United States Patent [19]

Horak

[11] **3,861,614**

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[54] **DEMOUNTABLE RIBBON REEL**

[75] Inventor: **Anthony Horak,** Detroit, Mich.

[73] Assignee: **Burroughs Corporation,** Detroit, Mich.

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[52] **U.S. Cl.** **242/71.8,** 242/116

[51] **Int. Cl.** **B65h 75/18**

[58] **Field of Search** ..... 242/71.8, 71.8 A, 115, 242/116

[56] **References Cited**

UNITED STATES PATENTS

2,476,928	7/1949	Thomas	242/116 X
2,881,985	4/1959	Overmire	242/71.8 A
3,415,458	12/1968	Newell	242/71.8 A

Primary Examiner—Edward J. McCarthy

Attorney, Agent, or Firm—Edwin W. Uren; Edward G. Fiorito; Paul W. Fish

[57] **ABSTRACT**

A reel for holding a roll of material such as expendable tape or an inked ribbon is provided with demountable flanges and spool retaining means therebetween, such reel affording optimized utility as material supply means in a material utilizing device, and as take-up and disposal means for the material after it has been utilized by the device, a pair of demountable flanges of the reel permitting convenient discarding of the spool with the utilized material wrapped therearound, the flanges being thereafter reassemblable for reuse in the device with a new spool installed therebetween.

14 Claims, 6 Drawing Figures

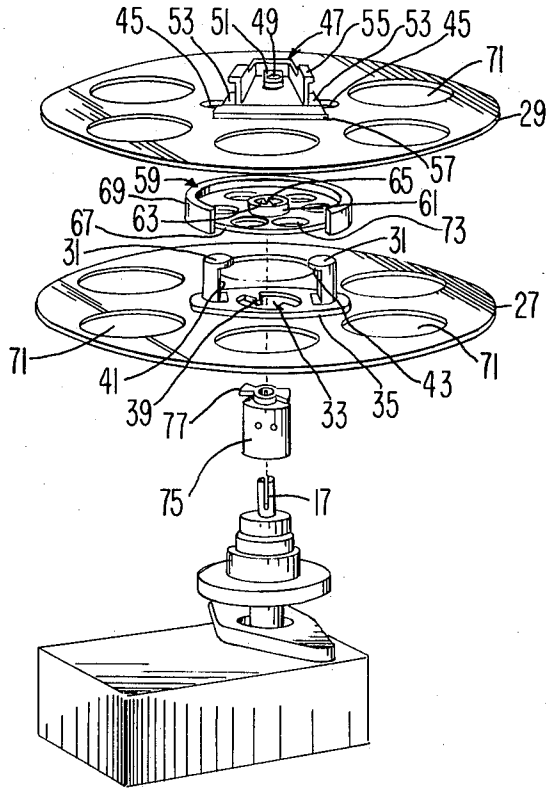


FIG. 1.

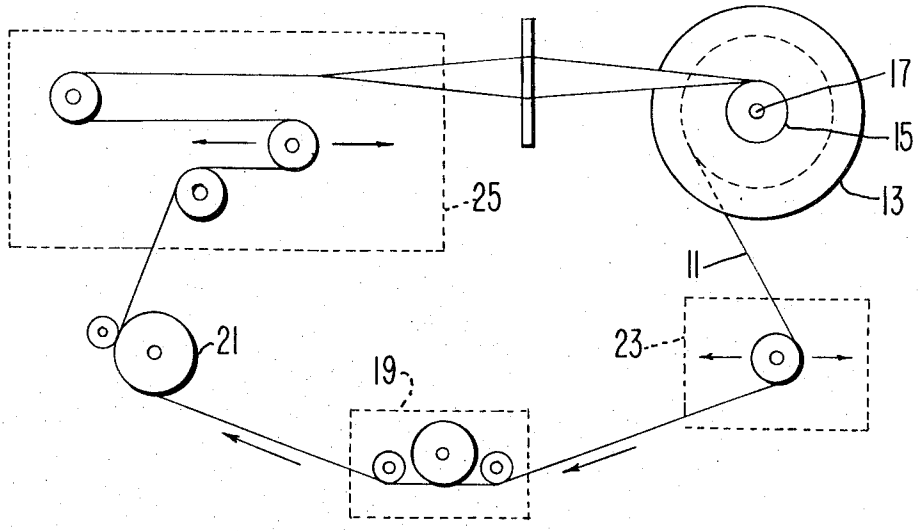


FIG. 2.

