United States Patent [19]

Kramer

[11] **3,842,890**

[45] **Oct. 22, 1974**

[54] **COILABLE CLOSURE DEVICE**

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[22] Filed: **Feb. 9, 1973**

[21] Appl. No.: **330,953**

[52] **U.S. Cl.** **160/26**

[51] **Int. Cl.** **A47h 1/124,** E06b 9/08

[58] **Field of Search** ..... 160/23, 26, 231 A, 242, 160/264

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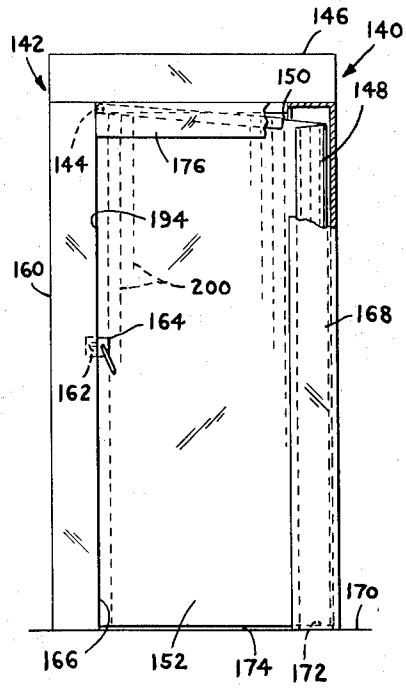
Primary Examiner—Peter M. Caun

Attorney, Agent, or Firm—Harold Weinstein

[57] **ABSTRACT**

A coilable closure device to open or close a door opening. The device includes a frame, a guide means, a vertical storage chamber and a single sheet of plastic vertically coilable upon itself within the storage chamber without the use of a post for storage when not in use. Whenever the door opening is to be closed the sheet is slid in the guide means across the frame to close the door opening. Vertical rods are embedded in the plastic sheet if extra stiffness or rigidity is desired. The guide means are either fixed or pivotal and the top of the plastic sheet can be horizontal or slanted.

