

PATENT SPECIFICATION

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(54) RIBBON CARTRIDGE FOR TYPEWRITERS OR THE LIKE

(71) We, SCM CORPORATION, a corporation of the State of New York, United States of America, of 299 Park Avenue, New York, State of New York, 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:—

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

The present invention provides a ribbon cartridge adapted to be removably mounted on a typewriter or the like, the cartridge having an endless loop of ribbon and comprising: a base, arm means carried by said base for guiding said ribbon from the base on one side of the print point to the print point and thereafter guiding the ribbon back to the same side of the print point; a storage compartment on said base for storing the major portion of said ribbon and having a ribbon entrance and a ribbon egress, ribbon feed means mounted on said base adjacent said ribbon entrance for pulling ribbon from said storage compartment through said arm means and for returning said ribbon into said storage compartment to be stored there in random convolutions; and output gate means adjacent said ribbon egress including an exit path and at least one projection on either side of said exit path for regulating the flow of ribbon from said egress and preventing the exit of ribbon as convolutions of ribbon.

The present invention also provides a ribbon cartridge adapted to be removably mounted on a typewriter or like machine, said cartridge comprising: a base, arm means pivotally supported on said base by

fulcrum means for guiding an endless loop of ribbon to the print point of said typewriter and thereafter guiding said ribbon back to a storage area within said cartridge, a ribbon storage platform defining said area supported on said base and having a ribbon feed means mounted thereon for feeding said ribbon into said storage area, and having a ribbon output gate means for regulating the flow of said ribbon from said storage area; and cover means securable to said base for enclosing said ribbon storage platform and said stored ribbon within said cartridge.

In a preferred embodiment, the pivotally mounted arm is normally spring biased to a rest position. The fulcrum has a surface forming an oblique angle with the base plate and an upstanding member is provided on the base plate also having a surface forming an oblique angle therewith for guiding the pivotal movement of the arm. A tapered adjusting roller is provided adjacent the input feed mechanism to the storage compartment for receiving ribbon from the arm and guiding it to the feed mechanism; the feed mechanism comprises a pair of split friction rollers spring biased toward each other for engaging the ribbon and pushing it into a storage area in random convolutions. Strippers extending from the split portions of the friction rollers prevent the ribbon in the storage area from winding upon the rollers. A barrel shaped roller is provided adjacent an output gate comprising a ramp and a plurality of projections disposed alternately on the cover and a wall of the storage compartment to define an exit path for preventing the flow of ribbon in convolutions from the storage compartment. The arm, storage compartment and cover are removably secured to the base plate by means enabling automatic assembly or hand assembly without the use of tools.

[Price 33p]

Price 75p

The cartridge is laterally insertable in the typewriter to a position where the arm is engaged by a lift mechanism in the typewriter. Thus, there is no need for threading of the ribbon nor other manipulations which are time consuming and cause soiling of the fingers. Furthermore, the cartridge is removable by laterally sliding the cartridge from the typewriter thus enabling easy replacement or variation in colour or type of ribbon, e.g. carbon ribbon or fabric ribbon.

Ribbons such as fabric ribbons may be used with satisfactory results for many cycles, and such ribbons are preferably used in the above cartridge. The use of an endless loop of ribbon avoids the need for end of ribbon sensing means and ribbon reverse mechanisms and makes the flow of ribbon reliable.

Other features and advantages of the present invention will become apparent from the following description of an embodiment thereof, given by way of example only, when taken in conjunction with the accompanying drawings in which:—

Figure 1 is a perspective view of a part of a typewriter having a typewriter ribbon cartridge according to the present invention therein;

Figure 2 is an exploded perspective view of the typewriter ribbon cartridge of Figure 1 including its relationship to the platform upon which it is mounted in the typewriter;

Figure 3 is a rear perspective view of the typewriter ribbon cartridge of Figure 2 with its cover removed;

Figure 4 is a front perspective view of the typewriter ribbon cartridge of Figure 2 mounted upon a platform with portions broken away to show the interior mechanisms;

Figure 5 is a perspective view of the interior of the cartridge cover as viewed from its bottom.

