United States Patent [19]

Mueller

[11] **3,897,866**

[45] **Aug. 5, 1975**

[54] **VERTICALLY INSERTABLE TYPEWRITER RIBBON CARTRIDGE**

[75] Inventor: **Hans W. Mueller,** Cortland, N.Y.

[73] Assignee: **SCM Corporation,** New York, N.Y.

[22] Filed: **Nov. 12, 1973**

[21] Appl. No.: **415,262**

[52] **U.S. Cl.** **197/151;** 197/157; 197/170

[51] **Int. Cl.²** **B41J 33/14;** B41J 35/04; B41J 35/28

[58] **Field of Search** ..... 197/151, 157, 158, 159, 197/168, 170, 153 R, 153 A; 248/44

[56] **References Cited**

UNITED STATES PATENTS

764,342	7/1904	Booth	197/168
785,709	3/1905	Burridge	197/168
2,062,455	12/1936	Henry	197/153 R
2,689,705	9/1954	Ciaccio	248/44 X
2,803,331	8/1957	Berill	197/153 R
3,490,671	1/1970	Hladky	197/168 UX
3,590,221	6/1971	Malkowski	197/168 UX
3,643,777	2/1972	Anderson et al.	197/151
3,643,778	2/1972	Anderson	197/151
3,643,779	2/1972	Anderson et al.	197/151
3,726,381	4/1973	Murphy	197/168
3,777,871	12/1973	Zeamer	197/170 X
3,799,315	3/1974	Stewart	197/170 X
3,804,227	4/1974	Cappotto et al.	197/151

FOREIGN PATENTS OR APPLICATIONS

29,235	1913	United Kingdom	197/168

OTHER PUBLICATIONS

IBM Technical Disclosure Bulletin, "Endless Fold Ribbon Cartridge," Gardineer, Vol. 15, No. 2, July 1972, p. 543.

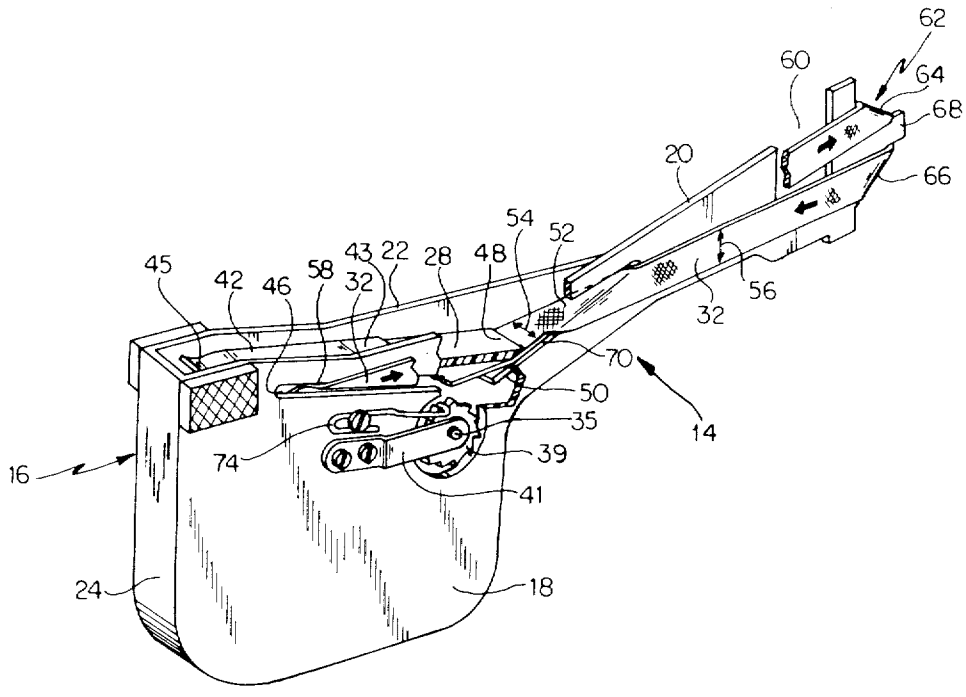
Primary Examiner—Clifford D. Crowder

Attorney, Agent, or Firm—Stanley J. Klem

[57] **ABSTRACT**

A ribbon cartridge removably mountable in a typewriter. The ribbon cartridge has a chamber for storing a ribbon in a first orientation and has an integral rigid arm for guiding the ribbon in a second orientation from the chamber to a typewriter print point and back to the chamber. Ribbon feed rollers are provided in the ribbon cartridge for feeding the ribbon from the chamber, along the rigid arm, to the typewriter print point and back into the chamber.

