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Brunett

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[54] **WIDE LINE RIBBON PACKAGE**

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[52] **U.S. Cl.** **206/497,** 242/68

[51] **Int. Cl.** **B65d 85/66**

[58] **Field of Search** ..... 206/65 S, 65 R, 59 R, 59 F, 206/52 R, 58 R, 46 FC; 242/68, 71.2, 118.61

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Attorney, Agent, or Firm—Leon E. Redman; Charles S. Hall; Edward G. Fiorito

[57] **ABSTRACT**

A package for wide, thin film printer ribbon including a pair of generally butterfly-shaped end pieces of substantially uniform thickness having integral bosses extending orthogonally and inwardly therefrom with a groove surrounding each boss for press fitting thereinto the open ends of a ribbon supply roll and a ribbon leader roll, a span of the ribbon being exposed between the two spaced-apart rolls. The depth of the grooves for the leader roll is less than that for the supply roll or alternately grooves may encircle only the supply roll bosses so that the end pieces angle away from the lead portion of the ribbon exposed between the rolls whereby the edges of the exposed span of film do not touch the end pieces. A heat-shrinkable overwrap encompasses the package, and the end pieces have break open cavities in their outer walls.

13 Claims, 9 Drawing Figures

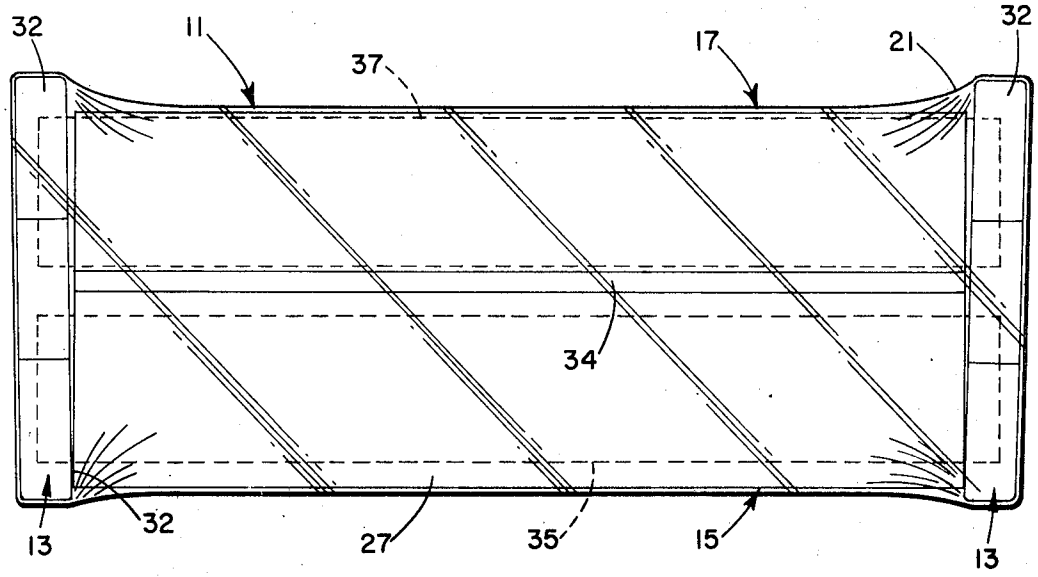

FIG. 1

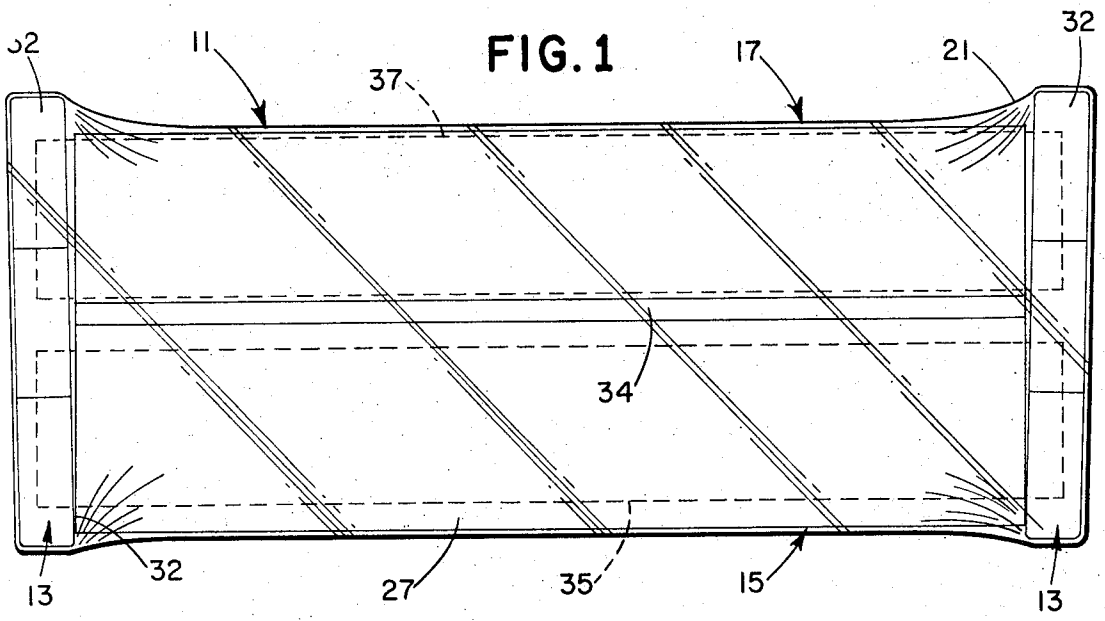
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FIG. 2

