Jan. 28, 1969 B. M. OSOJNAK 3,424,303

SEALING RING

Filed Nov. 20, 1967

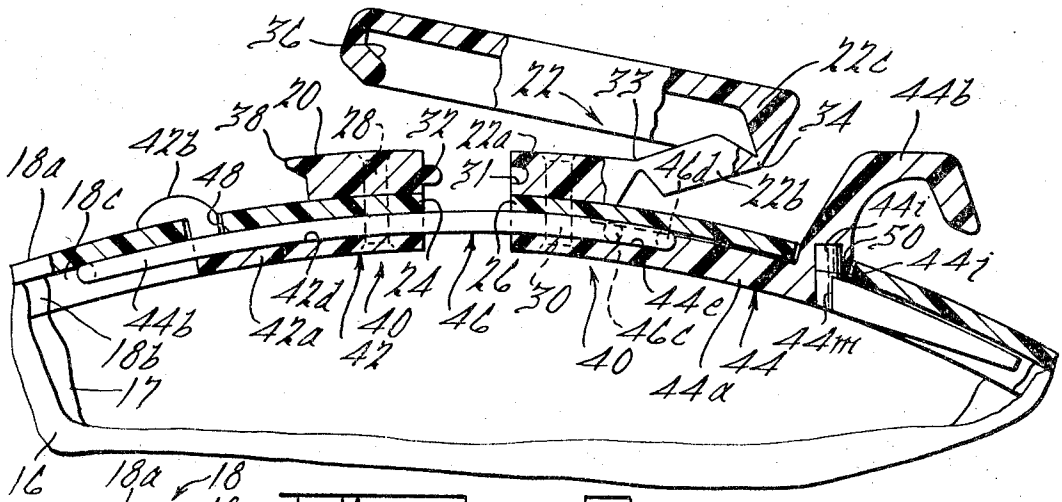


FIG. 2.

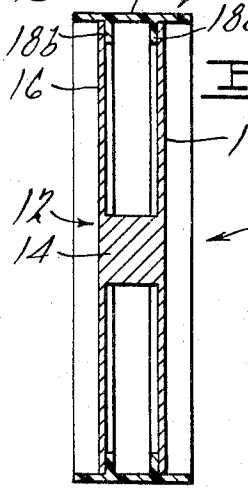


FIG. 1.

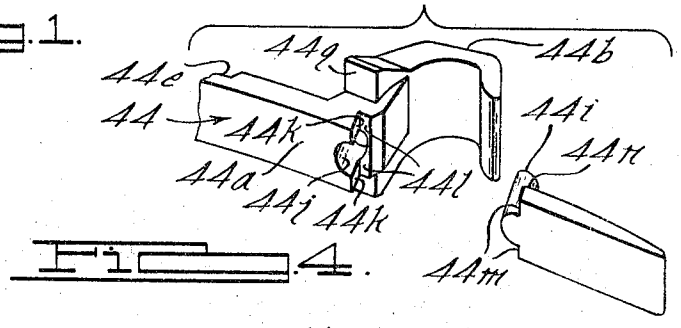


FIG. 4.