18 Claims, 7 Drawing Figures



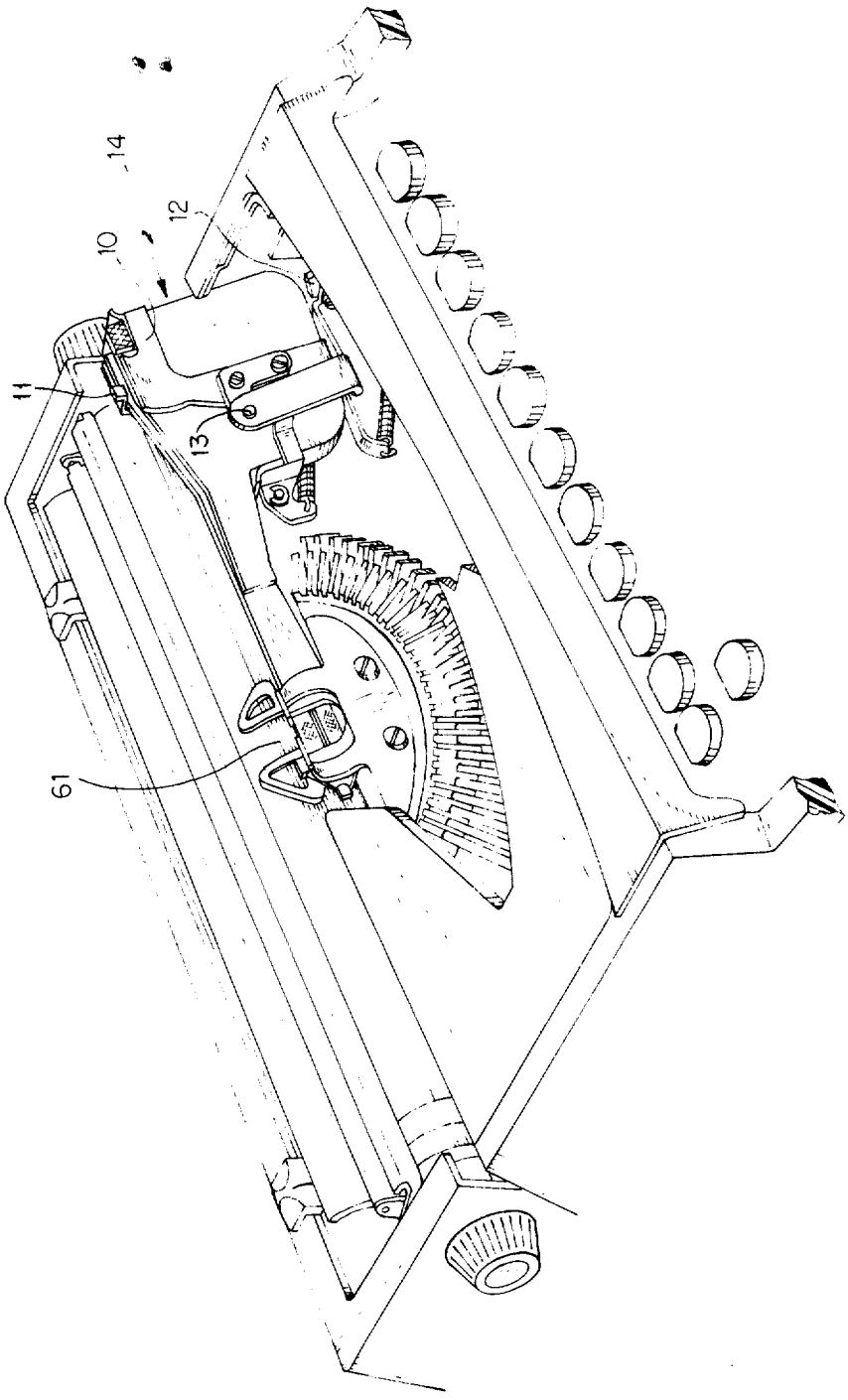


FIG 1

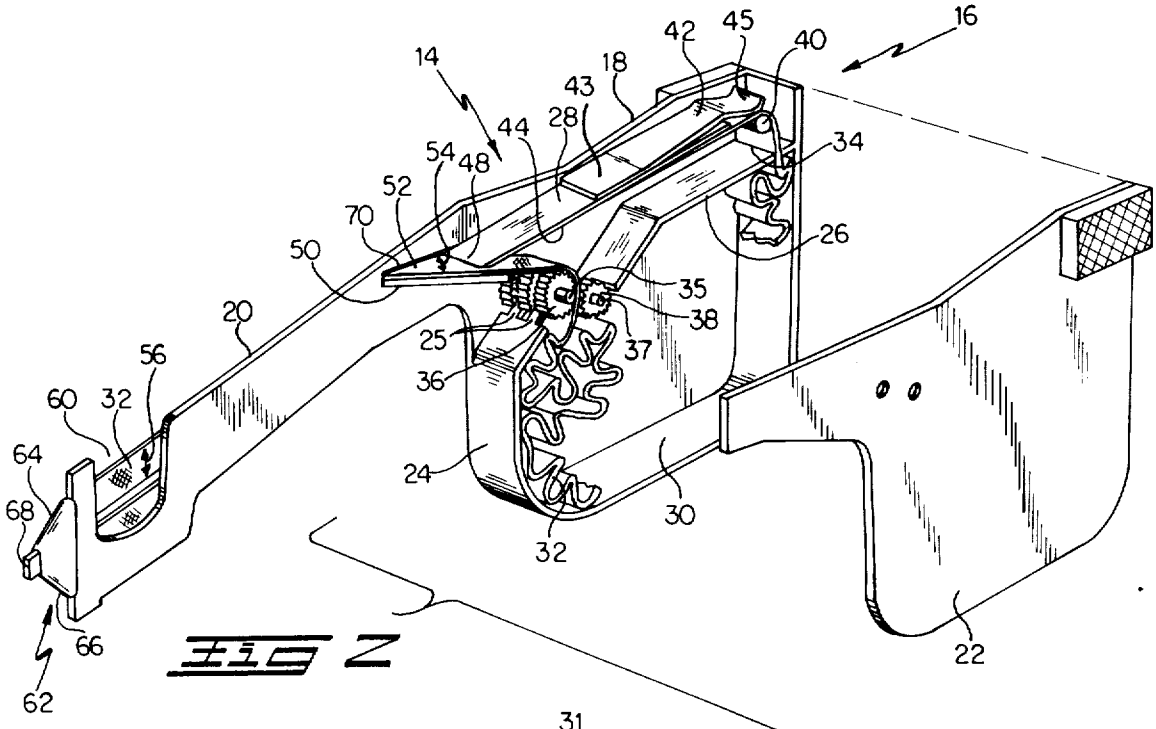


Fig 2

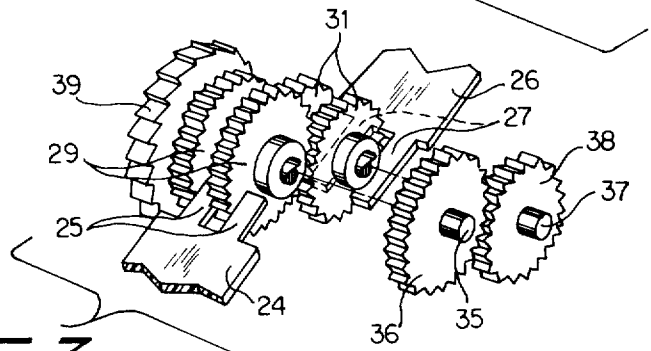


Fig 3

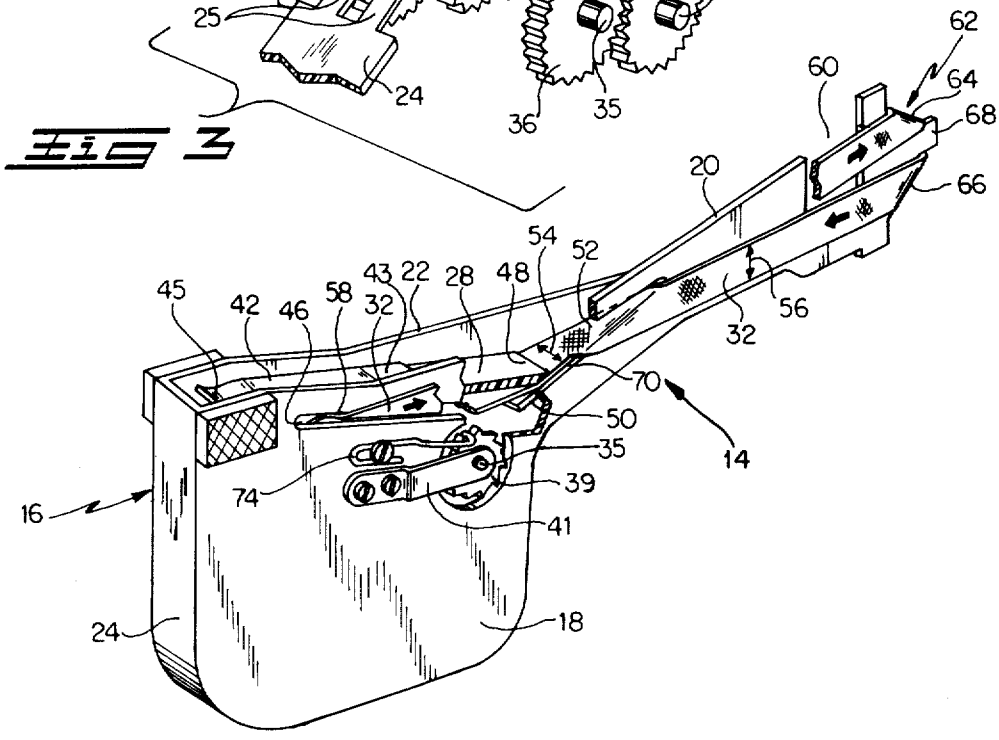


Fig 4

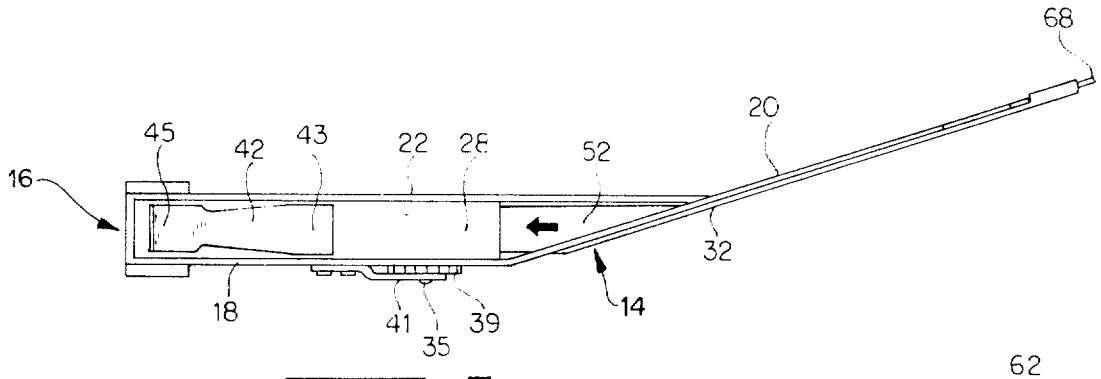


Fig 5

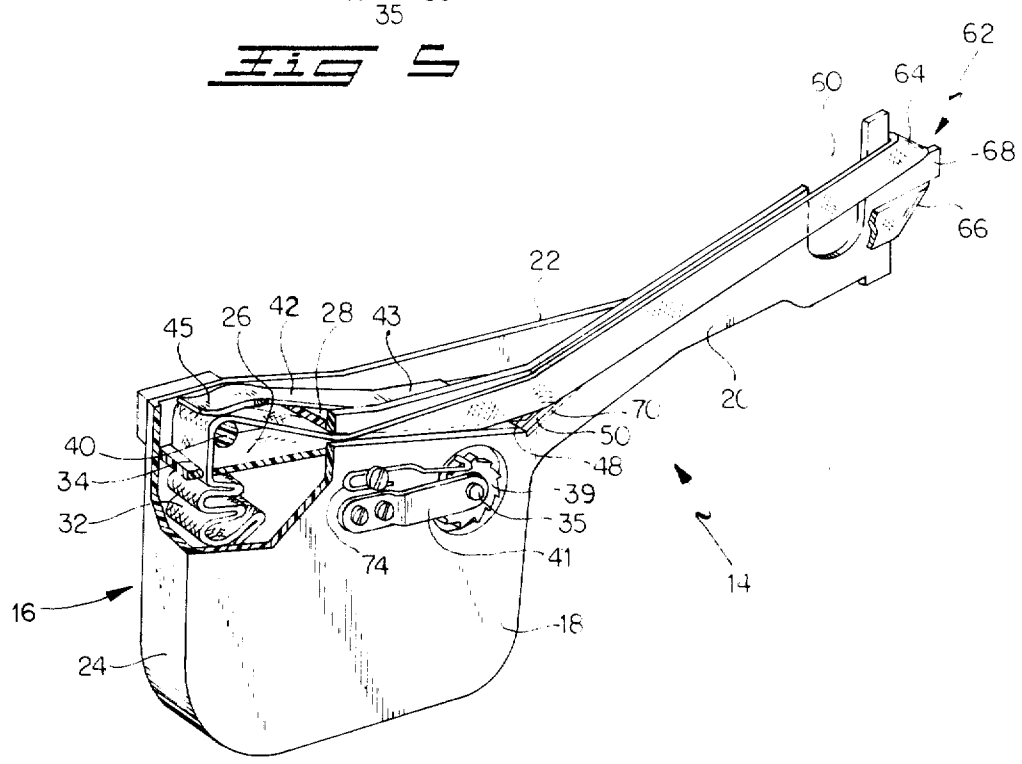


Fig 6

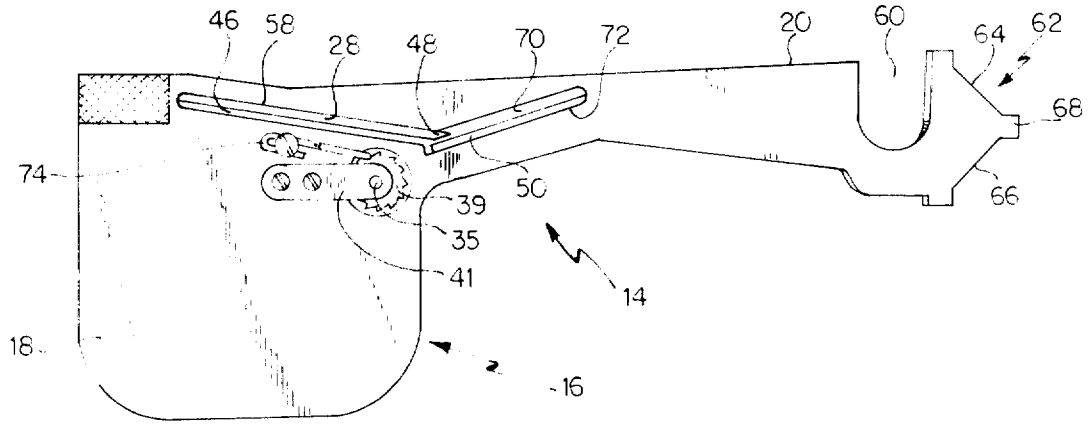


Fig 7

VERTICALLY INSERTABLE TYPEWRITER RIBBON CARTRIDGE

BACKGROUND OF THE INVENTION

The present invention relates to typewriters, and more specifically to a printing ribbon supply that is stored in a ribbon cartridge in a first orientation, and positioned for printing in a second orientation.

Ribbons supported on independent structures, to be removably mounted on a typewriter and cooperate with the typewriter printing mechanisms are common.