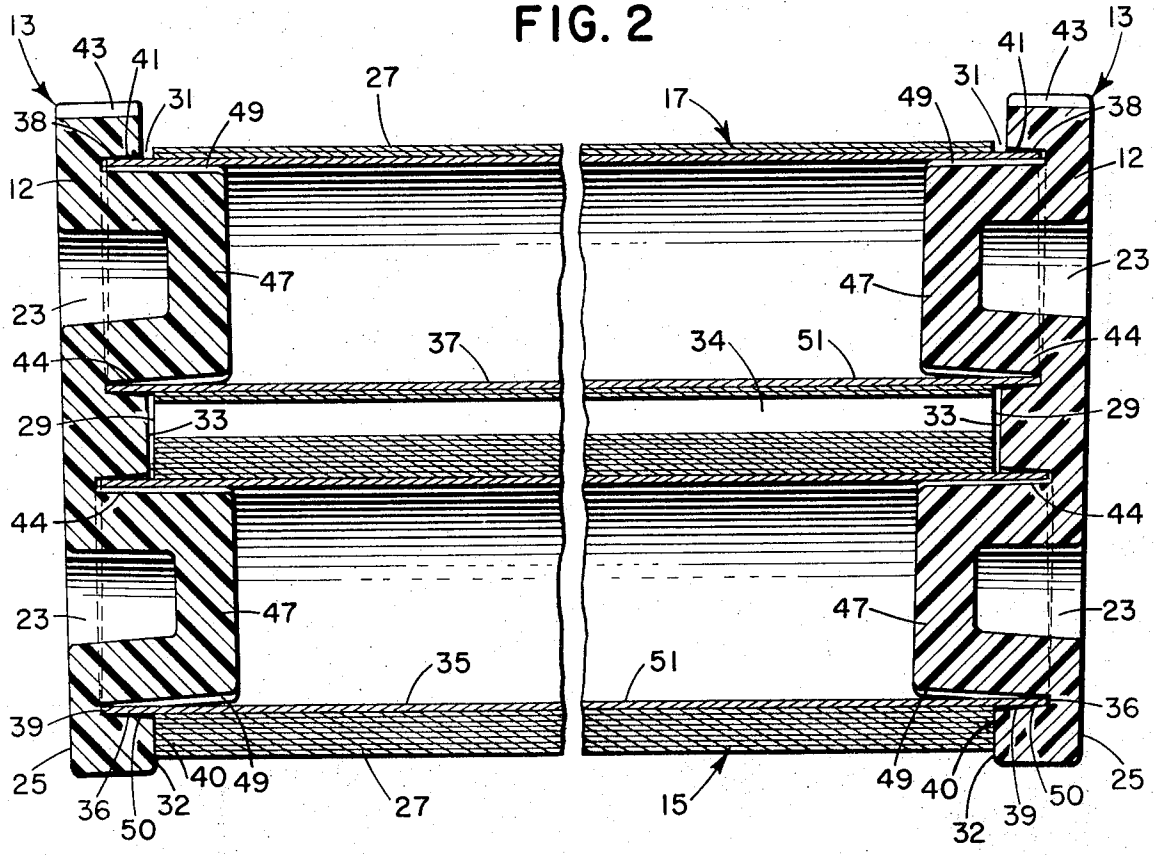
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FIG. 3.