4 Claims, 25 Drawing Figures



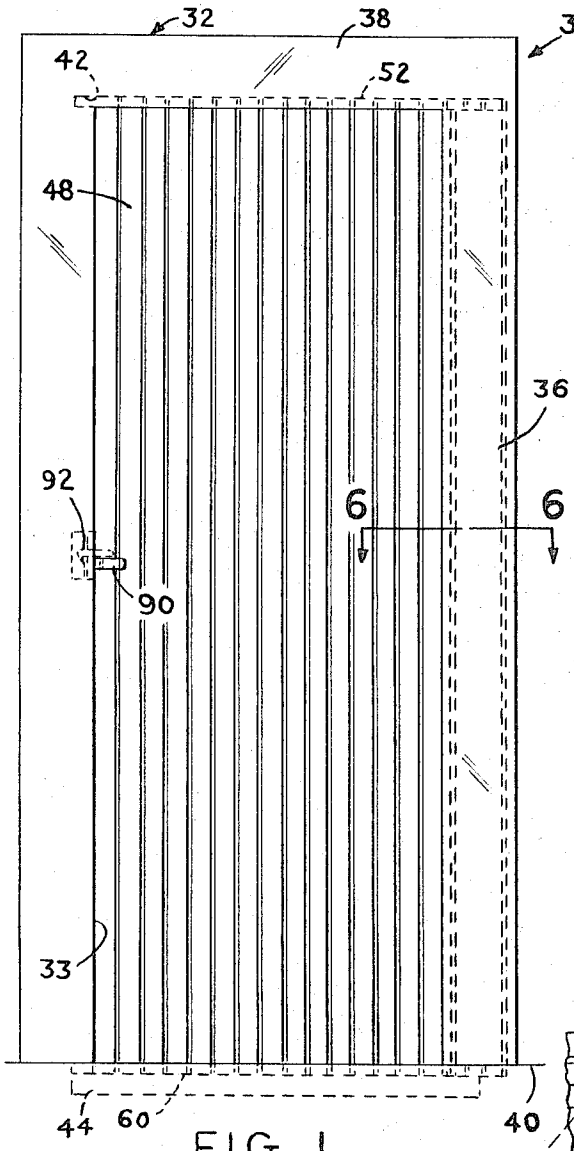


FIG. 1

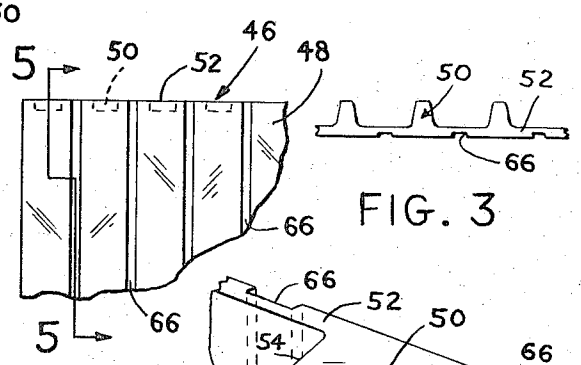


FIG. 2

FIG. 3

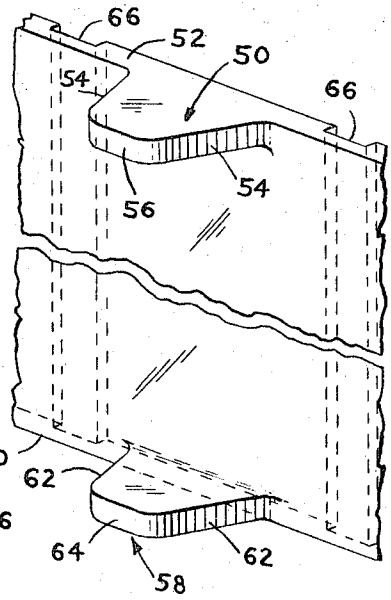


FIG. 4

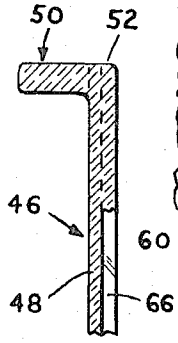


FIG. 5

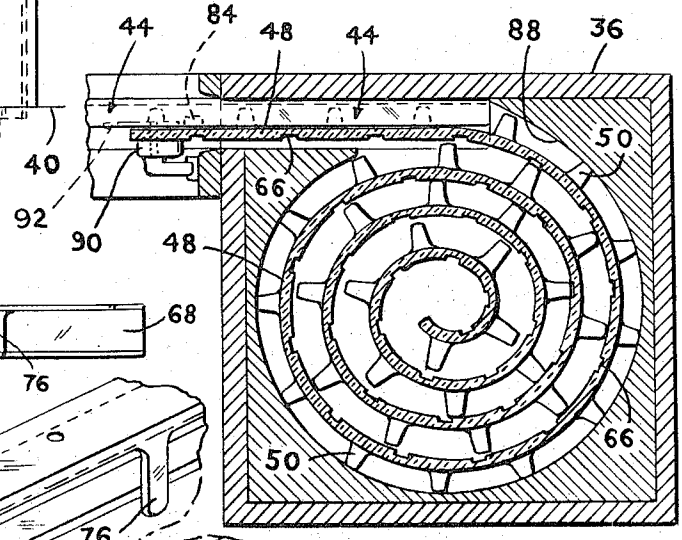


FIG. 6

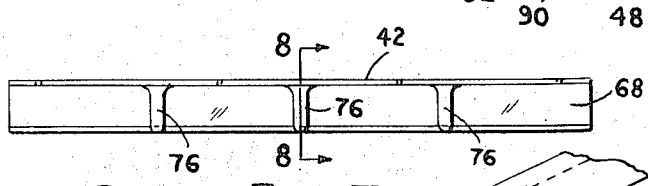


FIG. 7

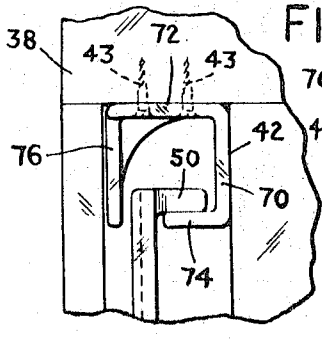


FIG. 10

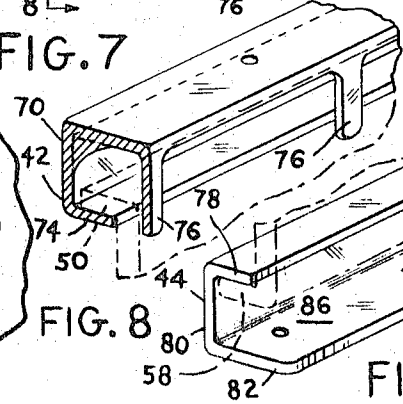


FIG. 8

FIG. 9

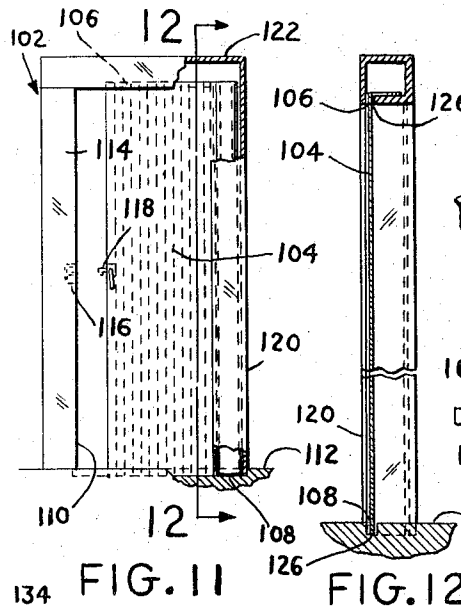


FIG. 11

FIG. 12

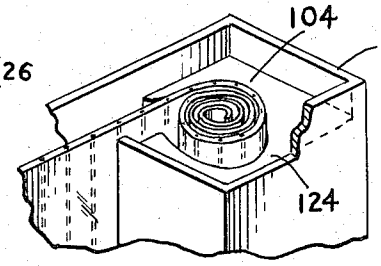


FIG. 13

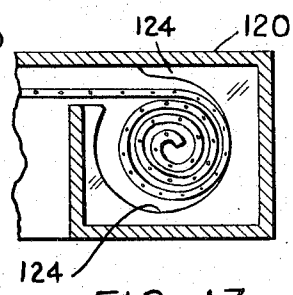


FIG. 13a

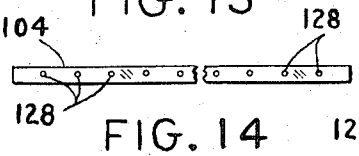


FIG. 14

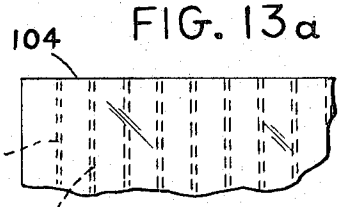


FIG. 15

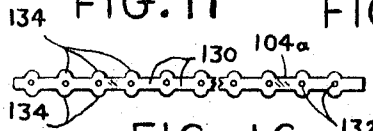


FIG. 16

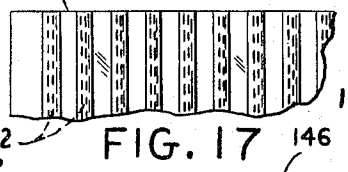


FIG. 17

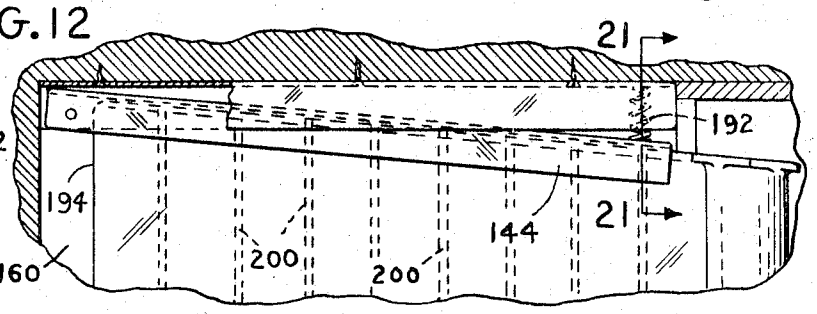


FIG. 19

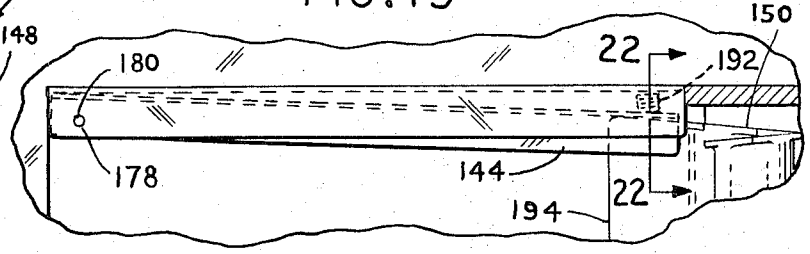


FIG. 20

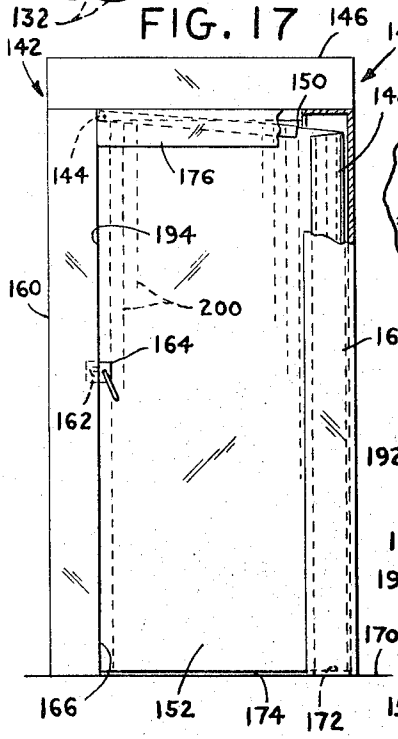


FIG. 18

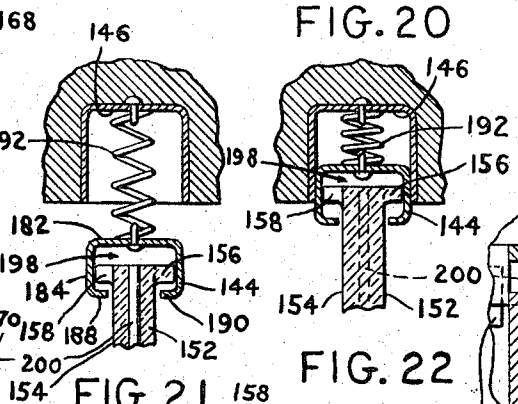


FIG. 21

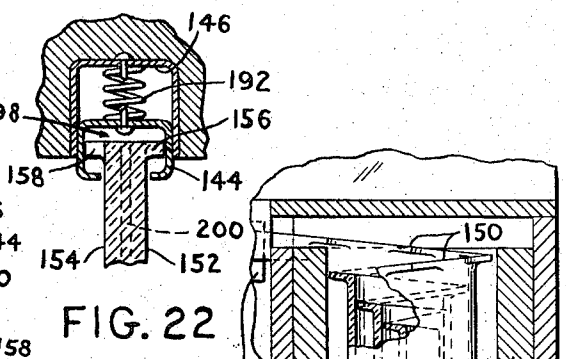


FIG. 22

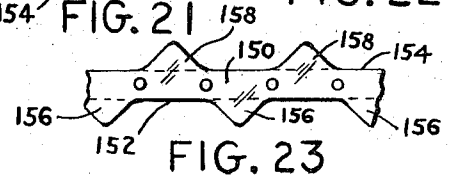


FIG. 23

FIG. 24

COILABLE CLOSURE DEVICE

BACKGROUND OF THE INVENTION