For example, U.S. Pat. No. 785,709 discloses a supporting structure for a ribbon maintained in a first orientation on a ribbon supporting structure which is detachably mounted on a typewriter. The ribbon is then manually threaded onto a typewriter supported ribbon guide structure, over and under guide rollers wherein the ribbon is altered to a second orientation.

Manual manipulation of the ribbon to thread it onto the ribbon guide from the supporting structure is a distinct disadvantage overcome by the present invention.

In U.S. Pat. No. 2,869,705 is disclosed a motor driven ribbon mechanism supported outside the confines of a typewriter with only an elongated ribbon track extending laterally to the print point. The ribbon is supplied from a supply reel, along a guided pathway in a first orientation, then obliquely upward in a second orientatiton, and then downward to a printing station in a third orientation. The ribbon track terminates in an encircling ring that requires the removal of the platen to install the unit.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a ribbon cartridge for typewriters that can be easily installed and aligned with the typewriter print point without handling the ribbon.

A still further object of the present invention is to provide a ribbon cartridge for typewriters wherein the ribbon is stored in a first orientation and positioned for printing in a second orientation.

A still further object of the present invention is to provide a ribbon cartridge for typewriters that is compact and of simple construction.

A still further object of the present invention is to provide a ribbon cartridge having a ribbon carrying arm that dispenses with the need for a ribbon vibrator mechanism within the typewriter.

In pursuance of the above objects, and others which will become apparent hereafter, the present invention resides in the provision of a ribbon cartridge construction which may be adapted for vertical mounting in a typewriter which is particularly suitable for a compact typewriter of low silhouette design.

Accordingly, the present embodiment teaches a ribbon cartridge for storing a ribbon in a first orientation in a storage chamber and has a rigid arm for guiding the ribbon in a second orientation from the ribbon cartridge storage chamber to the typewriter printpoint and back to the ribbon cartridge storage chamber. The ribbon cartridge has a ribbon egress slit for altering the ribbon from the first orientation to the second orientation and has a ribbon ingress slit disposed in the rigid arm for altering the ribbon from the second orientation to the first orientation.

Other objects, features, and advantages of the invention will become more apparent from the following description, including appended claims, and accompanying drawing, in which:

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a perspective view of a portion of a typewriter showing the ribbon cartridge made in accordance with the invention.