Referring to the drawings and specifically to Figure 1, there is disclosed generally a typewriter ribbon cartridge 10 mounted in a typewriter 12. The cartridge 10 includes a housing section 14 and a ribbon guide or carrier arm 16 laterally extending from the housing section 14. The carrier arm 16 is the subject of our co-pending Patent Application No. 21111/73 (Serial No 1,375,687) and therefore only so much of the carrier arm 16 will be described herein as is necessary to understand the operation of the present embodiment and reference may be made to said application for further details.

The carrier arm 16 has a stud 18 which projects therefrom to engage lever 20 of lift mechanism 22 of the typewriter 12 when the cartridge 10 is inserted in the typewriter. An aperture 24 is provided in the carrier arm 16 adjacent typebar guide 26 to expose a portion of the ribbon 36 to a type element, not shown, of the typewriter 12.

Referring next to Figures 2-5, the cartridge housing includes a base 30, a cover 32 and a ribbon storage platform 34 mounted between the base and cover for storing a supply of ribbon 36. The platform 34 is mounted upon the base 30 by means of three pins 31, only two of which are shown in Figure 2, which mate with elements 33 on base 30. A plurality of studs 35, only one of which is shown in Figure 2, are provided to further support the platform 34 on base 30.

The platform 34 has ribbon confining flanges 38 and 40 extending partially therearound to define a ribbon storage compartment having a ribbon entrance section generally designated 42 and a ribbon egress section generally designated 44. Mounted in the entrance section are split friction feed rollers 46 which are moulded integral and coaxial with gear 48 upon shaft 50, the lower end of which is free to rotate in cylindrical pivot 52 and the upper end of which is free to rotate in circular aperture 59. A channel 56 is provided between the lower portion of split friction roller 46 and gear 48 for receiving an arcuate section 58 of platform 34. A C-shaped section 62 of a stripper 60 for preventing the ribbon from winding around the roller 46 is mounted between the upper and lower portions of split friction roller 46. The entrance to the C-shaped portion 62 is slightly smaller than the diameter of the shaft between the upper and lower portions of split friction roller 46 and the central aperture slightly greater than such diameter whereby the split friction roller 46 is a snap fit in the stripper 60 and free to rotate with respect thereto. The stripper 62 is restrained from movement when mounted upon platform 34 by stud 64 and flange 40.

Also mounted in the entrance section 42 is split idler friction roller 66. Roller 66 is a snap fit in a C-shaped section 70 of a stripper 68 as described above with respect to split friction roller 46. Stripper 68 is in the form of a bellcrank and has a central cylindrical portion 72 which is pivotally supported on stud 74 and resilient arm 76 which may be integral therewith or preferably a leaf spring connected thereto between sections 78 and 80 of the stripper 68. When this unit is mounted upon platform 34, arm 76 is flexed against flange 38 of the platform 34 to apply a counterclockwise moment to the stripper 68 thereby biasing split idler friction roller 66 against split friction roller 46 and the ribbon therebetween.

Tapered roller 82 is mounted upon stud 84 on platform 34 adjacent the entrance section 42 to adjust the plane of ribbon 36 coming from the carrier arm 16 as to be explained hereinafter.

The egress section 44 of platform 34 includes a ramp 86 bordered on one side thereof by flange 40. Projections 88, 90 and 92 extend from the portion of flange 40 bordering ramp 86 and alternate with projections 94 and 96 projecting from the side of cover 32 and which are situated on the opposite side of ramp 86 when the cover 32 is placed over the platform 34.

Also in the egress section 44 is a barrel shaped roller 98 which is mounted upon stud 100 and is free to both rotate and swivel thereon to adapt to the plane of ribbon being pulled therearound. It has been found in practice that permitting the barrel shaped roller to swivel is effective to substantially decrease climbing of the ribbon which could cause binding and snagging. On the opposite side of ramp 86 from roller 98 are projections 102 and 104.

Also in the egress section but on the inside of cover 32 is projection 106. This projection is in alignment with projection 92 of platform 34.

The carrier arm 16 has a stud 110 which rests on open fulcrum 112 and is secured to the base 30 by spring 114 which has one end secure in aperture 116 of fulcrum 112 and which has its opposite end hooked over hook-like tab 118 on carrier arm 16. Thus, spring 114 maintains carrier arm 16 in a normal rest position against base 30. Projection 120 in cover 32 aligns with stud 110 when the cartridge is assembled to prevent carrier arm 16 from being accidentally knocked off fulcrum 112. Surface 122 of fulcrum 112 is at an oblique angle to base 30 as is surface 124 of member 126 and edge 128 of cover 32. Thus, carrier arm 16 is mounted for pivotal movement in a plane oblique to the base. Stop 120 limits movement of carrier arm 16.