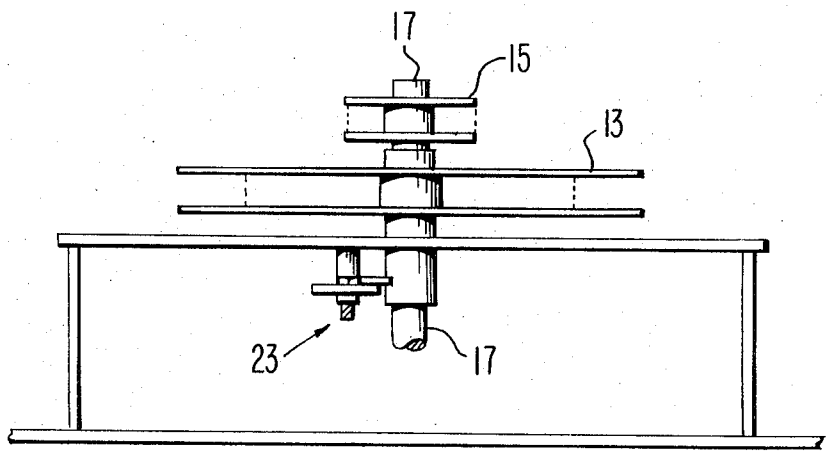


FIG.3.

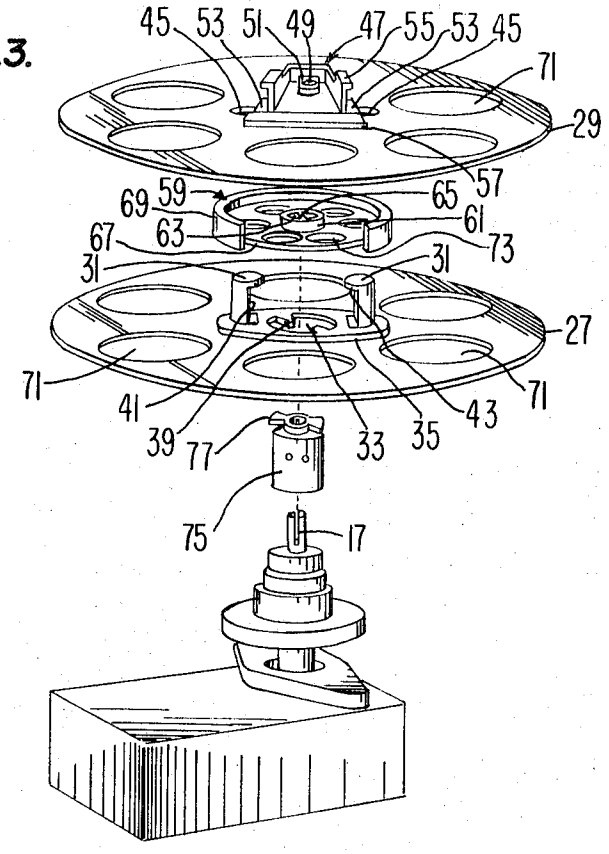


FIG.4.

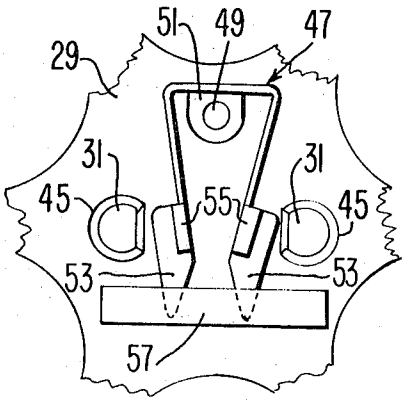


FIG.5.