FIG. **2** is an exploded perspective view of the ribbon cartridge showing all component parts.

FIG. **3** is an enlarged fragmentary view of the feed roller mechanisms shown in FIG. **2.**

FIG. **4** is a rear perspective view of the ribbon cartridge showing the ribbon orientation as it ingresses the ribbon storage chamber.

FIG. **5** is a top plan view of the ribbon cartridge as shown in FIG. **4.**

FIG. **6** is a rear perspective view of the ribbon cartridge showing the ribbon orientation as it egresses from the ribbon storage chamber.

FIG. **7** is a plan view of the ribbon cartridge without ribbon showing the relationship of the egress and ingress slits to one another.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing and particularly to FIG. **1,** where a ribbon cartridge carrier **10** is pivotally supported about a pivot stud **13** on a right typewriter frame **12** in a substantially vertical orientation. The ribbon cartridge carrier **10** has an open top for receiving a ribbon cartridge **14.** The ribbon cartridge **14** is installed in the ribbon cartridge carrier **10** and retained in the installed operative position by a suitable latching means **11.** When installed, the ribbon cartridge **14** engages a feed means in the typewriter that is disclosed in co-pending U.S. application Ser. No. 415,274, filed on Nov. 12, 1973 and having the same assignee.

Referring now to FIG. **2,** the ribbon cartridge **14** is comprised of a cartridge housing **16** preferably of a lightweight resilient material such as molded plastic and includes a flat base **18** with an integral laterally extending rigid arm **20** which may be integral therewith and a flat top **22** spaced from the flat base **18** in a parallel relationship. Joined at the edges of the flat base **18** and the flat top **22** is a U-shaped lower wall member **24,** an intermediate wall **26,** and an upper wall **28,** thereby defining a storage chamber **30** for a ribbon **32.** Intermediate wall **26** provides the upper limit of the storage chamber **30** and includes a ribbon exit slot **34** extending between the flat base **18** and flat top **22** and oriented in alignment with the ribbon **32** as the ribbon **32** exits from the storage chamber **30.**

Ribbon **32** is pulled from the storage chamber **30** by the action of a pair of feed rollers **36** and **38** which drive the ribbon **32** into the chamber **30** at the opposite end. As the ribbon **32** is pulled from the storage chamber **30,** it passes over a fixed stud **40,** under a flexible member **42,** and along an undersurface **44** of the upper wall **28.** Flexible member **42** includes one end **43** fixed to upper wall **28** and the other end **45** resting on fixed stud **40.** The biasing action of flexible member **42** exerts just enough pressure on the fixed stud **40** so that as the ribbon **32** passes therebetween, the ribbon **32** is under sufficient tension to prevent any slack from accumulating along the ribbon path between the ribbon exit slot **34** and the feed rollers **36** and **38.**

Base 18 (FIG. 4) includes a lengthwise egress slit 46 in the direction of arm 20 through which the ribbon 32 passes as it emerges from the interior of the housing 16 to the exterior of the housing 16. An end 48 of the wall 28 rests on a partial wall 50. Partial wall 50 also acts as a ribbon support platform in entrance corridor 52.

As the ribbon 32 passes through the slit 46 (FIG. 4), the ribbon orientation is progressively altered from a first orientation designated by arrows 54, in planar alignment with the walls 24 and 26 to a second orientation designated by arrows 56, in planar alignment with arm 20. This progressive alteration is accomplished as the ribbon 32 is pulled through the slit 46. The ribbon 32 slideably contacts an edge 58 of the egress slit 46 on a bias as it passes therethrough to the outside of the cartridge housing 16. It is at the biasing position where the ribbon 32 is twisted from the first orientation to the second orientation. This progressive alteration results in a smooth transition of the ribbon 32 from a first orientation in the storage chamber 30 to a second orientation on the rigid arm 20.

Ribbon 32 is now oriented parallel to the rigid arm 20. Rigid arm 20 extends from the ribbon cartridge housing 16 in substantially planar alignment with base 18 and includes a print point opening 60 near its end. When the ribbon cartridge 14 is installed in the ribbon cartridge carrier 10, the print point opening 60 of the ribbon cartridge arm 20 and the print point 61 of the typewriter coincide. Ribbon 32 traverses the print point opening 60 of rigid arm 20 at which time the ribbon 32 is aligned and exposed for printing.

Beyond print point opening 60 is a free end 62, which is V-shaped to provide a guide having two substantially 45° surfaces 64 and 66. Disposed between the guide surfaces 64 and 66 is a projecting member 68 to prevent the ribbon 32 from climbing as it is guided along the surface 64 and the surface 66 whereupon the ribbon direction is reversed and directed back along the same side of the arm 20 towards the housing 16.