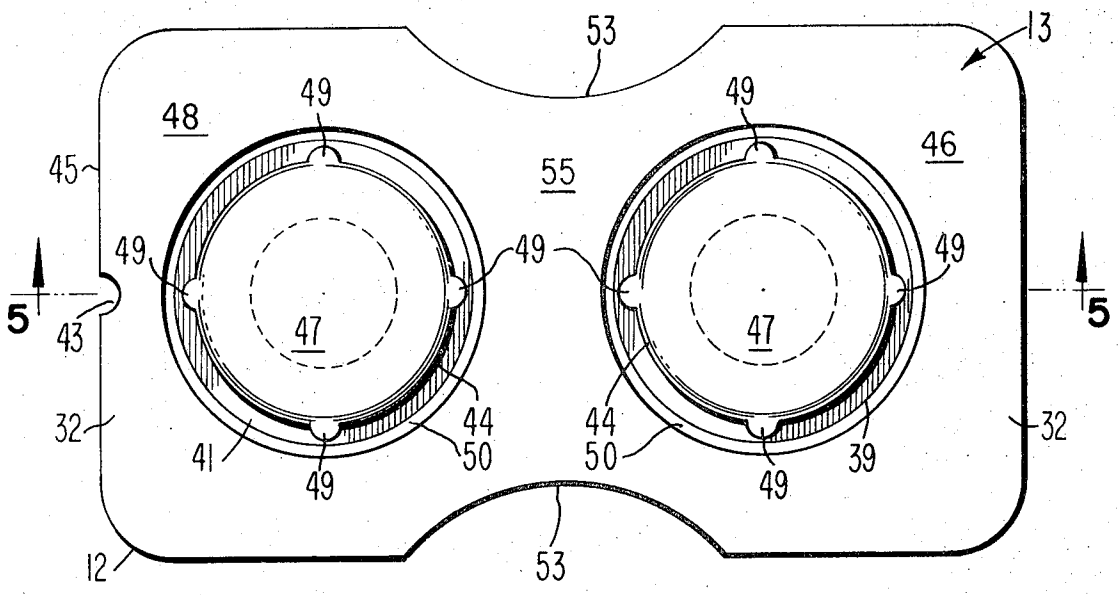


FIG. 4.

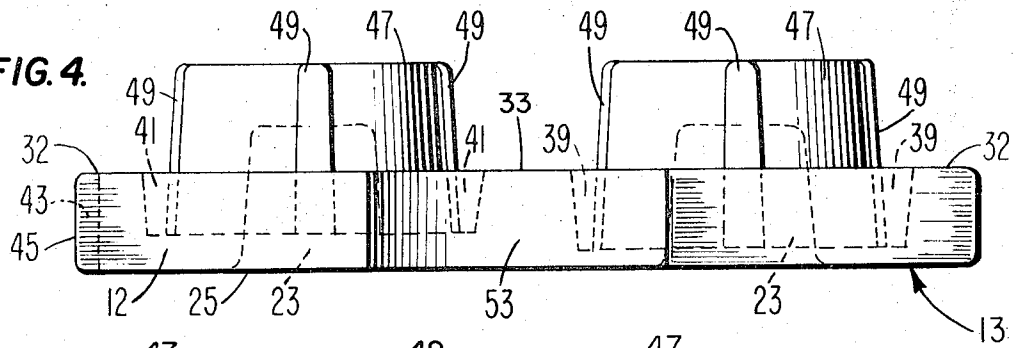


FIG. 5.

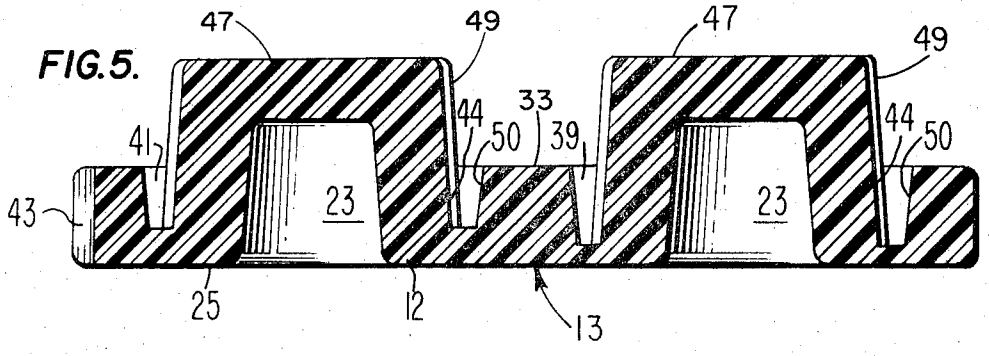


FIG. 6.