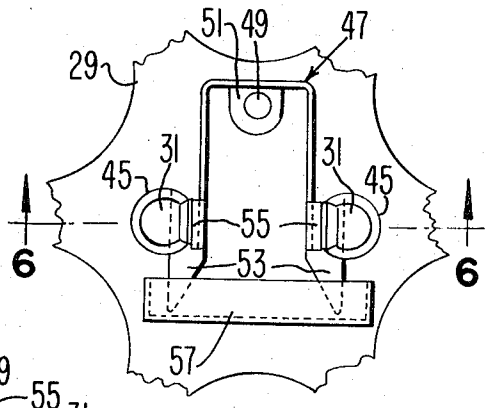
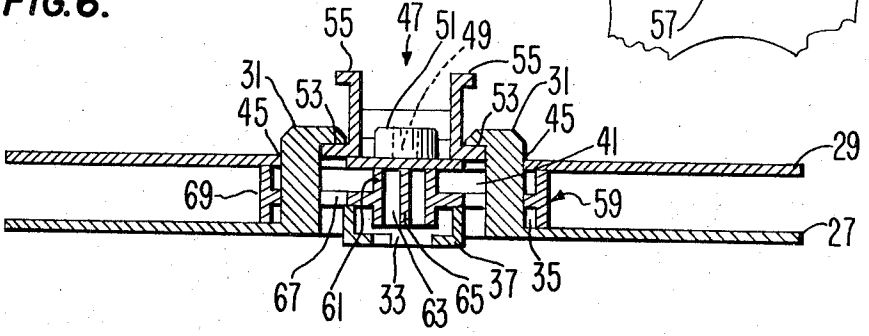


FIG.6.



DEMOUNTABLE RIBBON REEL

CROSS REFERENCES TO RELATED APPLICATIONS

The inventive reel with its demountable flanges finds particular use in ribbon utilizing devices such as that disclosed in U.S. Pat. Nos. 3,797,773 and 3,800,254 which were issued to Jack Beery and assigned to the assignee of the present invention.

BACKGROUND OF THE INVENTION

Many known printing and MICR encoding devices utilize a one-time expendable ribbon that is transported from a supply source through a printing or encoding station and then windably collected on a take-up spool for subsequent discarding. These known devices have commonly experienced problems either with respect to the efficient collection of the utilized ribbon on a flangeless expendable spool, or with respect to the discardable unwinding of the utilized ribbon from a flanged take-up reel the cost of which would preclude its discarding. A typical ribbon transport and take-up mechanism, as used in an MICR encoding device, is disclosed in the above reference patents to Jack Berry, and briefly summarized in the following.

With reference to FIGS. **1** and **2**, a typical transport and take-up mechanism for an expendable ribbon **11** might be comprised of a supply reel **13** and a take-up reel or spool **15**, the supply reel **13** being freely rotatable on a motor drive shaft **17** and the take-up spool **15** being coupled to the drive shaft **17** for rotation therewith. The expendable ribbon **11** is withdrawn from the reel **13** and transported past a utilizing device such as a printer or encoder **19** by a driven roller **21**, such withdrawal being tensionally controlled by a braking device generally designated at **23**, the ribbon being controllably collected on the take-up spool **15** following its utilization by means of the motor drive shaft **17** and a motor control device generally indicated at **25**. The control device **25** serves to intermittently start and stop the motor drive shaft **17** such that ribbon tension between the driven roller **21** and the take-up spool **15** is maintained within predetermined tensional limits.

In the ribbon transport and take-up mechanism disclosed in U.S. Pat. Nos. 3,797,773 and 3,800,254, the utilized ribbon collected on the take-up spool **15** would be disposed of either by removing and discarding the spool **15** or by unwinding the ribbon therefrom prior to its discarding. In either event objectionable experiences would be entailed as by the incurrence of excessive costs were a flanged spool **15** to be discarded, or as by the objectionable handling and unwinding of the utilized ribbon from the spool were a flangeless inexpensive spool **15** to be employed.

Another disadvantage that would arise in connection with the ribbon transport and take-up mechanism illustrated in FIGS. **1** and **2** is the need for supplying different kinds of reels for supply and take-up purposes, the supply reel **13** being of a more expensive type having flanges of predetermined larger diameter, and the take-up spool being of a less expensive type employing either no flanges or flanges of predetermined lesser diameter.

SUMMARY OF THE INVENTION

It is accordingly an object of the present invention to provide a multi-purpose reel that may be utilized in printing or encoding devices either for ribbon supply or take-up purposes, the ribbon in either event being wound around an inexpensive discardable spool carried intermediate the flanges thereof.