Heretofore in the prior art closures were made of slatted members or flexible sheets which were wound about a post much like a window shade. If the material were metal, wood or heavy plastic fixed guides tracks or power drives were required to roll the slideable closure member closed, but even then a large storage space was required because of the post or track.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an improved coilable closure device which is simple, economical and reliable; which overcomes the prior art disadvantages; which in the open position has a plastic sheet which upon itself coils in a tight roll without a post; which is vertically coiled within a storage chamber of the frame; which uses a single or pair of fixed guide means; which uses a plastic sheet having an enlarged top or a lengthened height to retain the sheet within the guide; which uses a pivotal guide in combination with a slanted top plastic sheet; which has a latch member serving as a stop to prevent the plastic sheet from being completely disposed within the storage chamber; and which uses vertical rods in the plastic sheet to provide stiffness and to prevent collapse thereof.

Other objects and advantages will be apparent from the following description of several embodiments of the invention and the novel features will be particularly pointed out hereinafter in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

This invention is illustrated in the accompanying drawings in which:

FIG. 1 is a front elevational view of the improved closure device of the present invention.

FIG. 2 is a partially enlarged front elevational view of FIG. 1.

FIG. 3 is a top plan view of FIG. 2.

FIG. 4 is a partial perspective view broken away showing the top and bottom guide flanges of the plastic sheet.

FIG. 5 is a sectional view taken along line 5—5 of FIG. 2.

FIG. 6 is a sectional view taken along line 6—6 of FIG. 1.

FIG. 7 is a front elevational view of the top guide track.

FIG. 8 is a view taken along line 8—8 of FIG. 7.

FIG. 9 is a side sectional view of the bottom guide track looking in the opposite direction as FIG. 8.

FIG. 10 is an assembly view of the upper portion of the closure device showing the guide mounted to the sash.

FIG. 11 is a front elevational view of a modified closure device.

FIG. 12 is a longitudinal sectional view taken along line 12—12 of FIG. 11.

FIG. 13 is a partial perspective view of the upper portion of the right side of FIG. 11.

