding movement of the button 186 is thereby limited between the top ring 194 and the intermediate stop flange 198.

Again it is believed that the foregoing description clearly shows the operation of the device, but a brief description will be provided for a clear understanding of the invention. When in the closed position, the lower edge of the shoulders 182 of the flexible legs 166 normally engage the upper surface of the rigid locking portion 177 on the cover 22. The legs 166 provide an axial force for holding and pulling the container halves together so as to provide a positive dust-sealing relationship therebetween.

In order to release the container halves, the operator places two fingers underneath the peripheral ridge 174 around the central wall 168 and the thumb depresses the actuating button 186 downwardly to the position shown in FIGURE 12. Upon the depression of the button 186, the slanted lower edge 192 of the cylindrical wall 168 of the button 186 moves into sliding engagement with the upper slanted surfaces 188 of each of the legs 166. Since the legs 166 are flexible, the rigid wall 190 causes the legs 166 to flex inwardly out of engagement with the rigid locking portion 177 on the cover 24. When this occurs, the bottom container portion 22 is separated from the top container portion 24.

In order to lock a reel R within the container 20, it is merely necessary for the locking mechanism 158 to be placed in such a position that the rigid locking portion 177 will be aligned with the upper slanted surfaces 188 of the flexible fingers 166. Pressure is applied to the container half 24 so that the upper slanted surface 188 slides around the rigid locking portion 177 upon inward flexing of the legs 166. The locking shoulders 182 of the flexible legs 166 then snap outwardly over the rigid edge 176 to the locking position shown in FIGURE 11.

Once again the locking mechanism 158 shown in the embodiment of FIGURES 11-13 is a highly simple and economical construction. The mechanism 158 is also primarily made of plastic parts and is simple to assemble.

The mechanism 158 also permits one-handed operation and acts to positively pull the container halves together. What I claim is:

1. A container for a computer tape reel, said container comprising, in combination, a bottom member, a top member, said bottom and top members cooperating to define a chamber for receiving said tape reel, said bottom and top members each having central portions and mating outer peripheral portions, gasket means substantially co-
extensive with and between said outer peripheral portions to provide for dust sealing relationship between said bottom and top members, a first locking member secured to the central portion of said bottom member, a second locking member secured to the central portion of said top member, said first and second locking members normally being enclosed by said top and bottom members and being in interlocking engagement for securing said cover and said top members together, one of said locking members being rigid and the other of said locking members including flexible legs, said rigid locking member having a ridge, said flexible legs having projections and said projections and said legs cooperating during interlocking engagement to axially pull said top and bottom members together to apply pressure to said gasket means to provide the said dust sealing relationship between said bottom and top members, means axially movable on the central portion of said top member, one of said locking members being responsive to inward axial movement of said axially movable means towards said bottom member to disengage said locking members and permit the separation of said top member from said bottom member, said locking members being relatively slideable with substantially no wear between during movement into and out of said interlocking engagement, thereby avoiding undesired generation of particles, and means fixedly mounted on said top member and substantially surrounding said axially movable means for receiving fingers of one hand whereby the thumb of the same hand may apply inward pressure to said axially movable means to disengage said locking members.

2. The device of claim 1 in combination with a computer tape reel having a hub portion, gasket members on the interior of both said bottom member and said top member at the central portions thereof, said gasket members being in sealing engagement with said hub of said reel.

3. The device of claim 1 wherein a slidable collar is carried by said first locking member, said first locking member being rigid, said collar and said first member confine said second member in locking engagement with said rigid member, said second locking member being flexible, and said axial movable means moving said collar to permit release of said flexible locking member from confinement between said collar and said rigid locking member.

4. The device of claim 3 wherein said flexible locking member includes a plurality of downwardly extending flexible legs which are confined between said collar and said rigid locking member, said flexible locking member also has a connecting portion secured to said top member, apertures in said connecting portion, and downwardly extending collar-engaging portions on said axial movable means passing through said apertures.

5. The device of claim 3 wherein said flexible locking member comprises a plurality of spaced flexible legs, and said rigid locking member is a substantially cylindrical member engaging said flexible legs.

6. The device of claim 5 wherein said rigid member has an outward projection, and said flexible legs have inward projections, said inward projections being locked in engagement with said outward projections.

7. The device of claim 5 wherein said rigid locking member has an inward projection, and said flexible legs have outward projections, said outward projections being locked in engagement with said inward projection.

8. The device of claim 1 wherein biasing means are normally provided for separating the mating top and bottom members from each other upon disengagement of said first and second locking members.

9. The device of claim 1 wherein at least one of said locking members is of a molded plastic material so as to provide smooth sliding engagement between said locking members.

10. The device of claim 1 wherein both said locking members are of a molded plastic material so as to provide smooth sliding engagement between said locking members.

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