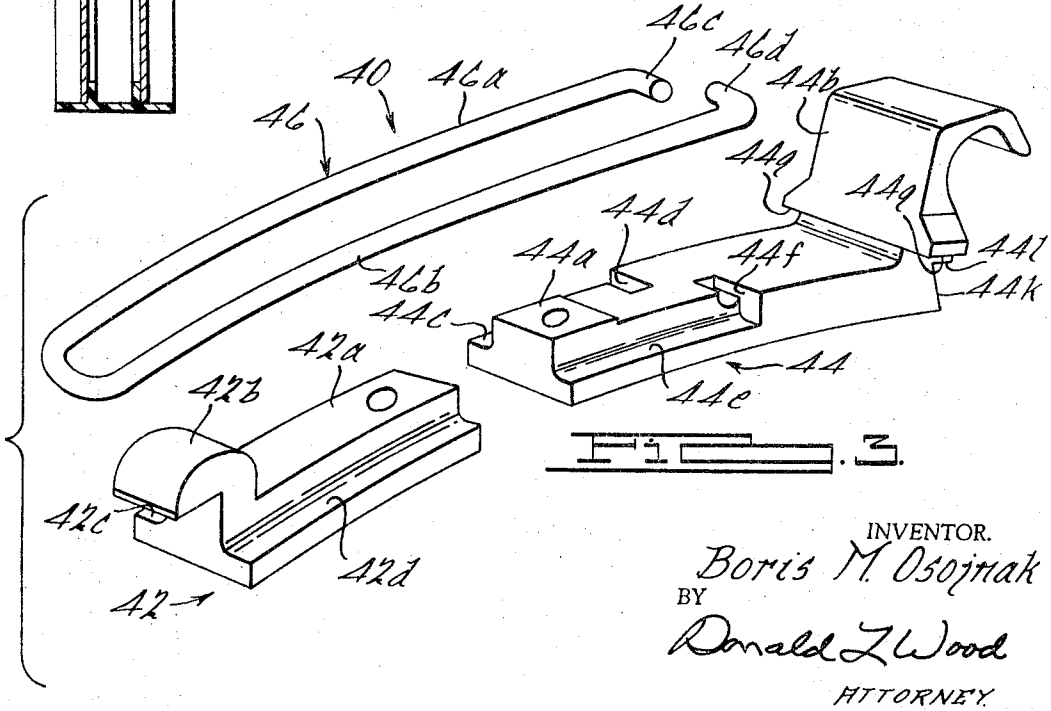


FIG. 3.

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SEALING RING

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Continuation-in-part of application Ser. No. 601,205, Dec. 12, 1966. This application Nov. 20, 1967, Ser. No. 684,152

U.S. Cl. 206—53 15 Claims

Int. Cl. B65h 75/00; G11b 23/02

ABSTRACT OF THE DISCLOSURE

A sealing ring for use with a reel comprising a strip of flexible plastics material adapted to be wrapped around the reel to sealingly encircle the same; coacting latch elements of relatively rigid plastics material are positioned on the outer sides of the strip adjacent the respective free ends of the same and coacting guide members of relatively rigid plastics material as positioned on the undersides of the free ends of the strip in underlying relation to the respective latch elements. The guide members coact with a slide member formed of a doubled over stainless steel wire to prevent uncontrolled separation of the free ends of the strip and constrain the free ends to movement along an arcuate path centered on the axis of the strip loop. One of the rigid guide members has a radial extension which passes outwardly through an aperture in the strip and thereafter curves over to form a hook for hanging the sealing ring with the hook also serving to provide a protuberance to protect the latch elements against accidental unlatching and further serving to provide a reaction surface to facilitate deliberate unlatching of the latch elements.

This application is a continuation-in-part of application Ser. No. 601,205, filed Dec. 12, 1966, now abandoned.

Background of the invention

This invention relates to sealing rings adapted to sealingly encircle a reel of the type having a central spool and spaced flanges. More particularly, it relates to a sealing ring for use with a computer tape reel.

Various forms of sealing rings for computer tape reels are presently available. While these rings are generally satisfactory, under certain circumstances they are rather awkward to latch. They are also relatively expensive and are susceptible to excessive wear and breakage.

Summary of the invention

It is an object of the present invention to provide an improved computer tape sealing ring.

A more particular object is to provide a computer tape sealing ring having improved latching and handling characteristics.

The sealing ring of the invention includes a strip of flexible material formed into a loop to encircle a reel, coacting latch means on the respective free ends of the strip to maintain the strip in its closed encircling position, and guide means on the respective free ends of the strip to prevent uncontrolled separation of the strip ends and guide the strip ends into position of circumferential alignment upon operation of the latch means. According to an important feature of the invention, the guide means includes a rigid guide member which has an elongated guide portion positioned circumferentially along the underside of one of the free ends of the flexible strip and a hook portion which extends radially outwardly from the guide portion through an aperture in the strip and thereafter curves over to form a hook on the outer side of the strip

for hanging up the sealing ring and encircled reel. The guide portion of this rigid guide member coacts with a suitable guide member on the underside of the other free end of the strip to provide the aforementioned guiding and anti-separation functions, and further serves to provide a large area circumferentially extending interface with the underside of the flexible strip so as to distribute the weight of the sealing ring and encircled ring to the hook portion over a relatively large area to thereby minimize areas of localized stress concentration.