FIG. 13*a* is a sectional plan view of FIG. 13.

FIG. 14 is a top edge view of the plastic sheet showing the vertical rods.

FIG. 15 is a partial front elevational view of the plastic sheet of FIG. 14.

FIG. 16 is a top edge view of a modified plastic sheet.

FIG. 17 is a partial front elevational view of the plastic sheet of FIG. 16.

FIG. 18 is a front elevational view, partly broken away of another modified closure device of the present invention.

FIG. 19 is a partially enlarged front elevational view of FIG. 18 in which the closure member is shown extended to close the opening.

FIG. 20 is a partially enlarged front elevational view of FIG. 18 in which the closure member is shown retracted to leave the opening open.

FIG. 21 is a sectional view taken along lines 21—21 of FIG. 19 showing the holding spring relaxed.

FIG. 22 is a sectional view taken along lines 22—22 of FIG. 20 showing the holding spring compressed by the closure member.

FIG. 23 ia a fragmentary top plan view of the guide flanges of the closure member.

FIG. 24 is a fragmentary elevational view partly broken away showing the slanted top of the coil closure member.

DESCRIPTION OF THE INVENTION

In the embodiment of the invention shown in FIGS. 1–10 an improved closure device designated generally 30 is illustrated as having a frame 32. The frame 32 is connected into the wall or other opening 33 and may be pre-assembled or assembled at site using new or existing components. The frame 32 shown in FIG. 1 includes a side jamb 34, a storage jamb 36, a top member 38 connected between the jambs 34 and 36, and a bottom floor member 40. A top guide track 42 shown best in FIGS. 1 and 7 is connected to the top member 38 by suitable means such as screws 43 (See FIG. 10). A bottom guide track 44 shown in FIGS. 1 and 9 is connected in the floor 40 below the floor line.

A closure member 46 in the form of a single sheet 48 is used to close the wall opening 33 as shown best in FIG. 1. The sheet 48 may be made of any suitable plastic. A plurality of top guide flanges 50 are formed along one side of the top edge 52 in spaced relation to each other. Each of the top guide flanges 50 extend horizontally a short distance with sides 54 sloped toward and terminating at the blunt end 56 as shown in FIG. 4.

A plurality of bottom guide flanges 58 are formed along the bottom edge 60 on the same side as that of top guide flanges 50 and immediately below the same. The bottom guide flange 58 is shaped similar to that of top guide flange 50, and extends horizontally a short distance with sides 62 sloped toward and terminating at the blunt end 64 as best illustrated in FIG. 4. A plurality of vertical relief recess 66 is formed on the side of the plastic sheet 48 opposite the flanges 50 and 58 and extends the full length thereof from top edge 52 to bottom edge 60. There is a recess 66 formed between adjacent flanges 50.

The thickness of plastic sheet 48 is predetermined to permit the plastic sheet to readily coil about itself as shown in FIG. 6. The recesses 66 allow the sheet 48 to wind tighter without fatiguing or cracking the plastic. However, the flanges 50 and 58 serve as spacers to delimit the self-coiling of the sheet 48 by contracting the opposite surface on which the recesses 66 are formed

as the sheet is coiled within the storage jamb **36** as more fully explained hereinafter.

The top guide track **42** is U-shaped with the opening **68** facing the viewer as shown in FIG. **7.** The track **42** has a vertical base **70** which turns into a horizontal long leg **72** on the top and a horizontal short leg **74** on the bottom as is illustrated in FIGS. **7** and **10.** The screws **43** pass through holes in the leg **72** to mount the track to the trade **32.** The guide flanges **50** of the closure member **46** rest upon the leg **74** to hold the plastic sheet **48** in vertical position. A plurality of spaced vertical ribs **76** extend from the end of the log leg **72** downwardly parallel to the base **70** and outwardly of the end of the short leg **74** to terminate in the plane of the short leg **74.** The ribs **76** are somewhat flexible in that they can be bent to permit the sheet **48** to be positioned with the flanges **50** inserted into the opening **68** past the ribs **76.** However, once the flanges **50** of the sheet **48** has been positioned upon the legs **74** the ribs **76** act to prevent the sheet **48** from outward movement to maintain the flanges **50** upon the leg **74** and prevent their slipping off during opening or closing of the member **46.**