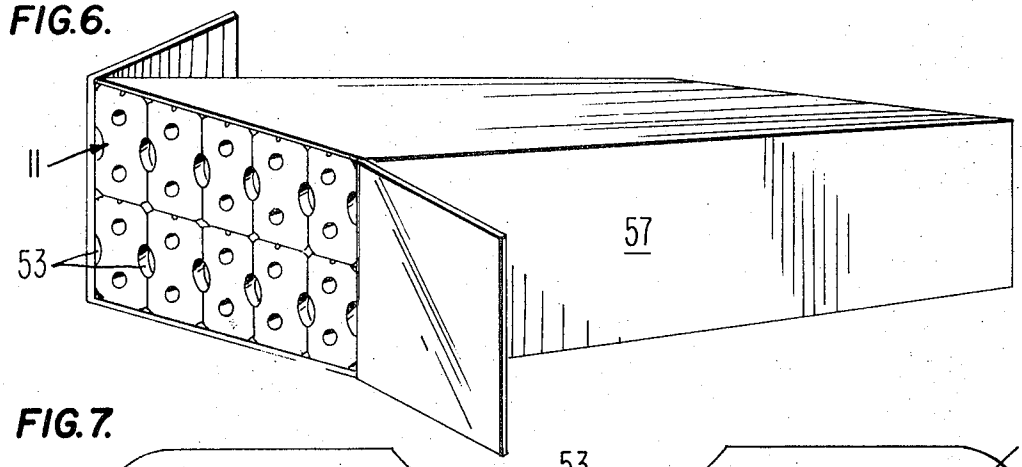


FIG. 7.

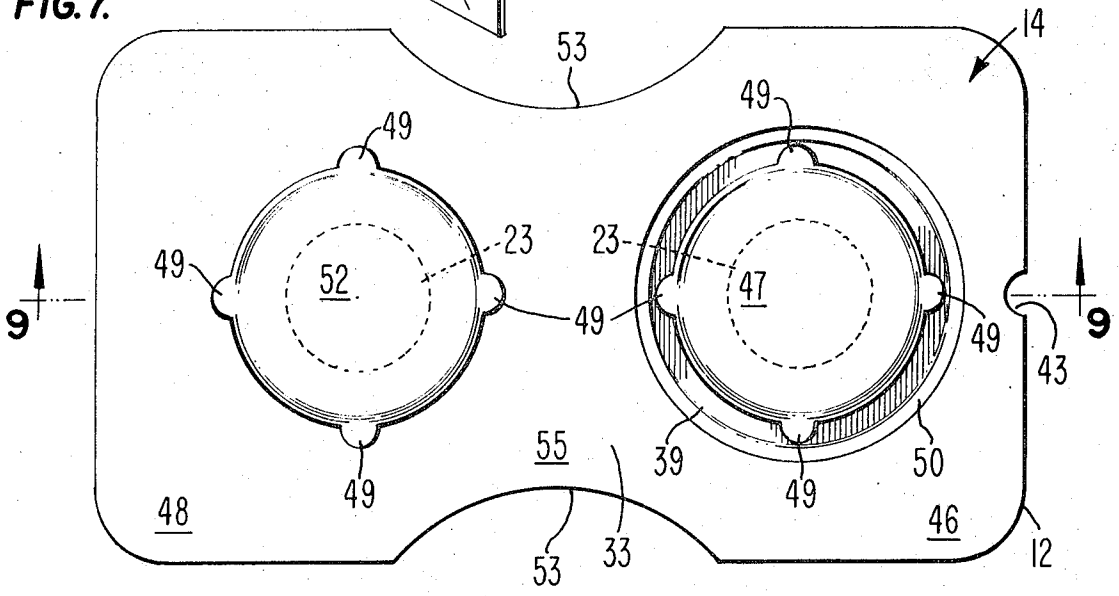


FIG. 8.