Cover 32 fits within flanges 132 and 134 of base 30 and has wedge-shaped projections 135 thereon which engage flanges 132 and 134 at apertures 138. Stud 140 are provided to ensure the secure connection of projections 135 in apertures 138 and thus the secure connection of cover 32 to base 30.

Platform 142 is adapted to support the cartridge 10 but since it does not form a part of the invention only so much of the platform 142 will be described herein as is necessary to understand the operation of the cartridge. The platform 142 has a floor 144 and a pair of opposed parallel flanges 146 and 148 having lips 150 and 152 thereon, respectively. Cartridge 10 is insertable into the platform 142 by placing flanges 132 and 134 under lips 150 and 152, respectively, and laterally sliding the cartridge into the position shown in Figure 1. Carrier arm 16 is maintained at the correct orientation by spring 114 to enter the slot in lever 20.

The central portion 154 of base 30 is higher than its ends 156 and 158 to permit gear wheel 160 to fit beneath base 30 (the gear wheel 160 is used with another cartridge which is not disclosed herein), and to permit the securement of the cartridge 10 to the platform 142 by latch 162 which is spring biased by a spring, not shown, on the underside of the platform 142 to engage a rib, also not shown, on the underside of the cartridge 10. The latch 162 is removable from engagement with the rib by pressing a lever 164 which is operatively associated therewith.

Feed mechanism 166 includes a power driven chamfered gear 168 meshed with a driven chamfered gear 170 on pulley wheel 172. Pulley wheel 172 is coaxial with drive gear 174 and is rigid therewith. Thus rotation of pulley wheel 172 by the power driven gear 168 causes equal angular rotation of gear 174. Gear 174 meshes with gear 48 of the ribbon feed mechanism in the cartridge 10 causing rotation of that gear and split friction rollers 46. It is to be noted that only the portion of the feed mechanism relevant to feeding the ribbon of the cartridge of the instant invention has been described herein.

Ribbon 36 flows in a path from the storage compartment on storage platform 34 around barrel shaped roller 98 down ramp 86 where projections 88, 90, 92, 94, 96, 102, 104 and 106 cooperate to eliminate any convolutions in ribbon 36 and, thus, to prevent entanglement and snagging, along the lower half of carrier arm 16 where it is protected by shield 17, around the V-shaped end of carrier arm 16 where it is protected by shield 17, around the V-shaped end of carrier arm 16 where it is protected by cap 19 to the upper half of carrier arm 16, past the aperture 24 where it is exposed to a typing element, back along the upper half of carrier arm 16, around tapered roller 82 which reorients the ribbon to a plane ensuring that the lower edge of the ribbon engages the lower portion of split friction roller 46 to minimize the possibility of the ribbon climbing over the split friction roller, between rollers 46 and 66 and into the storage compartment of platform 34.

In operation, during each typing action lift mechanism 22 functions to lift carrier arm 16 and thus raise ribbon 36 in aperture 24 at an oblique angle toward the print point in the typewriter 12 where a character is transferred to a record mechanism by the typebar striking the ribbon 36.

The ribbon feed is also operated during type action either before or after the typebar strikes the ribbon. During the feed, power driven gear 168 rotates clockwise to rotate pulley wheel 172 counterclockwise thus causing gear 174 to rotate clockwise.

This results in counterclockwise rotation of gear 48 and split friction roller 46. Ribbon 36 which is frictionally engaged between rollers 46 and 66 in the cartridge 10 is thus
 5 pulled through carrier arm 16 from storage compartment egress as roller 46 rotates counterclockwise to drive idler roller 66 clockwise and push the ribbon 36 from
 10 carrier arm 16 into the storage compartment. Since gear 174 is rotated a fixed angular distance for each type action, the ribbon feed is in uniform incremental amounts. Thus, there is an efficient usage of the ribbon.

15 The above described embodiment of the present invention is preferably made of plastics with the exception of spring 114, cap 19 and leaf spring 76. Furthermore, all of the component parts of the cartridge
 20 10 including carrier arm 16, the various rollers, platform 34 and cover 32 can be assembled and/or secured to the base 30 without the use of tools. Thus, economic manufacture of the cartridge 10 may be
 25 accomplished either manually or by automated machinery. The wall of the cover 32 is sufficiently flexible to permit the projections 135 to be forced out of the apertures 138 without damaging the cover so that the
 30 cover 32 may be removed for refill purposes.