It is another object of the present invention to provide a take-up reel the flanges of which are coupled together in such manner as to carry a removable spool therebetween, the flanges being further demountable such that the spool may be conveniently discarded with the utilized ribbon collected therearound.

It is another object of the present invention to provide a ribbon take-up reel having demountable flanges for operably accommodating an inexpensive and discardable spool, the spool being conveniently removable from the reel after the utilized ribbon has been wound therearound, the utilized ribbon being thereby rendered disposable without resorting to objectionable ribbon handling.

An important aspect of the inventive ribbon reel is the provision of a pair of separatably connectable spool-carrying-flanges that may be rotatably mounted on a ribbon utilizing device, anchoring means being provided on a first of the flanges for holding the spool in fixed angular relationship relative to the rotatable flanges when the flanges are interconnected, and a second of the flanges being provided with latching means cooperating with the anchoring means of the first flange for holding a spool intermediate the flanges.

Another important aspect of the inventive ribbon reel is the resilient characteristic of the latching means of the second flange, such characteristic permitting yieldable response to manual manipulation to thereby effectuate separation of the flanges, and permitting ready cooperation with the anchoring means of the first flange upon manual release thereof to thereby effectuate couplable connection between the flanges.

BRIEF DESCRIPTION OF THE DRAWING

These and other objects and advantages of the invention will become apparent from the following description when read in conjunction with the accompanying drawing figures, in which:

FIG. **1** is a diagrammatic plan view of a ribbon utilizing device such as that disclosed in the above-referenced patents.

FIG. **2** is a partial elevational view of the device of FIG. **1**;

FIG. **3** is an exploded elevational view of the inventive demountable ribbon reel in association with mounting means of the utilizing device;

FIG. **4** is a partial plan view of the uppermost flange of the demountable reel showing the latching means thereof in disengaged relationship relative to the anchoring means of the lowermost flange;

FIG. **5** is a partial plan view of the uppermost flange showing the latching means thereof in engaged relationship relative to the anchoring means; and

FIG. **6** is a view taken along the line **6—6** of FIG. **5** and showing the various parts of the demountable reel in assembled relationship.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As best illustrated in FIG. **3**, the inventive demountable ribbon reel is comprised of a first flange **27** and a second flange **29**, the flange **27** being provided with a pair of normally disposed anchor posts **31** fixed to the

inner surface thereof in radially opposite relationship relative to a central aperture **33**, the latter aperture **33** being formed in a raised portion **35** and in a hub portion **37** (FIG. **6**) of the flange **27**, such aperture being provided with any suitable means for cooperably engaging the motor drive shaft **17** of the utilizing device, as for example by a pair of oppositely disposed projections **39** formed therein. Each of the anchor posts **31** is provided with a rectilinear recess **41** formed on the side thereof adjacent the central aperture **33**, such recess presenting an upper ledge **43** the function of which will be described hereinafter.

The second flange **29** is provided with a pair of circular apertures **45** radially and oppositely disposed of the central point thereof, such apertures being effective for receiving the anchor posts **31** of the first flange **27** when the second flange **29** is coupled thereto. The second flange **29** is additionally provided with a resilient U-shaped member generally indicated at **47**, such U-shaped member being pinned to the outer surface of the second flange **29** by means of a pin **49** securing a hub **51** of the U-shaped member to the flange **29**, as best illustrated in FIG. **4**. The resilient U-shaped member **47** is additionally provided with a pair of integrally formed offset knife-like projections **53** disposed at the free-end extremities thereof, and with a pair of web-like offset tabs **55** disposed latitudinally opposite the knife-like projections **53**. It is to be noted that the resilient U-shaped member **47** is provided with a normal set effective for disposing the knife-like projections **53** in protruding and intercepting relationship relative to a portion of the circumference of the circular apertures **45**, to thereby provide latching engagement of the projections **53** with the ledges **43** of the anchor posts **31** when the second flange **29** is coupled to the first flange **27**, as hereinafter described. The second flange **29** is further provided with a guide bar **57** for guidably protecting the knife-like projections **53** during the demounting and reassembly of the second flange **29** from and to the first flange **27**.