The bottom guide track **44** is the mirror image of track **42** and has short leg **78** on top for engagement with bottom flange **58,** a base **80** terminating in a long leg **82** which mounts the track into the floor **40** by suitable means (not shown). Ribs **84** (only one of which is shown) extend upwardly from the end of the long leg **82** to terminate in the plane of the short leg **78** after crossing the opening **86** in the track **44.** The ribs **84** serve the same purpose as the upper ribs **76** in that they act to prevent the sheet **48** from accidentally being removed from the track **44** by maintaining the engagement between the leg **78** and the flange **58.**

A coiling guide **88** is formed within the storage jamb **36** along the entire vertical inner periphery thereof. The coiling guide **88** has a curved surface as shown in FIG. **6.** The outermost coil of the sheet **48** within the jamb **36** will slide along and be guided by the coiling guide **88** to permit smooth coiling or uncoiling of the sheet **48** within the storage jamb **36.**

The tracks **42** and **44** each extend within the storage jamb **36** with the bottom track **44** being shown in FIG. **6** as representative thereof. The tracks **42** and **44** abut the coil guide **88,** with the base **70** and **80** respectively leaving the openings **68** and **86** free to continuously receive from or deliver to the flanges **50** and **58** respectively of the sheet **48** within the storage jamb **36.**

The two extremes of the positions of the closure member **46** are the open position shown in FIG. **6** wherein the sheet **48** is substantially coiled within the storage jamb **36** so that the opening **33** is free to pass, and the closed position shown in FIG. **1** wherein the sheet **48** has been slid out of the storage jamb **36** to close the opening **33.** In the open position a latch **90** connected at the leading edge of the sheet **48** acts as a stop to butt against the outer side of jamb **36** to prevent the sheet **48** from being completely coiled within the jamb **36.** In the closed position the latch **90** will engage a latch bolt **92** connected within jamb **34** to secure the closure member **46** in the closed position.

Once the closure member **46** is assembled within the frame **32** the guide flanges **40** and **58** will be in continuous contact with the legs **74** and **78** respectively of the guide tracks **42** and **44.** Whenever it is desired to move the closure member **46** the leading edge of the sheet **48** or the latch **90** will be grasped and pushed inwardly or pulled outwardly to slide the sheet **48** to the desired position with the flanges **50** and **58** slidingly contacting the one piece legs **74** and **78** to continuously maintain the sheet **48** in vertical position.

The sheet **48** is self-coiling within the storage jamb **36** with the aid of the coiling guide **88** and there is no need for the use of a vertical post or coiling grooves to wind about.

The closure member **46** can be used instead of or to replace existing doors or in home improvements where a wall opening is added may be installed new. The closure device offers the positive advantage of a mechanical sliding contact between the flanges and the tracks across the opening, rather than the pivoting action of hinge hung doors which always have to be cut when carpeting is added. Also there is less likelihood of drafts or binding or warpage and it is easier to replace if the need ever arises for redecorating or wear.

In the embodiment of the invention illustrated in FIGS. **11–17** a modified closure device designated generally as **100** has a frame **102** in which a reinforced closure member **104** is disposed to slide within a top guide track **106** and a bottom guide track **108** shown in FIGS. **11** and **12** to open and close a wall opening **110** bounded by the frame **102** and floor **112.**

The frame **102** shown in FIG. **11** has a side jamb **114** which is fitted with a latch bolt **116** upon which the latch **118** mounted on the closure member **104** locks when the member **104** is drawn fully across the opening **110.** A storage jamb **120** is formed on the frame **102** on the side opposite jamb **114** and connected between a top member **122** and the floor **108** to complete the frame **102.**

As in the earlier embodiment the storage jamb **120** shown in FIGS. **13** and **13***a* has a coiling guide **124** and is used to store the coiled closure member **104** which will be slid into and out of storage for opening or closing thereby.

The top guide track **106** is suitably affixed to the top track **122** and the bottom guide track **108** is suitably affixed to the floor **112.** Each track **106** and **108** is generally U-shaped with the track **108** upright, while the track **106** is inverted so that the grooves **126** therein face each other and add to the height of the opening **110.**

The height of the closure member **104** is substantially equal to the combined heights of the opening **110** and the two grooves **126.** To operate the closure member **104** one need merely slide the same to the left or the right as viewed in FIG. **11.** The closure member **104** has an oversized height for the opening **110** which is taken into the two grooves **126** and slideably held therein.