According to another important feature of the invention, the latch element on the free end of the strip to which the rigid guide member is secured is movable selectively between latching and unlatching positions to control the latching of the sealing ring, and the hook portion of the rigid guide member passes through the strip on the side of the movable latch member remote from the strip end and thereafter curves over in a direction away from the movable latch member. The hook portion thus serves to provide a guard to protect against accidental unlatching movement of the movable latch element and the near or back side of the hook portion provides a reaction surface against which a thumb may be pressed to enable the thumb tip to flip the movable latch element to its unlatched position.

According to yet another feature of the invention, the rigid guide members positioned on the undersides of the respective strip ends, as well as the latch elements positioned on the outer sides of the respective strip ends, are formed of a hard plastics material and a fastener element is provided on each strip end to extend successively through the related latch element, the strip, and the related guide member to thereby clamp these elements together in sandwich fashion. The fastener elements, which may, for example, comprise aluminum rivets, thus secure firm holds at their upper and lower ends in the hard plastics material of the latch elements and guide members, thereby forming a rigid construction which will not work loose even after sustained and/or abusive usage. Other features and advantages of the invention will be apparent from the detailed description of the preferred embodiment.

Brief description of the drawing

A preferred embodiment of the invention is illustrated in the accompanying drawing. In the drawing:

FIGURE 1 is a cross sectional view showing a sealing ring applied to a computer tape reel;

FIGURE 2 is a fragmentary perspective view of a sealing ring embodying the constructional and operational features of the present invention; and

FIGURES 3 and 4 are perspective, exploded views of a subassembly of the sealing ring of the invention.

Detailed description of the preferred embodiment

The sealing ring of the invention, seen generally at **10** in FIGURE 1, is especially suited for use with a reel **12** of the type including a central spool **14** and spaced flanges **16, 17**. Sealing ring **10** includes a strip of flexible material such, for example, as polyethylene, formed into a loop to encircle reel **12**. Strip **18** includes a main body portion **18***a* lying in a circular plane concentric with the central axis of the strip loop and a pair of circumferentially extending rib portions **18***b*, **18***c*. Rib portions **18***b*, **18***c* are formed on the radially inner face of the strip loop and lie in spaced planes generally transverse to the central loop axis. Rib portions **18***b*, **18***c* are adapted to fit within the outer peripheral edges of spaced flanges **16, 17** to determine the lateral positioning of the strip loop on the reel.

As best seen in FIGURE 2, coacting latch members **20, 22** formed for example of polypropylene or other relatively rigid and relatively hard plastics material, are pro-

vided on the free ends **24**, **26** of the strip loop. Latch member **20** constitutes a keeper and is secured by an aluminum rivet **28** to the radially outer face of strip loop end **24**. Latch member **22** is a three part structure comprising a first portion **22***a* secured by an aluminum rivet **30** to the radially outer face of strip loop end **26** and including a recess **31** for coaction with a tongue **32** on keeper **20**, a second portion **22***b* hinged to portion **22***a* at **33**, and a third portion **22***c* hinged to portion **22***b* at **34** and including a recess **36** for coaction with a tongue **38** on keeper **20**. Latch means of the type shown at **20**, **22** are available from Southco Division of the South Chester Corporation, Lester, Pa., as Part No. 07–10–102–11.

The sealing ring of the invention further includes guide means **40** for permanently interconnecting strip loop ends **24**, **26** and guiding these ends in their relative movement. Guide means **40** is seen in assembled relation to the other elements of the sealing ring **10** in FIGURE 2 and isolated from the other elements of the sealing ring in FIGURE 3.

Guide means **40** includes a guide member **42**, an anchor member **44**, and a wire **46**. Members **42** and **44** may be formed, for example, of polycarbonate or other relatively rigid and relatively hard plastics material, and wire **46** may be stainless steel.

Guide member **42** includes a block portion **42***a* curved on an arc centered on the central axis of the strip loop, and a hook portion **42***b* extending upwardly and then rearwardly from the rearward end of block portion **42***a*. Block portion **42***a* is cut away along its upper side edges to define open arcuate grooves **42***c*, **42***d*. In the assembled relation of guide member **42**, block portion **42***a* is positioned between rib portions **18***b*, **18***c* at strip loop end **24** with the adjacent undersides of main body portion **18***a* and the adjacent laterally inner faces of rib portions **18***b*, **18***c* coacting with open arcuate grooves **42***c*, **42***d* to form closed arcuate grooves, and hook portion **42***b* extends radially outwardly through an opening **48** in main body portion **18***a* and lips over the adjacent radially outer edge of opening **48** to position block portion **42***a* between rib portions **18***b*, **18***c*.