The inventive demountable ribbon reel is designed to operatively carry a spool **59** therewithin, as for windably holding a ribbon to be utilized in a ribbon utilizing device, the spool **59** being comprised of a hub member **61** having a partitioned central aperture **63** with a partition **65** for engagement with a slot formed in the motor drive shaft **17**, and comprised also of a web portion **67** and a circumferential rim **69** around which the ribbon is wound. It is to be noted that the relative dimensions of the raised portion **35** of the flange **27** and of the extension of the rim **69** beyond the web portion **67** of the spool **59** are such that the lower surface of the rim **69** will contact the innermost surface of the flange **27**, outwardly of the raised portion **35** thereof, when the spool **59** is assembled onto the first flange **27**. It is also to be noted that the first flange **27** and second flange **29** may be provided with a plurality of openings **71** to thereby lighten the weight of the flanges and to permit visibility of the wound ribbon therebetween. The spool **59** is also provided with a plurality of paired apertures **73** for receiving the anchor posts **31** of the first flange **27**.

To install a ribbon in the inventive demountable reel, a ribbon would be wound onto the spool **59** (as by the manufacturer), the spool **59** being then installed onto the first flange **27** by introducing a pair of the paired apertures **73** thereof over the anchor posts **31**, completion of the assembly then being accomplished by installing the second flange **29** onto the first flange **27** by engaging the circular apertures **45** of the second flange **29** with the anchor posts **31** of the first flange **27**, such process being accomplished by manually contracting the web-like offset tabs **55** of the U-shaped member **47** so as to displace the knife-like projections **53** thereof from the apertures **45**, release of the tabs **55** permitting the U-shaped member to assume its normal set wherein the knife-like projections **53** are latchably engaged with the upper ledges **43** of the recesses **41** formed in the anchor posts **31**.

To removably dispose of a utilized ribbon wound around the spool **59**, as when the reel is located in the ribbon take-up position illustrated at **15** in FIG. **2**, a reverse procedure would be followed whereby the offset tabs **55** would be manually contracted to disengage the knife-like projections **53** from the upper ledges **43** of the recesses **41**, the second flange **29** being thereafter removed from the first flange **27**, and particularly from the anchor posts **31** thereof, the spool **59** with the collected utilized ribbon wound therearound being then removed from the first flange **27** for convenient discarding.

FIG. **3** is illustrative of how the inventive demountable ribbon reel might be coupled to the motor drive shaft **17** of the ribbon utilizing device illustrated in FIGS. **1** and **2**, a sleeve **75** being fixed to the motor drive shaft **17** by means of set screws to thereby provide coupling with the first flange **27** by means of the projections **39** thereof and a pair of oppositely disposed teeth **77** forming a part of the sleeve **75**. The previously mentioned slot formed in the motor drive shaft **17** would additionally engage the partition **65** formed in the central aperture **63** of the spool **59** to provide a direct drive as between the motor drive shaft **17** and the spool **59**.

While the preferred embodiment of the demountable ribbon reel has been described herein in considerable detail, it will be appreciated that various modifications and alterations therein may be conceived by persons skilled in the art without departing from the true spirit and scope of the invention.

What is claimed is:

1. A reel for windably holding a roll of material and wherein the material may be conveniently installed therein and removed therefrom, said reel comprising:

a. a pair of separatable spaced-apart flanges at least a first of which is provided with a central aperture serving as an axis of rotation for said reel and also as engaging means relative to a material utilizing device,

b. first means associated with said first flange for holding a spool in fixed angular relationship relative to and intermediate said flanges and for windably activating a second of said flanges in response to the windable activation of said first flange by said material utilizing device, said first means including a pair of cylindrical anchor posts fixed to said first flange and a pair of circular apertures formed in said second flange, and

c. second means associated with said second flange and engageably cooperating with said first means to securably hold said spool between said flanges such that said spool defines said spaced-apart relationship therebetween, said second means including a pair of rectilinear recesses formed in said pair of cylindrical anchor posts and resilient latching

means operatively coupled to said second flange, said resilient latching means being manually manipulatable to disengage said second flange from said first flange to thereby effectuate removal or installation of said spool, the installation of a said spool being for the purpose of utilizing the material wound therearound and the removal of a said spool being for the purpose of disposing of the utilized material collected therearound.