The closure member **104** is made of any suitable plastic material, some of which would be flexible enough to coil in stored position and rigid enough to vertically stand within the tracks **106** and **108** to close the opening **110** without buckling. However, such plastic material is relatively expensive and in order to use a less costly plastic material rods, stiffeners or wire **128** made of metal or plastic are vertically disposed as illustrated in FIGS. **14** and **15** within the uniform thickness of the plastic sheet or closure member **104.** This permits the thickness of the member **104** to be kept at a minimum, while providing sufficient vertical strength to prevent

buckling even during severe sliding use of the closure member **104.**

In certain service a heavier design such as a closure member **104a** as illustrated in FIGS. **16** and **17** is needed. Member **104a** has sections **130** of uniform thickness formed between adjacent vertical rods or wire stiffeners **132.** Immediately surrounding each of the vertical rods **132** in an enlarged cross-section **134** shaped as semi-circular bulges which extend vertically the full length of the closure member **104*a*.**

The closure members **104** and **104*a*** do not require either top or bottom guide flanges since their stiffness and height provide the necessary stability to keep the members **104** and **104*a*** within the guide tracks **106** and **108.** Of course closure member **104*a*** would be used in the closure device **100** as a substitute for closure member **104,** without requiring any other component changes except possibly some minor dimensional adjustments to permit slidable motion of a member **104*a*** within tracks **106** and **108** and proper storage thereof within the jamb **120.**

The closure device **100** is able to use a much smaller storage jamb **120** than would have been possible with the closure device **30** because of the use of the modified closure members **104** and **104*a*** and the elimination of the guide flanges therein. Accordingly each of the closure members **104** and **104*a*** are able to form a tight coil about itself within the storage jamb **120** responsive to the small horizontal force exerted upon sliding or pushing the closure member **104** or **104*a*** open to the retracted position within jamb **120** as illustrated in FIG. **13** and **13*a*.** The coiling action of closure members **104** and **104*a*** is aided by the coiling guide **124** in continuing to turn about itself within the jamb **120** without the need of a center post. The enlarged cross sections **134** of closure member **104*a*** all have curved surfaces to permit the edges and contacting surfaces to move relative each other and ride over such curves without binding or sticking in any manner so as to form a tight coil when member **104*a*** is fully retracted.

The wire rods **128** and **132** may be embedded within the closure members **104** and **104*a***, respectively, during the molding of said members, or in any other suitable manner as for example if the closure members are to be laminated then such rods would be positioned upon the lamination prior to final assembly.

In the embodiment of the invention illustrated in FIGS. **18–24** another modified closure device designated generally as **140** has a frame **142** in which a pivotal top guide track **144** is mounted in the top member **146** thereof. A closure member **148** shown in FIGS. **18, 19** and **20** is slideably received in the top guide track, and has a sloped or slanted top **150** which will cause the track **144** to pivot as described more fully hereinafter. The closure member **148** has a front side **152** and a rear side **154.** A plurality of guide flanges **156** are formed at the top **150** to extend outwardly from the front side **152** as shown in FIGS. **21, 22** and **23.** A plurality of guide flanges **158** are formed at the top **150** to extend outwardly from the rear side **154** also as shown in FIGS. **21, 22** and **23.**

The present embodiment of FIGS. **18–24** combines the advantages of the two previous embodiments but does not have their disadvantages. Accordingly the embodiment of the present invention of FIGS. **18–24** uses a closure member **148** with (1) guide flanges **156** and **158** to provide positive mechanical support therefor and (2) a slanted or sloped top **150** set at an angle which permits the closure member **148** to be tightly coiled by continually collecting the flanges **156** and **158** above the top **150** of the coil to prevent the thickness of the flange from adding to the cross-sectional area of the coil as is illustrated in FIGS. **20** and **24.**

The frame **142** depicted in FIG. **18** has a side jamb **160** which is fitted with a latch bolt **162** upon which a latch **164** affixed in the closure member **148** is locked onto in the usual manner to close the opening **166.** A storage jamb **168** is formed on the frame **142** on the side opposite jamb **160** and connected between the top member **146** and the floor **170.** The bottom of the storage jamb **168** is fitted with a pedestal **172** upon which the coiled closure member **148** sits slightly raised above the floor **170** so as to provide a small clearance or the barest touching **174** at or just above the floor **170** as the closure member **148** is extended across the opening **166.**

The top guide track **144** is hidden from view by a clover plate **176** connected to the top member **146** and extending across the frame **142** from jamb **160** to jamb **168** as illustrated in FIG. **18.**

The top guide track **144** is pivotally connected to the top member **146** as at **178** by a pin **180** extending therethrough. The pivot **178** is formed in superposition to the side jamb **160.** The opposite end of the guide track **144** abuts the storage jamb **168.** The guide track **144** shown in FIGS. **21** and **22** is an inverted U-shaped with a horizontal base **182** connected into parallel vertically extending legs **184, 186** which each have its end turned inwardly to form horizontal lips **188, 190,** respectively. A spring **192** is pinned at either end to connect between the top member **146** and the guide track **144.**