WHAT WE CLAIM IS:—

1. A ribbon cartridge adapted to be removably mounted on a typewriter or the like, the cartridge having an endless loop of ribbon and comprising: a base, arm
 35 means carried by said base for guiding said ribbon from the base on one side of the print point to the print point and thereafter guiding the ribbon back to the same side of the print point; a storage compartment on said base for storing the major
 40 portion of said ribbon and having a ribbon entrance and a ribbon egress, ribbon feed means mounted on said base adjacent said ribbon entrance for pulling ribbon from said
 45 storage compartment through said arm means and for returning said ribbon into said storage compartment to be stored there in random convolutions; and output gate
 50 means adjacent said ribbon egress including an exit path and at least one projection on either side of said exit path for regulating the flow of ribbon from said egress and preventing the exit of ribbon as convolutions
 55 of ribbon.

2. A ribbon cartridge according to claim 1 wherein said storage compartment is defined by confining means extending therearound and there are a plurality of said
 60 projections alternately arranged on opposite sides of said exit path.

3. A ribbon cartridge according to claim 1 or 2 further including roller means adjacent said exit path for smoothing out the

convolutions of ribbon fed into said path and reducing the force necessary to pull the ribbon to said egress.

4. A ribbon cartridge according to claim 2 or 3 wherein said confining means includes a wall, a portion of which separates
 70 said storage compartment and said exit path.

5. A ribbon cartridge according to any one of claims 1 to 4 wherein said ribbon
 75 feed means includes two friction rollers, and means for biasing at least one of said friction rollers toward the second of said friction rollers to engage said ribbon between said rollers.

6. A ribbon cartridge according to claim 5, wherein each said friction roller is split, having upper and lower ribbon engaging
 80 portions with a channel therebetween, and ribbon stripper means extending into each
 85 said channel for preventing said ribbon in the storage compartment from winding around said friction roller.

7. A ribbon cartridge according to any preceding claims, wherein said exit path
 90 includes ramp means leading from said storage compartment to change the plane of the ribbon withdrawn from said storage compartment along said ramp means.

8. A ribbon cartridge adapted to be removably mounted on a typewriter or like machine, said cartridge comprising: a base, arm means pivotally supported on said base by fulcrum means for guiding an endless
 95 loop of ribbon to the print point of said typewriter and thereafter guiding said ribbon back to a storage area within said cartridge, a ribbon storage platform defining said area supported on said base and having
 100 a ribbon feed means mounted thereon for feeding said ribbon into said storage area, and having a ribbon output gate means for regulating the flow of said ribbon from said storage area; and cover means securable to
 105 said base for enclosing said ribbon storage platform and said stored ribbon within said cartridge.

9. A ribbon cartridge according to claim 8 wherein said base and said ribbon storage platform include a plurality of mating
 115 means for enabling said platform to be snapped on to said base in fixed relationship thereto.

10. A ribbon cartridge according to claim 9 wherein said base includes a wall partially
 120 extending therearound and apertures in said wall, and said cover means having a wall extending partially therearound and having wedge-shaped projections corresponding to said apertures enabling said cover means to
 125 be snapped on to said base in fixed relationship thereto.

11. A ribbon cartridge according to claim 10 wherein said wall on said cover means is sufficiently flexible to permit said pro- 130



This results in counterclockwise rotation of gear 48 and split friction roller 46. Ribbon 36 which is frictionally engaged between rollers 46 and 66 in the cartridge 10 is thus
5 pulled through carrier arm 16 from storage compartment egress as roller 46 rotates counterclockwise to drive idler roller 66 clockwise and push the ribbon 36 from
10 carrier arm 16 into the storage compartment. Since gear 174 is rotated a fixed angular distance for each type action, the ribbon feed is in uniform incremental amounts. Thus, there is an efficient usage of the ribbon.
15 The above described embodiment of the present invention is preferably made of plastics with the exception of spring 114, cap 19 and leaf spring 76. Furthermore, all of the component parts of the cartridge
20 10 including carrier arm 16, the various rollers, platform 34 and cover 32 can be assembled and/or secured to the base 30 without the use of tools. Thus, economic manufacture of the cartridge 10 may be accomplished either manually or by automated machinery. The wall of the cover 32 is sufficiently flexible to permit the projections 135 to be forced out of the apertures 138 without damaging the cover so that the
25 cover 32 may be removed for refill purposes.
30