Arm 20 includes an ingress slit 70, through which the ribbon 32 passes as it ingresses to the entrance corridor 52. Ingress slit 70 intersects egress slit 46 thereby allowing the ribbon 32 to egress from the cartridge housing 16 with the egressing ribbon path substantially overlapping the ingressing ribbon path as the ribbon 32 ingresses to the cartridge housing 16. Ribbon 32 (FIG. 2) is now pulled through ingress slit 70, through entrance corridor 52, under wall end 48, and thereafter to feed rollers 36 and 38. As the ribbon 32 is pulled through the ingress slit 70, the orientation of ribbon 32 is progressively altered from the second orientation in planar alignment with arm 20 to the first orientation in planar alignment with the walls 24 and 26.

As shown in FIG. 7, this progressive alteration is accomplished as the ribbon 32 contacts and follows an edge 72 of ingress slit 70. Ribbon 32 contacts the wall edge 72 on a bias and is pulled through the ingress slit 70 to the entrance corridor 52 of the ribbon cartridge 14 by the feed rollers 36 and 38. It is at the biasing position where the ribbon 32 is progressively altered from the second orientation back to the first orientation.

Feed rollers 36 and 38 (FIG. 2) are rotatably supported about shafts 35 and 37 at the entrance of the storage chamber 30. Shafts 35 and 37 extend through the base 18 and the top 22 in a parallel relationship with one another and in a perpendicular relationship with the base 18 and the top 22. Shaft 35 extends through the base 18 a greater distance than the shaft 37. The extra shaft length provides a support for a ratchet wheel 39, the ratchet wheel 39 being retained between the end of roller 36 and a retaining plate 41 (FIG. 4).

Referring now to FIG. 3, intermediate wall 26 terminates in integral fingers 27, and lower wall 24 terminates in integral fingers 25. Fingers 25 and 27 cooperate with a pair of coacting feed roller groves 29 and 31 to prevent the ribbon 32 from wrapping around the feed rollers 36 and 38. This wrapping condition is amplified when the feed rollers 36 and 38 are feeding the ribbon 32 into the storage chamber 30 wherein the ribbon 32 becomes crowded within the storage chamber 30. As a result of this crowding, the outer convolutions of the ribbon 32 have a tendency to migrate to the outer limits of the storage chamber 30 and ultimately to the entrance and exit openings therein.

In the embodiment, specifically shown in FIG. 3, the feed rollers 36 and 38 have a toothed periphery. However it has been found that rollers with an uninterrupted periphery will also function acceptably.

Ribbon 32 passes between the rollers 36 and 38 with the teeth of the rollers 36 and 38 in mesh sufficiently to insure positive and uniform feeding as the ribbon 32 passes therebetween. Consequently the feed roller teeth pleat the ribbon 32 passing there between as the ribbon 32 is being forced into the storage chamber 30. The pleating of the ribbon 32 renders it physically more suitable for crowding into the storage chamber 30 and cross-sectionally more stable to help maintain its attitude within the storage chamber 30.

When the ribbon cartridge 14 is installed in the cartridge carrier 10 and typing commenced, the ratchet wheel 39 is engaged by a feed means (not shown) within the typewriter and the ratchet wheel 39 incrementally rotates. A spring 74 is mounted on the base 18 for engaging and preventing reverse rotation of the ratchet wheel 39. Consequently feed rollers 36 and 38 are incrementally rotated to pull the ribbon 32 from the storage chamber 30 through the ribbon printing path and feed the ribbon 32 back into the storage chamber 30.

While the invention has been particularly shown and described with reference to the described embodiment thereof, it will be understood by those skilled in the art that the foregoing, and other changes in form and details may be made therein without departing from the scope of the invention.

What is claimed is:

1. A ribbon cartridge removably insertable in a typewriter, the typewriter having a ribbon cartridge carrier adjacent a print point of the typewriter for receiving and supporting said ribbon cartridge, said ribbon cartridge comprising:

a housing having peripheral and side walls for enclosing therein a ribbon in a first orientation wherein the plane of the ribbon surface is perpendicular to said side walls and generally in planar alignment with said peripheral walls;

a single integral arm laterally extending from said housing in planar alignment with said side walls for guiding the ribbon on and there along from said housing on one side of the typewriter print point to the typewriter print point and thereafter guiding the ribbon back to the housing on the same side of the typewriter print point; and

means for altering the ribbon from said first orientation in said housing to a second orientation in planar alignment with said single integral arm on and along said single integral arm to the typewriter print point and then back to said first orientation.