Rivet **28** fastening keeper **20** to the radially outer face of strip loop end **24** passes through main body portion **18***a* to also serve to fasten block portion **42***a* to the radially inner face of strip loop end **24**. Rivet **28** thereby secures a firm hold at its upper end in the hard polypropylene material of latch keeper member **20** and secures a firm hold at its lower end in the hard polycarbonate material of block portion **42***a*, thereby forming a rigid sandwich construction which will not work loose even after sustained usage.

Anchor member **44** includes a guide or block portion **44***a* curved on an arc centered on the central axis of the strip loop, and a hook portion **44***b* extending radially outwardly from the remote end of block portion **44***a* and thereafter curving over to form a hook. Block portion **44***a* is cut away along its upper side edges to define an open arcuate groove **44***c* terminating in a laterally inwardly extending portion **44***d* and an open arcuate groove **44***e* terminating in a laterally inwardly extending portion **44***f*. Portions **44***d* and **44***f* are circumferentially spaced to avoid excessively weakening the transverse section of block portion **44***a*. In the assembled relation of anchor member **44**, block portion **44***a* is positioned between rib portions **18***b*, **18***c* at strip loop end **26** with the adjacent undersides of main body portion **18***a* and the adjacent laterally inner faces of rib portions **18***b*, **18***c* coacting with open arcuate grooves **44***c*, **44***e* to form closed arcuate grooves, and hook portion **44***b* extends radially outwardly through an opening **50** in main body portion **18***a* to present a hook for use in hanging up the sealing ring, either with or without a reel. Shoulder portions **44***g* defined on the neck of hook portion **44***b* lip over the opposite side edges of opening **50** to position arcuate block portion **44***a* between ribs **18***b*, **18***c*. Rivet **30** fastening latch member **22** to the radially outer face of strip loop end **26** passes through main body portion **18***a* to also serve to fasten block portion **44***a* to the radially inner face of strip loop end **26**. Rivet **30**, like rivet **28**, thus secures firm holds at its upper and lower ends in the hard plastics materials of the latch member **22** and block portion **44***a*, respectively, thereby forming a rigid sandwich construction which resists unwanted pivotal movement of latch member **22** about the rivet axis even after sustained usage.

Anchor member **44** also includes an extension portion **44***h*, best seen in FIGS. 2 and 4. While extension portion **44***h* may be formed integrally with the main body portion of anchor member **44**, in the disclosed embodiment it comprises a separate polycarbonate member joined to block portion **44***a* by a pin **44***i* received in a socket **44***j*. Extension **44***h* has an arcuate upper surface corresponding to the curvature of strip **18** and lies within ribs **18***b*, **18***c*. The under surface of extension **44***h* is generally flat, giving the extension a generally wedge-shaped appearance. The adjacent end of block portion **44***a* is notched to provide generally radial faces **44***k* and generally circumferential faces **44***l* for mating interlocking coaction with shoulder surfaces **44***m* and upper surfaces **44***n*, respectively, of extension **44***h*. A suitable glue or adhesive may be used to augment the interference fit of the pin and socket, or the plastic material adjacent the pin and socket may be fused to provide a rigid interconnection.

Wire **46** is bent back upon itself to form a loop having both legs curved on an arc centered on the central axis of the strip loop. One leg **46***a* is shorter than the other leg **46***b* and is bent inwardly at its free end to form a crank portion **46***c*. Longer leg **46***b* is bent inwardly at its free end to form a crank portion **46***d*. In the assembled relation of wire **46**, crank portion **46***b* is received in lateral groove portion **44***d* in block portion **44***a* of anchor member **44** with leg **46***b* extending forwardly through groove **44***c* and then through groove **42***c* in block portion **42***a* of guide member **42**; wire **46** thereafter bends around through its closed end to position leg **46***b* in aligned grooves **42***d* and **44***e* with crank portion **46***c* received in lateral groove portion **44***f*.