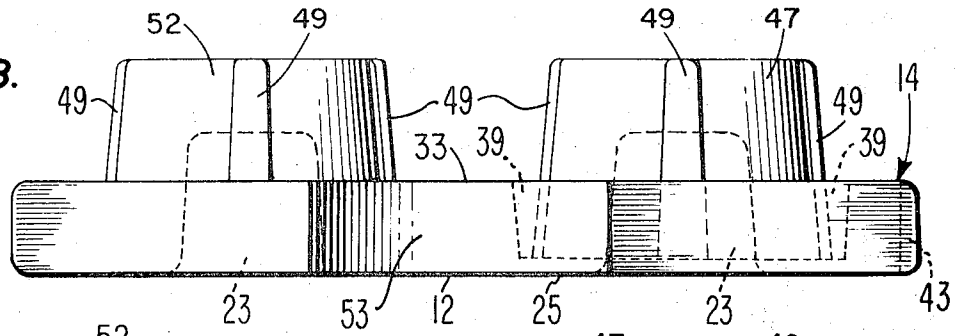
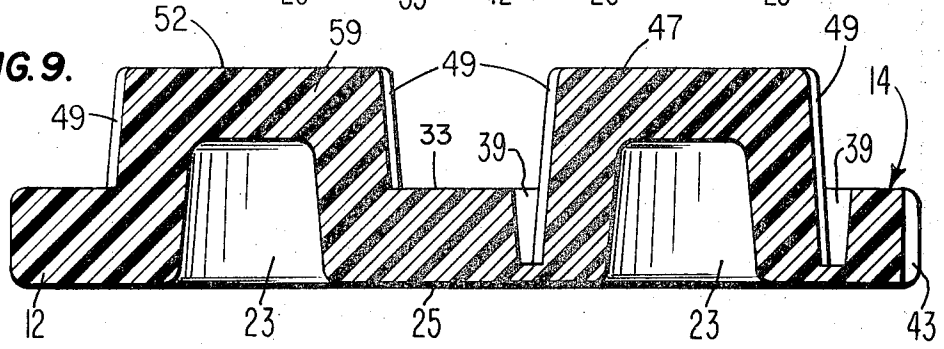


FIG. 9.



WIDE LINE RIBBON PACKAGE

BACKGROUND OF THE INVENTION

This invention relates generally to a wide line ribbon package and more specifically to a high strength unitary package including molded end pieces for thin film ribbon protection while maintaining uniform ribbon edge alignment.

It is well-known in the art to employ molded container positioners in a package. However, prior to this invention, molded container positioners were usually associated with can packages and maintained adjacent the top and bottom end chimes in a parallel relationship. These container positioners may include depressions extending into the package among the group of adjacent end chimes.

However, packaging wide line ribbon, particularly when composed of thin film, presents problems that are not encountered in the can packaging art. These wide line printers are typically 14 inches wide, twenty yards long and consist of a backing medium, an undercoating and a synthetic resin ink transfer coating as described in U.S. Pat. No. 2,943,952 to Clark.

This ribbon is centered upon and tightly wound about a supply core keeping the side edges in uniform alignment. The core is longer than the ribbon width thereby providing core ends extending beyond each side of the ribbon a predetermined distance. The ribbon leader is turned about and secured to a central portion of a take up core which is the same length as the supply core, thereby providing core ends extending beyond each side of the leader ribbon. It is important for the edges of wide line ribbon to be maintained uniformly aligned while being protected from knicking or tearing. Uniform alighment is essential for preventing ribbon jamming as it is fed through a high speed printer. The ribbon must, therefore, be constrained from telescoping while in the package.

Due to a combination of the high speed at which wide line ribbon typically moves through a line or page data processing printer and the thinness of the film ribbon, any knick or tear at the film ribbon edge usually leads to a tear across the entire width of the ribbon thereby necesitating costly replacement. The nature of the composition of film ribbon is such that the ink transfer coating is subject to flaking and, therefore, the film ribbon must not rub against itself or be touched by human fingers.

SUMMARY OF THE INVENTION

The principal object of this invention is to improve the packaging of wide line film ribbon.

Another object of the invention is to develop an improved package for wide line, film ribbon for preventing telescoping of the ribbon.

A further object of the invention is to protect packaged film ribbon edges from knicks.

BRIEF DESCRIPTION OF THE INVENTION

In achieving the above-mentioned objects the package for wide line, film printing ribbon of the invention utilizes a pair of end pieces having spaced-apart circular grooves for the insertion of the ends of the supply roll, having ribbon stored thereon in multiple turns, and a leader roll. Ribbed frusto-conical bosses support the rolls and define the inner surface of each groove in which the rolls are press-fitted for firm engagement. The depth of the grooves for the supply roll permits the aligned edges of the ribbon wound thereon to seat snugly against the shoulder of the end pieces, while the depth of the grooves for the leader roll is less, thus angling the end pieces away from the span of ribbon exposed between the two rolls. The ribbon supply roll is thus prevented from telescoping and the edges of the exposed portion of the film ribbon are prevented from rubbing against the end pieces. Instead of both bosses of the end piece being surrounded by grooves of different depths, a groove may encircle only one boss for receiving an end of the multiple turn roll with the leader roll mounted on the other boss merely abutting the end piece. A heat-shrinkable overwrap encompasses the end pieces and the ribbon rolls, the shoulders on the end pieces being of sufficient width to maintain the overwrap away from the ribbon adjacent the end pieces. Hand grip areas may be provided along the sides of the end pieces for easy removal of a single ribbon package from a shipping box and the end pieces may have cavities for enabling uniform thickness throughout and for facilitating the breaking open of the overwrap.