2. A reel as defined in claim 1 wherein said pair of cylindrical anchor posts of said first means are fixed to and normally disposed of the planar surface of said first flange adjacent said second flange, and are disposed also in radial straddling relationship to said central aperture of said first flange, said anchor posts being effective for receiving a said spool by means of at least a pair of correspondingly disposed apertures formed therein, and wherein said pair of circular apertures of said first means are formed in said second flange in corresponding radial relationship to said pair of anchor posts fixed to said first flange, said apertures being effective for receiving said anchor posts to thereby effect said windable activation of said second flange in response to the activation of said first flange by said material utilizing device.

3. A reel as defined in claim 2 wherein said pair of rectilinear recesses of said second means formed in said anchor posts of said first means are of predetermined length and depth and disposed on the side of said anchor posts adjacent said central aperture of said first flange, and wherein said resilient latching means operatively coupled to said second flange is disposed on the exterior planar surface thereof opposite the surface adjacent said first flange, said resilient latching means being contiguously disposed relative to said pair of circular apertures formed in said second flange and cooperably disposed relative to said rectilinear recesses formed in said anchor posts such that a said spool is securably held between said flanges.

4. A reel as defined in claim 3 wherein said resilient latching means comprises:

a. a generally U-shaped web member attached to said exterior planar surface of said second flange at a predetermined intermediate point along a base portion of said web member, and

b. a pair of offset projections integrally formed on the free-end extremities of said U-shaped web member, said projections extending outwardly of the web member in a plane contiguous to and parallel with the plane of said exterior surface of said second flange, said free-end extremities of said web member being yieldably displaceable from a normal set inwardly of said pair of circular apertures formed in said second flange and of said pair of anchor posts fixed to said first flange such that upon termination of said displacement said extremities resiliently return to said normal set wherein said projections thereof latchably engage said pair of rectilinear recesses of said anchor posts and particularly a pair of outermost ledges formed thereby.

5. A reel as defined in claim 4 wherein said resilient latching means is additionally provided with a protective guide bar fixed to said exterior surface of said second flange, said bar serving to guidably retain and to support the outermost extremities of said offset projections of said U-shaped web member during said yieldable displacement and resilient return thereof, said support serving further to oppose extraneous forces that might be applied to said U-shaped web member and to thereby preserve said attachment thereof to said exterior surface of said second flange.

6. A reel as defined in claim 4 wherein said U-shaped web member is additionally provided with a pair of manually operable tabs integrally formed on the free-end extremities thereof opposite said offset projections, said pair of tabs being manually contractable to effectuate said yieldable displacement of said free-end extremities and said offset projections to thereby unlatch said offset projections and said second flange from said anchor posts and said first flange.

7. A ribbon take-up reel for use in a ribbon utilizing device wherein the utilized ribbon may be effectively collected and disposed of, said take-up reel comprising;

a. a pair of separatable spaced-apart flanges at least a first of which is provided with a central aperture serving as an axis of rotation for said reel and also as engaging means relative to said ribbon utilizing device,

b. a ribbon spool effective for windably collecting said utilized ribbon for effectively disposing of same, said spool having a central aperture coaxially disposed of said central aperture of said first flange and engageable by said ribbon utilizing device,

c. first means associated with said first flange for holding said ribbon spool in fixed angular relationship relative to and intermediate said flanges and for rotatably activating a second of said flanges in response to the activation of said first flange by said ribbon utilizing device, said first means including a pair of cylindrical anchor posts fixed to said first flange and a pair of circular apertures formed in said second flange, and

d. second means associated with said second flange and engageably cooperating with said first means to securably hold said ribbon spool between said flanges such that said spool defines said spaced-apart relationship therebetween, said second means including a pair of rectilinear recesses formed in said pair of cylindrical anchor posts and resilient latching means operatively coupled to said second flange, said resilient latching means being manually manipulatable to disengage said second flange from said first flange to thereby effectuate removal of said ribbon spool and disposition of the utilized ribbon woundably collected therearound.

8. A reel as defined in claim 7 wherein said pair of cylindrical anchor posts of said first means are fixed to and normally disposed of the planar surface of said first flange adjacent said second flange, and are disposed in radial straddling relationship to said central aperture of said first flange, said anchor posts being effective for receiving a said ribbon spool by means of at least a pair of correspondingly disposed apertures formed therein, and wherein said pair of circular apertures of said first means are formed in said second flange in corresponding radial relationship to said pair of anchor posts fixed to said first flange, said apertures being effective for receiving said anchor posts to thereby effect said windable activation of said second flange in response to the activation of said first flange by said ribbon utilizing device.