WHAT WE CLAIM IS:—

1. A ribbon cartridge adapted to be removably mounted on a typewriter or the like, the cartridge having an endless loop
35 of ribbon and comprising: a base, arm means carried by said base for guiding said ribbon from the base on one side of the print point to the print point and thereafter guiding the ribbon back to the same
40 side of the print point; a storage compartment on said base for storing the major portion of said ribbon and having a ribbon entrance and a ribbon egress, ribbon feed
45 means mounted on said base adjacent said ribbon entrance for pulling ribbon from said storage compartment through said arm means and for returning said ribbon into said storage compartment to be stored there
50 in random convolutions; and output gate means adjacent said ribbon egress including an exit path and at least one projection on either side of said exit path for regulating the flow of ribbon from said egress and preventing the exit of ribbon as convolutions
55 of ribbon.

2. A ribbon cartridge according to claim 1 wherein said storage compartment is defined by confining means extending therearound and there are a plurality of said projections alternately arranged on opposite
60 sides of said exit path.

3. A ribbon cartridge according to claim 1 or 2 further including roller means adjacent said exit path for smoothing out the

convolutions of ribbon fed into said path and reducing the force necessary to pull the ribbon to said egress.

4. A ribbon cartridge according to claim 2 or 3 wherein said confining means includes a wall, a portion of which separates
70 said storage compartment and said exit path.

5. A ribbon cartridge according to any one of claims 1 to 4 wherein said ribbon
75 feed means includes two friction rollers, and means for biasing at least one of said friction rollers toward the second of said friction rollers to engage said ribbon between said rollers.
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6. A ribbon cartridge according to claim 5, wherein each said friction roller is split, having upper and lower ribbon engaging portions with a channel therebetween, and ribbon stripper means extending into each
85 said channel for preventing said ribbon in the storage compartment from winding around said friction roller.

7. A ribbon cartridge according to any preceding claims, wherein said exit path
90 includes ramp means leading from said storage compartment to change the plane of the ribbon withdrawn from said storage compartment along said ramp means.

8. A ribbon cartridge adapted to be removably mounted on a typewriter or like machine, said cartridge comprising: a base, arm means pivotally supported on said base by fulcrum means for guiding an endless
100 loop of ribbon to the print point of said typewriter and thereafter guiding said ribbon back to a storage area within said cartridge, a ribbon storage platform defining said area supported on said base and having a ribbon feed means mounted thereon for
105 feeding said ribbon into said storage area, and having a ribbon output gate means for regulating the flow of said ribbon from said storage area; and cover means securable to said base for enclosing said ribbon storage
110 platform and said stored ribbon within said cartridge.

9. A ribbon cartridge according to claim 8 wherein said base and said ribbon storage platform include a plurality of mating
115 means for enabling said platform to be snapped on to said base in fixed relationship thereto.

10. A ribbon cartridge according to claim 9 wherein said base includes a wall partially
120 extending therearound and apertures in said wall, and said cover means having a wall extending partially therearound and having wedge-shaped projections corresponding to said apertures enabling said cover means to
125 be snapped on to said base in fixed relationship thereto.

11. A ribbon cartridge according to claim 10 wherein said wall on said cover means is sufficiently flexible to permit said pro-
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jections to be forced out of said apertures without damaging said cover means so that said cover means may be removed for refill purposes.

- 5 12. A ribbon cartridge according to any one of claims 8 to 11 further including guide means on said base and on said cover means for guiding the pivotal movement of said arm at an oblique angle to said
10 base.

13. A ribbon cartridge according to claim 12 further including biasing means for biasing said arm means toward said base and securing said arm means on said fulcrum
15 means.

14. A ribbon cartridge according to any one of claims 8 to 13, wherein the ribbon output gate means comprise a ramp for

changing the level of the ribbon withdrawn from the storage area.

15. A ribbon cartridge substantially as hereinbefore described with reference to the accompanying drawings. 20

16. A typewriter or the like having a ribbon cartridge substantially as hereinbefore described with reference to the accompanying drawings. 25

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