BRIEF DESCRIPTION OF THE DRAWING

The foregoing objects and advantages of the invention, together with other objects and advantages, which may be obtained by its use, will be apparent from the following detailed description when read in conjunction with the drawing, wherein like numerals identify corresponding elements:

FIG. **1** is an isometric perspective view of a unitary wide line ribbon package illustrating the orientation of various elements of the present invention;

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

FIG. **3** is a side plan view of an end piece according to the present invention;

FIG. **4** is a front elevation view of the end piece of FIG. **3**;

FIG. **5** is a sectional elevation view taken along line **5—5** of FIG. **3**;

FIG. **6** is an isometric view of a plurality of the unitary wide line ribbon packages of FIG. **1** in a shipping box, illustrating the orientation of the easy removal hand grips of the end piece of FIG. **3**;

FIG. **7** is a side plan view of an end piece according to an alternate embodiment of the present invention;

FIG. **8** is a front elevation view of the end piece of FIG. **7**;

FIG. **9** is a sectional elevation view taken along line **9—9** of FIG. **7**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A unitary wide line ribbon package **11** (FIG. **1**) is provided with a pair of identical molded end pieces **13** press fit with aligned open-ended film ribbon supply and take-up rolls **15, 17** with a span of exposed leader portion **34** of ribbon **27** extending therebetween. A heat shrinkable overwrap **21** encompasses the ribbon rolls **15, 17** and end pieces **13.** Break open cavities **23** are provided at the planar outer surface **25** of the end pieces **13** for allowing substantially uniform thickness throughout and for permitting the heat-shrunk over-

wrap 21 to be broken without danger of damaging the frail thin film ribbon 27.

The heat-shrinkable plastic film overwrap 21, encompassing the molded end pieces 13 and ribbon rolls 15, 17 press fit therein and confined therebetween, protects the film ribbon 27 from atmospheric contamination and also provides a single unitary package 11 for each and safe handling. The shoulders 32 on the end pieces 13 are wide enough to maintain the film overwrap 21 away from the ribbon 27 adjacent the end pieces.

An essential function of this invention is to protect the side edges 29 (FIG. 2) of the leader portion 34 of the film ribbon 27 by providing a safety clearance 31 between the planar inner surface 33 of the end pieces and the side edges 29 of the span 34 of ribbon exposed between the supply roll 15 and the leader roll 17. The invention accomplishes the above function by providing means for slightly angling the end pieces 13 away from each other from the supply roll 15 towards the take-up roll 17 (FIG. 2).

In the preferred embodiment each of the end pieces 13 is gneerally butterfly-shaped (FIG. 3), and has substantially uniform thickness (FIGS. 2 and 5) as will be described later. A circular groove 39, 41 of truncated V-shaped cross-section is provided in each wing portion 46, 48 of the end piece block 12. These grooves have slightly different depths. The deeper groove is hereby designated the supply roll groove 39, while the shallower groove is designated the leader roll groove 41. Tapered bosses 47 (FIGS. 2, 4 and 5) extend outwardly from the end piece blocks 12 forming the inner walls 44 of each of the grooves 39, 41, and a plurality of crush ribs 49 (FIGS. 3 and 4) may be disposed about the perimeter of each boss 47 for firm engagement with the inner surfaces 51 of the ribbon roll cores 35, 37.

The supply and leader rolls 15, 17 have cylindrical rolls or cores 35, 37 of the same length. The exposed ends 36 of the supply roll extending beyond the material web 27 are press fit into the supply groove 39 a predetermined depth in each of the end pieces 13. Thus, the uniformly aligned multiple turn roll edges firmly abut a shoulder 32 of each of the planar walls 33 at 40 (FIG. 2) thereby trapping the multiple turn roll 15 therebetween. The exposed portions 36 of the core 35 are pressed between the groove's inner walls 44 engaging the inner surface 51 of the core and the groove's tapering outer walls 50 (FIG. 5) engaging the outer surface of the exposed portions 36 of the core. This firm engagement of the core 35 combined with the tightly wound and uniformly aligned supply roll edges being trapped between the inner planar walls 33 of the end pieces 13 prevents the ribbon roll 15 from twisting and telescoping.

The exposed ends 38 of the leader roll extending beyond the web of material 27 are press fit into the leader roll grooves 41 to a depth less than the predetermined distance that the supply roll ends 36 are press fit into the supply roll grooves 39. Therefore, with the web of material 27 being a uniform width and the supply and take-up cores 35, 37 substantially the same length, safety clearances 31 are provided between the inner planar surfaces 33 of the end pieces 13 and the leader portion edges 29 as the end pieces 13 are forced away from each other by the step in groove depths while the supply roll ribbon edges are maintained in uniform alignment seated against the inner planar walls 33 of the end pieces 13.