9. A reel as defined in claim 8 wherein said pair of rectilinear recesses of said second means formed in said anchor posts of said first means are of predetermined length and depth and disposed on the side of said anchor posts adjacent said central aperture of said first flange, and wherein said resilient latching means operatively coupled to said second flange is disposed on the exterior planar surface thereof opposite the surface adjacent said first flange, said resilient latching means being contiguously disposed relative to said pair of circular apertures formed in said second flange and cooperably disposed relative to said rectilinear recesses formed in said anchor posts such that a said ribbon spool is securably held between said flanges.

10. A reel as defined in claim 9 wherein said resilient latching means comprises:

a. a generally U-shaped web member attached to said exterior planar surface of said second flange at a predetermined intermediate point along a base portion of said web member, and

b. a pair of offset projections integrally formed on the free-end extremities of said U-shaped web member, said projections extending outwardly of the web member in a plane contiguous to and parallel with the plane of said exterior surface of said second flange, said free-end extremities of said web member being yieldably displaceable from a normal set inwardly of said pair of circular apertures formed in said second flange and of said pair of anchor posts fixed to said first flange such that upon termination of said displacement said extremities resiliently return to said normal set wherein said projections thereof latchably engage said pair of rectilinear recesses of said anchor posts and particularly a pair of outermost ledges formed thereby.

11. A reel as defined in claim 10 wherein said resilient latching means is additionally provided with a protective guide bar fixed to said exterior surface of said second flange, said bar serving to guidably retain and to support the outermost extremities of said offset projections of said U-shaped web member during said yieldable displacement and resilient return thereof, said support serving further to oppose extraneous forces that might be applied to said U-shaped web member and to thereby preserve said attachment thereof to said exterior surface of said second flange.

12. A reel as defined in claim 10 wherein said U-shaped web member is additionally provided with a pair of manually operable tabs integrally formed on the free-end extremities thereof opposite said offset projections, said pair of tabs being manually contractable to effectuate said yieldable displacement of said free-end extremities and said offset projections to thereby unlatch said offset projections and said second flange from said anchor posts and said first flange.

13. A device for windably holding a roll of material in material utilizing apparatus such that a roll of used material may conveniently be removed therefrom and discarded, said device comprising:

a. a first retainer member having a central aperture engageably associated with said utilizing apparatus and having also a pair of recessed cylindrical anchor posts normally disposed of said first member on opposite sides of said central aperture,

b. a material holding member receivable by said cylindrical anchor posts for windable rotation with said first retainer member, and

c. a second retainer member having a pair of apertures receivably corresponding to said pair of recessed cylindrical anchor posts of said first retainer member, and having also manually operable resilient latching means cooperably associated with the recesses of said pair of recessed cylindrical anchor posts such that upon the manual manipulation of said latching means against its normal resiliency said second retainer member may be removed from said first retainer member to permit the discarding of said material holding member and the used material wound therearound.

14. A device for holding a roll of material in material utilizing apparatus such that a roll of unused material may be installed therein preparatory to its unwindable utilization, and such that a roll of rewound used material may be removed therefrom and discarded, said device comprising:

a. a first retainer member having a central aperture engageably associated with said utilizing apparatus and having also a pair of recessed cylindrical anchor posts normally disposed of said first member on opposite sides of said central aperture, and

b. a second retainer member having a pair of apertures receivably corresponding to said pair of recessed cylindrical anchor posts of said first retainer member, and having also manually operable resilient latching means cooperably associated with the recesses of said pair of recessed cylindrical anchor posts such that said second retainer member may be removed from said first retainer member for the insertable installation of a new roll of unused material therebetween and for the removal of a roll of used material therefrom, the manual manipulation of said latching means against its normal resiliency serving to effectuate said removal of said first retainer member from said second retainer member and the release of said latching means to the control of its normal resiliency upon said insertable installation of a new roll of unused material serving to secure said second retainer member to said first retainer member preparatory to the unwindable utilization of said new roll of material by said material utilizing apparatus.

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