The top **150** of the closure member **148** is slanted at a predetermined angle so that the leading edge **194** has the greatest height and the top **150** slants downwardly toward the jamb **168** and the top **150** slopes downwardly into the coil so that the smallest height is inside the coil at the center or trailing edge of the member **148.** The thickness of the top **150** is divided into substantially equal thirds between flange **156,** central portion **196** and flange **158.** The sloped to **150** will prevent the adjacent flanges **156** and **158** from contacting each other within the coil but rather one will be raised above the other as shown in FIGS. **20** and **24.** Since the flange **156** and **158** thickness is equal to the thickness of the central portion of the closure member **148** the flanges will continually next above the coil as the closure member **148** is retracted and coiled within the storage jamb **168.**

The closure member **148** is continually within the guide track **144** once the closure device **140** is assembled as shown in FIG. **20.** The height of the leading edge **194** determines the position of the guide track **144** which in FIG. **20** is shown raised with the spring **192** compressed. The flanges **156** and **158** act to trap the top **150** of the member **148** within the U-shaped guide track **144** and prevent the member **148** from accidentally being withdrawn from the track **144.** The closure member **148** is fully retracted in FIGS. **20** and **22** so that the guide track **144** is fully raised in its most horizontal position, the coiled portion of the closure member **148** is of largest cross section and the most coils therein, and the opening **166** is fully open.

Contrasted with this is the illustration in FIG. **19** wherein the closure member **148** is fully extended so that the guide track **144** will be urged by the spring **192** to follow the slope of the top **150** and be pivoted clockwise to form an angle to the horizontal with spring **192** substantially relaxed as illustrated in FIGS. **19** and **21,** the coiled portion of the closure member **148** is of smallest cross section and the fewest coils therein, and the opening **166** is fully closed with the leading edge **194** of the closure member **148** contacting the side jamb **160** and the latch **164** bolted on bolt **162** as shown in FIGS. **18** and **19.**

Between the fully open and fully closed positions the guide track **144** will assume an intermediate position corresponding to that of the slope of the top **150** and the location of the leading edge **194** which will set the angle of said track **144.** The channel shaped aperture **198** formed within the track **144** is sufficiently large in size and cross-section to permit free universal movement of the top **150** and flanges **156** and **158** therein. Upon the closure member **148** being fully extended (FIGS. **18** and **19**) the guide track **144** will support the flanges **156** and **158** upon the lips **190** and **188** respectively to maintain the clearance **174.** In all the positions the light weight closure member **148** will be self supporting and the height of the pedestal sufficient to maintain the clearance **174.** Of course, as was shown in earlier embodiments of the invention a bottom track can be added and used as desired with a minimum of modification.

The closure member **148** in this preferred form includes wire rods **200** embedded in vertical spaced relation within the central portion **196** of the closure member **148.**

To provide maximum flexibility and stability, the flanges are formed **156** and **158** illustrated in FIG. **21, 22** and **23** in alternately spaced relation to each other on opposite sides **150** and **150** of the member **148,** and shaped generally triangular to provide for tight coiling of the closure member **148** within the storage jamb **168,** jet large flat surfaces for contact within the track **144.**

It will be understood that various changes in the details, materials, arrangements of parts and operating conditions which have been herein described and illustrated in order to explain the nature of the invention may be made by those skilled in the art within the principles and scope of the invention.

Having thus set forth the nature of the invention, what is claimed is:

1. A storagable closure device for a door opening comprising:

a. a frame connected across the door opening,

b. a storage chamber formed on one side of the frame,

c. a top guide member pivotally connected to the frame,

d. a plastic closure member coilably stored in the storage chamber,

e. the closure member having a slanted top with a folded portion formed on at least one side of the top whereby on coiling of the closure member the folded portion is on the slant and out of the way of the coil to permit a tight roll, and

f. the folded portion is received into the guide member and on closure of the closure member will cause the guide member to pivot to conform to the angle of the slanted top of the closure member.

2. The combination claimed in claim **1** wherein:

a. the guide member is channel shaped with the pivot connection remote from the storage chamber, and

b. the slant of the top of the closure member is highest at the leading edge of the closure member and decreases into the coil.

3. The combination claimed in claim **2** wherein:

a. the folded top has spaces horizontal extensions which are engaged in the channel member.

4. The combination claimed in claim **3** wherein:

a. spring means bias the channel member to pivot downwardly to conform to the slant of the top of the closure member.

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