Anchor member **44** thus anchors one end of wire loop **46** to strip loop end **26** while guide member **42** on strip loop end **24** slidably receives the other end of loop **46**. Guide means **40** thus constrains strip loop ends **24**, **26** to relative movement along an arcuate path centered on the central axis of the strip loop while the closed end of wire loop **46** coacts with arcuate block portion **42***a* to provide a stop limiting, and determining the extent of, opening movement of strip loop ends **24**, **26**. Guide means **40** thereby ensure that upon actuation of latch means **20**, **22** tongue **32** will be guided squarely and positively into recess **31** to ensure a firm, positive latching action; guide means **40** further ensure that strip loop ends **24**, **26** will never become completely disconnected, even upon disengagement of the latch means. Note that hook portion **44***b* of anchor member **44**, in addition to providing a convenient means of hanging up the loop, also facilitates unlatching of members **20**, **22** by providing a convenient reaction surface or fulcrum against which an operator may press the lower surface of the outer phalanx of his thumb while moving latch member **22***c* to its illustrated unlatched position by an upward or flipping movement of the remote tip of that phalanx. Hook portion **44***b* also provides a projection or protuberance on the outer side of strip **18** adjacent movable latch element **22**; this projection or protuberance protects the latch elements from damage and from accidental unlatching, such as might otherwise occur as a result of droppage or careless handling.

Block portion **44***a* of anchor member **44**, in addition to providing an anchor for wire loop **46**, also provides a large area circumferentially extending interface with the underside of strip **18**, thereby transmitting the weight of the sealing ring and enclosed reel to hook portion **44***b* over a relatively large area to minimize areas of localized

stress concentration. Extension 44*h* serves to increase the circumferential extent and total area of the interface with the underside of the strip, and extends the circumferential end of the interface area to a location well beyond hook aperture **50** in the strip, thereby resisting failure of the strip at the locally weakened area adjacent the hook aperture.

Although a preferred embodiment of the invention has been illustrated and described in detail, it will be understood that various changes and modifications may be made in the described embodiment without departing from the scope or spirit of the invention.

I claim:

1. A sealing ring for use with a reel of the type including a central spool and spaced flanges, said ring comprising:

(A) a strip of flexible material formed into a loop to encircle said reel;

(B) coacting latch means on the respective free ends of said loop operative to draw the free ends of the loop together to form a closed loop sealingly encircling said reel;

(C) a member of relatively rigid material having a first elongated guide portion positioned circumferentially along the underside of said flexible strip adjacent one of said strip ends and a second portion extending radially outwardly from said guide portion through an aperture in said strip and thereafter extending generally radially outwardly from the outer side of said strip to provide a projection on said strip; and

(D) guide means, including the said guide portion of said rigid member and coacting guide means on the underside of the other free end of said strip, permanently interconnecting said free ends and operative upon operation of said latch means to guide said free ends into positions of circumferential alignment, one with the other.

2. A sealing ring according to claim **1** wherein said second portion of said rigid member comprises a hook portion which curves over after passing through said aperture to form a hook on the outer side of said strip for hanging the sealing ring.

3. A sealing ring according to claim **2** wherein:

(E) the latch means on said one free end of said strip is positioned on the outer side of the strip and is selectively movable between a latching position and an unlatching position; and

(F) said hook portion of said rigid member passes through said strip on the side of said movable latch member remote from the lateral edge of said one free end and thereafter curves over in a direction away from said edge, whereby said hook portion provides a guard to protect against accidental unlatching movement of said movable latch member and the rear or back side of said hook portion provides a reaction surface against which a thumb may be pressed to enable the thumb tip to flip said movable latch means to its unlatching position.

4. A sealing ring according to claim **2** wherein:

(E) a pair of circumferentially extending ribs adapted to fit within the spaced flanges of said reel are formed on the underside of said strip at least in the area of said one strip end; and

(F) said guide portion of said rigid member is positioned between said ribs.

5. A sealing ring according to claim **4** wherein said rigid member further includes an extension portion extending from said guide portion along the underside of said strip within said ribs in a direction away from the lateral edge of said one free end to a location well beyond said aperture in said strip.

6. A sealing ring according to claim **4** wherein:

(G) said ribs are also formed adjacent said other free end;

(H) said guide portion comprises a first arcuate block positioned within said ribs; and

(I) said coacting guide means comprises a second arcuate block of relatively rigid material positioned on the underside of said other free end within said ribs.