The web of material 27 may be intended for use where telescoping of the multiple turn roll 15 does not present the same problem as when the material is to be used in an electronic data processing printer. In the case where telescoping need not be prevented the invention may be in an alternate embodiment as follows. This embodiment (FIGS. 7, 8 and 9) employs an end piece 14 having a groove 39 provided in the planar surface 33 of the end piece block 12 about only one boss 47 for receiving an end 36 of the multiple turn supply roll 15. The depth of this supply roll groove 39 should be sufficient to receive the end 36 of the multiple turn roll to at least the distance 36 (FIG. 2) the roll 35 extends beyond the edges of the multiple turn material 27.

Using a pair of such end pieces 14 the ends 36 of the multiple turn roll 15 may thus be supported within the package 11 by mounting them about the bosses 47 and press-fitting them within the grooves 39 of the end pieces 14. Another boss 52 is provided on each of the end piece blocks 12 and protrudes from the planar surface 33 thereof. In this embodiment grooves are not provided about these bosses 52. Thus, the ends 38 of the leader roll 17 may be mounted on these bosses 52 and do not extend into, but instead abut, the planar surfaces 33 of the end pieces 14. With this structure the package 11 may be assembled with a portion 40 of the multiple turn roll 15 seated against the end pieces' planar surfaces 33 and the exposed span 34 of the material 27 between the multiple turn roll 15 and the leader roll 17 being spaced away from the planar surfaces 33 as the end pieces 14 angle away from each other.

It is important to insert the supply and take-up rolls 15, 17 in the appropriate grooves 39, 41. Therefore, a key 43 (FIG. 3) is provided in a sidewall 45 of either the supply end 46 or take-up end 48 of the end piece 13. In the preferred embodiment, the key 43 is a slot provided in the sidewall 45 of the take-up end 48 of the end piece 13 for identifying it as such. In the alternate embodiment (FIGS. 7, 8 and 9) the key 43 is provided at the supply end 46 of the end piece 14. Thus, in assembling the ribbon rolls 15, 17 and end pieces 13, 14 it is readily apparent which roll is to be press fit into which groove without a tedious examination of the end piece and grooves to determine which is the groove into which the supply roll core 35 is to be press fit.

The biconcavity 53 of the body portion 55 of the end piece 13, 14 is an aid in removing a single wide line ribbon package 11 from a shipping box 57 in which a number of unitary wide line ribbon packages 11 may be stacked (FIG. 6).

Block 12 has an outer planar surface 25 disposed opposite planar surface 33 for defining the thickness of the block 12 as substantially uniform. Break open cavities 23 extend from this outer planar surface 25 into the end piece 13, 14 and continue into the inside of each boss 47, 52 with which the cavities 23 are concentric.

The break-open cavities 23 serve two independent purposes. These cavities allow the film overwrap to be ruptured outside the area of the ribbon and also enable the end piece to have substantially uniform thickness throughout. In order to gain access to the ribbon supply and leader rolls 15, 17, a user merely forces an object (not shown) such as a finger through one or both break

open cavities or hollow **23** thereby bursting the heat-shrunk overwrap **21.** The overwrap may then be easily torn and removed from about the end pieces **13, 14** and the ribbon rolls **15, 17** without accidentally touching the ribbon **27** itself.

In the preferred embodiment, the end pieces **13, 14** are manufactured according to known molding processes using materials such as foamed or unfoamed polystyrene or polythylene, fibrous pulp, thermoplastic or thermosetting resins of either the foamed or unfoamed variety. Whatever material is used in a molding process, a molded article requires time to set and dry. This time is dependent on the thickness of the thickest portion of the article being molded. Therefore, if the end pieces **13, 14** have substantially uniform thickness throughout a minimum period of time is required for setting and drying, thereby allowing great manufacturing economies to be realized. In order to achieve this substantially uniform thickness of the end piece **13, 14** circular break-open cavities **23** have whatever diameter and depth is necessary for enabling the thickness of the walls **59** of the bosses **47, 52** to be substantially uniform and substantially equivalent to the thickness of the block **12.**

Means other than break-open cavities could be employed in achieving substantially uniform thickness throughout the end pieces **13, 14.** For example, an outer portion of each boss **47, 52** could be hollowed or removed instead, thereby defining the boss wall **59** thickness as substantially equivalent to the thickness of the block **12.**

Molded end pieces of a yieldable material as described above allow the final package **11** to weigh less than it would if the end pieces were manufactured from a heavier stock. However, if weight is not an important consideration, the end pieces could be produced according to this invention from a stock of any suitable material such as wood or metal, which can be milled, fabricated or molded.

