

PATENT SPECIFICATION

(11)

1 486 141

1 486 141

(21) Application No. 113/75 (22) Filed 2 Jan. 1975

(44) Complete Specification published 21 Sept. 1977

(51) INT. CL.² B41J 3/40

(52) Index at acceptance
B8M 681 685 D

(72) Inventor HANS W. MUELLER



(54) IMPROVEMENTS IN AND RELATING TO TYPEWRITER RIBBON CARTRIDGE

(71) We, SCM CORPORATION, a corporation of the State of New York, United States of America of 299 Park Avenue, New York, New York 10017, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

10 The present invention relates to a device for supplying ribbon from a supply for use with a printing device such as a typewriter. Such a device is arranged to be removably mounted on the printing device and will hereinafter be referred to as a ribbon cartridge.

The present invention provides a ribbon cartridge removably insertable in a printing device having a ribbon cartridge carrier adjacent a print point 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 where-
25 in 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
30 said side walls for guiding the ribbon on and therealong from said housing on one side of the print point to the print point and thereafter guiding the ribbon back to the housing on the same side of the print point,
35 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 print point and
40 then back to said first orientation.

A preferred embodiment provides a ribbon cartridge for a typewriter that can be easily installed and aligned with the typewriter print point without handling the ribbon, the ribbon being stored in a first orien-

tation and positioned for printing in a second orientation.

The ribbon cartridge has a ribbon carrying arm that dispenses with the need for a ribbon vibrator mechanism within the typewriter. The cartridge is adapted for vertical mounting in a typewriter which is particularly suitable for a compact typewriter of low silhouette design. The ribbon cartridge preferably 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. Ribbon feed rollers can be 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.

In order that the present invention be more clearly understood, an embodiment thereof will now be described by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is a perspective view of a portion of a typewriter showing the ribbon cartridge made in accordance with the invention;

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

Figure 3 is an enlarged fragmentary view of the feed roller mechanisms shown in Figure 2;

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

Figure 5 is a top plan view of the ribbon cartridge as shown in Figure 4;

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

Figure 7 is a plan view of the ribbon cartridge without ribbon showing the relation-

ship of the egress and ingress slits to one another.

Referring now to the drawings and particularly to Figure 1, where a ribbon cartridge carrier 10 is pivotally supported on a typewriter frame 12. 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 (not shown). When installed, the ribbon cartridge 14 engages a feed means in the typewriter (not shown).

Referring now to Figure 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 an endless ribbon 32. Intermediate wall 26 provides the upper limit of the storage chamber 30 and includes a ribbon exit slot 34 extending between the bases 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 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 a 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 (figure 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 (figure 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 (figure 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 figure 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

(12)

from the second orientation back to the first orientation.

Feed rollers 36 and 38 (figure 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 (figure 4).

Referring now to figure 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 grooves 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 Figure 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 therebetween 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.

WHAT WE CLAIM IS:

1. A ribbon cartridge removably insert-

able in a printing device having a ribbon cartridge carrier adjacent a print point 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 and there along from said housing on one side of the print point to the print point and thereafter guiding the ribbon back to the housing on the same side of the 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 print point and then back to said first orientation.

2. A ribbon cartridge according to 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 print point with the ribbon in said second orientation.

3. A ribbon cartridge according to claim 2 wherein said enabling means is an opening in said single integral arm.

4. A ribbon cartridge according to claim 1 wherein said single integral arm is a rigid arm.

5. A ribbon cartridge according to 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 according to 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 according to 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 according to 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 according to 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 insert-



1486 141

3

from the second orientation back to the first orientation.

Feed rollers 36 and 38 (figure 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 (figure 4).

Referring now to figure 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 coating feed roller grooves 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 Figure 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 therebetween 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.

WHAT WE CLAIM IS:

1. A ribbon cartridge removably insert-

able in a printing device having a ribbon cartridge carrier adjacent a print point 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 and there along from said housing on one side of the print point to the print point and thereafter guiding the ribbon back to the housing on the same side of the 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 print point and then back to said first orientation.

2. A ribbon cartridge according to 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 print point with the ribbon in said second orientation.

3. A ribbon cartridge according to claim 2 wherein said enabling means is an opening in said single integral arm.

4. A ribbon cartridge according to claim 1 wherein said single integral arm is a rigid arm.

5. A ribbon cartridge according to 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 according to 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 according to 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 according to 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 according to 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 insert-

(13)

4

1 486 141



4

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 according to claim 10 wherein said housing includes means for supporting a ribbon therein in said first orientation.

12. A ribbon cartridge according to 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 according to 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 according to 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 according to claim 10 wherein said single integral arm rigidly extends from said base for guiding the ribbon in said second orientation.

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

bon is in said first orientation.

17. A ribbon cartridge according to 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.

19. A ribbon cartridge substantially as hereinbefore described with reference to the accompanying drawings.

A. A. THORNTON & CO.
Chartered Patent Agents
Northumberland House,
303/306 High Holborn
London, WC1V 7LE