7. A sealing ring according to claim **6** wherein:

(J) said hook portion extends outwardly from said guide portion adjacent the end of the latter remote from the lateral edge of said one end of said strip;

(K) said hook portion includes shoulders at the base of the hook engageable with the outer side of said strip to anchor the remote end of said guide portion;

(L) a fastener member anchors the other end of said guide portion to said strip;

(M) the end of said second arcuate block remote from the lateral edge of said other free end of said strip includes a hook portion extending radially outwardly from that block end through a suitable opening in said strip and thereafter bending over to lip over said opening to anchor that block end to said strip; and

(N) a fastener member anchors the other end of said second arcuate member to said strip.

8. A sealing ring according to claim **6** wherein:

(J) said guide means further includes a wire bent back upon itself to form a loop having both legs curved on a radius approximating that of said strip loop;

(K) one of said arcuate blocks defines a pair of circumferentially extending arcuate grooves slidably receiving the two legs of said wire loop; and

(L) the other arcuate block anchorably receives said wire.

9. A sealing ring according to claim **8** wherein said one arcuate block is said second arcuate block.

10. A sealing ring according to claim **1** wherein:

(E) said coacting guide means comprises a block of rigid material positioned on the underside of said strip loop adjacent said other free end;

(F) said coacting latch means include a latch element of rigid material positioned on the outer side of said strip adjacent each of said strip free ends;

(G) a first fastener element passes successively through the latch element on said one strip end, said strip, and said guide portion to clamp these three elements together in sandwich fashion; and

(H) a second fastener element passes successively through the latch element on the other strip end, said strip, and said rigid block to clamp these three elements together in sandwich fashion.

11. A sealing ring according to claim **10** wherein:

(I) said hook portion includes shoulders at the base of the hook engageable with the outer side of said strip to assist said first fastener element in securing said guide portion to said strip; and

(J) the end of said rigid block remote from the lateral edge of said other strip end includes a hook portion extending radially outwardly from that block end through a suitable opening in said strip and thereafter bending over to lip over said opening to assist said second fastener element in securing said rigid block to said strip.

12. A sealing ring for use with a reel of the type including a central spool and spaced flanges, said ring comprising:

(A) a strip of flexible material formed into a loop to encircle said reel;

(B) coacting latch means on the respective free ends of said loop and including a latch element of relatively rigid material positioned on the outer side of said strip adjacent one of said free ends;

(C) guide means, including a guide member of relatively rigid material positioned on the underside of

said strip adjacent said one free end, permanently interconnecting said free ends and operative upon operation of said latch means to guide said free ends into positions of circumferential alignment, one with the other; and

(D) a fastener element passing successively through said rigid latch element, said flexible strip, and said rigid guide member to clamp those three elements together in sandwich fashion.

13. A sealing ring according to claim **12** and further including:

(E) another latch element of relatively rigid material positioned on the outer side of said strip adjacent the other free end thereof;

(F) another guide member of relatively rigid material positioned on the underside of said other free end for coaction with the guide member on said one free end; and

(G) another fastener element passing successively through said other rigid latch element, said flexible strip, and said other rigid guide member to clamp those three elements together in sandwich fashion.

14. A sealing ring according to claim **12** wherein:

(E) said guide member is elongated with the fastener element passing through an end thereof adjacent the lateral edge of said one strip end; and

(F) said guide member includes a portion adjacent the other end thereof passing radially outwardly through a suitable opening in said strip and thereafter lipping over the outer side of said strip to assist the related fastener element in anchoring the guide member to the strip.

15. A sealing ring for use with a reel of the type including a central spool and spaced flanges, said ring comprising:

(A) a strip of flexible material formed into a loop to encircle said reel;

(B) a latch element on one free end of said strip;

(C) a coacting latch element on the other free end of said strip selectively movable relative to said other free end between a latching position and an unlatching position; and

(D) a member on said other free end of said strip

(1) extending generally radially outwardly from said other free end, in closely spaced relation to said movable latch element and at the side of said movable latch element remote from said other free end, and

(2) thereafter curving over in a direction away from said other free end to form a hook opening away from said other free end, whereby the hook may be passed over a hanger member without interfering with said latch elements and provides a shield to protect the latch elements against accidental unlatching while the back surface of the hook facing said movable latch element defines a smooth, large area reaction surface against which a finger may be pressed to facilitate movement of said movable latch element to its unlatching position.

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