2. A ribbon cartridge as defined in claim **1** wherein said single integral arm includes means enabling a portion of the ribbon to be brought into alignment with and exposed to the typewriter print point with the ribbon in said second orientation.

3. A ribbon cartridge as defined in claim **2** wherein said enabling means is an opening in said single integral arm.

4. A ribbon cartridge as defined in claim **1** wherein said single integral arm is integral and rigid with said housing and is a rigid arm.

5. A ribbon cartridge as defined in claim **1** wherein said altering means includes means defining a first slit in said housing for altering the ribbon from said first orientation to said second orientation.

6. A ribbon cartridge as defined in claim **5** wherein said altering means further includes means defining a second slit in said housing for altering the ribbon from said second orientation to said first orientation.

7. A ribbon cartridge as defined in claim **1** wherein said housing includes at least one wall oriented in a predetermined plane, said single integral arm extending from said housing in a plane substantially parallel to said predetermined plane for guiding the ribbon in said second orientation.

8. A ribbon cartridge as defined in claim **1** wherein said cartridge further comprises feed rollers oriented to feed said ribbon while said ribbon is in said first orientation.

9. A ribbon cartridge as defined in claim **8** further comprising at least one finger cooperating with said feed rollers to prevent the ribbon from wrapping around said feed rollers, said finger being an integral extension of a portion of said housing.

10. A ribbon cartridge removably mountable on a typewriter, the typewriter having a ribbon cartridge carrier adjacent to a print point of the typewriter for receiving and supporting said ribbon cartridge, said ribbon cartridge comprising:

a housing for enclosing a ribbon in a first orientation including a base and a top spaced in a parallel relationship by a U-shaped wall and an intermediate wall to define a storage chamber for said ribbon in said first orientation in planar alignment with said U-shaped wall;

a single integral arm laterally extending from said housing and having a guide surface normal to said U-shaped wall for guiding the ribbon from said housing in a second orientation in planar alignment with said single integral arm along said guide surface on one side of the typewriter print point to the typewriter print point and thereafter guiding the ribbon back to said housing on the same side of the typewriter print point when said cartridge is positioned in said ribbon cartridge carrier; and

means on said single integral arm enabling a portion of the ribbon to be brought into alignment with and exposed to the typewriter print point in said second orientation.

11. A ribbon cartridge as defined in claim **10** where said housing includes means for supporting a ribbon therein in said first orientation.

12. A ribbon cartridge as defined in claim **10** further comprising means for altering the ribbon from said first orientation in said housing to said second orientation on said single integral arm.

13. A ribbon cartridge as defined in claim **12** wherein said altering means includes means defining a first slit in said housing for altering the ribbon from said first orientation to said second orientation.

14. A ribbon cartridge as defined in claim **13** wherein said altering means further includes means defining a second slit in said single integral arm for altering the ribbon from said second orientation to said first orientation.

15. A ribbon cartridge as defined in claim **10** wherein, said single integral arm rigidly extends from said base for guiding the ribbon in said second orientation.

16. A ribbon cartridge as defined in claim **10** further comprising feed rollers oriented to feed said ribbon while said ribbon is in said first orientation.

17. A ribbon cartridge as defined in claim **16** further comprising at least one finger cooperating with said feed rollers to prevent the ribbon from wrapping around said feed rollers, said finger being an integral extension of a portion of said housing.

18. A ribbon cartridge removably mountable on a typewriter, the typewriter having a ribbon cartridge carrier adjacent a print point of the typewriter for receiving said ribbon cartridge containing a ribbon, said ribbon cartridge comprising:

a housing including an upper wall, a lower wall and a base and a top wall normal to and in peripheral contact with said upper and lower wall to provide a storage chamber for storing and enclosing the ribbon in a first orientation in planar alignment with said upper and lower walls;

a single integral rigid arm laterally extending from said base wall for guiding said ribbon from the housing on one side of the typewriter print point to the typewriter print point in a second orientation in planar alignment with said single integral arm and thereafter guiding said ribbon in said second orientation back to said housing on the same side of the typewriter print point when said ribbon cartridge is positioned on said ribbon cartridge carrier;

said base wall having means defining a ribbon egress slit and a ribbon ingress slit, said ribbon egress slit including an edge to alter the ribbon from said first orientation in planar alignment with said upper and lower walls to said second orientation in planar alignment with said single integral arm when egressing from said storage chamber, said ribbon ingress slit including an edge to alter the ribbon from said second orientation to said first orientation when ingressing into said storage chamber; and

a pair of cooperating feed rollers supported by said housing for feeding the ribbon in said first orientation.

* * * * *