While the prime embodiment of the invention shows and describes a package utilizing end pieces with grooves of varied depth and rolls of equal length for angling the end pieces outwardly from each other, other modifications would be obvious to one skilled in the art without departing from the spirit and scope of the invention. For example, the end pieces could have grooves of equal depth and be used in a package where the take-up roll was longer than the supply roll, thereby angling the end pieces outwardly from each other. Other modifications will be readily apparent to those skilled in the art and are intended to be included in the scope of the invention as defined in the following claims.

What is claimed is:

1. An end piece for use in packaging a pair of open-ended cylindrical rolls, one of said rolls having a web of material stored thereon in multiple turns and the other of said rolls having a leader of said web turned thereabout with a span of said material being exposed therebetween, the ends of said rolls extending beyond said material a predetermined distance comprising:

A block having at least one planar surface, said block having a first groove formed in said planar surface for receiving one end of said multiple turn roll to said predetermined distance and having a second groove also formed in said planar surface and spaced apart from said first groove for receiving one end of said leader roll to less than said predetermined distance, whereby when said ends of said rolls are mounted in said grooves a portion of said web on said multiple turn roll is seated against said planar surface and said exposed span of material is spaced away from said planar surface.

2. The end piece of claim **1** wherein said block further includes means disposed along at least one side of said block for facilitating manual gripping of said block.

3. An end piece for use in packaging a pair of open-ended cylindrical rolls, one of said rolls having a web of material stored thereon in multiple turns and the other of said rolls having a leader of said web turned thereabout with a span of said material being exposed therebetween, the ends of said rolls extending beyond said material a predetermined distance comprising:

A block having at least one planar surface, said block having a first groove formed in said planar surface for receiving one end of said multiple turn roll to said predetermined distance;

a first boss defining the inner side of said first groove and cooperating with said first groove for mounting said one end of said multiple turn roll; and,

a second boss protruding from said planar surface and spaced away from said first boss for mounting one end of said leader roll whereby when said ends of said rolls are mounted on said bosses a portion of said web on said multiple turn roll is seated against said planar surface and said exposed span of material is spaced away from said planar surface.

4. The end piece of claim **3,** wherein said bosses taper inwardly from their bases and a plurality of crush ribs is disposed about said tapered bosses.

5. The end piece of claim **3** wherein said second boss defines the inner side of a second groove formed in said planar surface of said block for receiving said one end of said leader roll to less than said predetermined distance.

6. The end piece of claim **5** wherein the cross-section of said first and second grooves is substantially a truncated "V."

7. The end piece of claim **5** wherein each of said bosses is the frustrum of a right circular cone and said first groove forms a circle about said first boss and said second groove forms a circle about said second boss.

8. The end piece of claim **5** also including means associated with a predetermined one of said grooves for identifying the depth of said predetermined groove relative to the depth of said other groove.

9. The end piece of claim **3** wherein said block further includes an outer planar surface opposite said at least one planar surface, said bosses being hollowed for defining said end piece as having a substantially uniform thickness throughout.

10. The end piece of claim **3** wherein said block further includes an outer planar surface opposite said at least one planar surface and each of said bosses is circular and has a circular cavity concentric therewith and extending therein from said outer planar surface, said circular cavity having sufficient depth and diameter for defining the thickness throughout said bosses as substantially equal to the thickness throughout said block.

11. A package comprising:

A pair of molded end pieces having aligned circular grooves therein;

at least a pair of open-ended cylindrical rolls press fit into and disposed between said molded end pieces; and

a heat-shrinkable film overwrap encompassing said at least one pair of molded end pieces and said open-ended rolls press fit therein.

12. The package according to claim **11** including means for angling each of said molded end pieces outwardly from the other.

13. A package for wide-line ribbon comprising:

a first open-ended cylindrical core;

a second open-ended cylindrical core disposed substantially parallel and adjacent said first core;

a wide-line ribbon supported on said first open-ended cylindrical core in multiple turns, said wide-line ribbon having a leader portion supported on said second open-ended cylindrical core with a span of said ribbon being exposed therebetween;

a first molded end piece for receiving a first open end of each of said first and second cores;

a second molded end piece for receiving a second open end of each of said first and second cores;

means in at least one of said first and second molded end pieces for abuttably engaging the edges of a portion of said multiple turn wide-line ribbon supported on said first core; and

means in each of said first and second molded end pieces for providing clearance between said end pieces and the edges of said span of said wide-line ribbon.

* * * * *