

# PATENT SPECIFICATION

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## (54) 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, 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:—

This invention relates to ribbon cartridges, and more particularly to a cartridge for housing the ribbon in a typewriter or like printing machine.

Most ribbon spool cartridges for typewriter or like printing machines are of the two spool type wherein separate housings are provided for the spools but are joined in a side by side relationship either integrally or by a separate member. The integral joint or the separate joining member is usually provided with a weakened section for separating the spool housing so they may be placed in their respective machine supports after the ribbon is inserted in the machine vibrator.

Although the type of ribbon cartridge does provided a somewhat expedient method of typewriter ribbon installation, it is still time consuming and bothersome to the operator.

The present invention is comprised of a cartridge having two main portions, the first portion comprises a substantially enclosed housing which supports a supply of ribbon of either an endless loop type or a coaxially mounted double spool type. The other cartridge portion comprises an arm having means for first directing the ribbon from the housing to the print point and secondly for changing the direction of the ribbon to guide the ribbon back to the housing.

Therefore, the present ribbon cartridge, by providing a single unit for housing a supply of ribbon and directing the ribbon

[Price 25p]

to and from a print point, need only be positioned within a suitable support in the machine to effect a ribbon installation thereby eliminating the aforementioned time consuming and bothersome steps needed for the separable type cartridge installation.

The invention will now be described by way of example with reference to the accompanying drawings wherein:—

Figure 1 is a top plan view of the present ribbon cartridge illustrating its position when in the typewriter;

Figure 2 is a right front perspective view of the cartridge having the top exploded therefrom illustrating its use with an endless type ribbon;

Figure 3 is a view similar to Figure 2 illustrating use of the cartridge with a double coaxially mounted spool for a conventional ribbon;

Figure 4 is a rear elevational view on a reduced scale of the cartridge showing a second embodiment of the cartridge arm;

Figure 5 is a top plan view of Figure 4 to a reduced scale;

Figure 6 is a view similar to Figure 4 but showing a third embodiment of the cartridge arm;

Figure 7 is a top plan view of Figure 6;

Figure 8 is a front elevational view to an enlarged scale of the free end of the arm which is common to each arm embodiment;

Figure 9 is a partial front elevational view taken along lines 9-9 of Figure 3 showing a double spool construction;

Figure 10 is a right front perspective view of a modified cartridge having a pivotal arm in operative relationship with a typewriter lift mechanism;

Figure 11 is a rear elevational view the cartridge of Figure 4 but with its arm modified as in Figure 10; and

Figure 12 is a rear elevational view of the cartridge of Figure 6 but with its arm modified as in Figure 10.

90

Referring now to Figure 1, the ribbon cartridge is preferably of a molded plastic construction and is mainly comprised of a housing portion 10 and an integral arm portion 12. A ribbon cartridge support 14 (see our U.K. patent application No. 57549/71) (Serial No. 1348060) is mounted on a right side frame 15. The housing 10 is inserted between an upper guide or flange 118 shown in phantom and a lower guide or flange. A suitable locking finger 16 engages the cartridge housing portion 10 to hold the cartridge in an installed position. A lever 17 is operable to release the locking finger 16 for removing the cartridge from the machine. A spring 19 is suitably connected to anchor 126 on the support flange 118 and post 122 in elongated slots 116 in upper support flange 118 and the lower flange (not shown) for biasing the cartridge in the cartridge removal direction to assist in removing the cartridge from the machine. The cartridge, when in the installed position, is located just in front of the platen 18 and substantially within the confines of a conventional typewriter configuration. The arm 12 extends from the housing 10 to the left to a terminal end 20 just beyond the print point 22 defined by a type guide 23. The terminal end 20 guides the ribbon sufficiently stable to act as a ribbon vibrator. A vibrator must necessarily confine the ribbon to retain the ribbon during normal rapid, oscillating movements. Thus, the cartridge guides the ribbon by way of the arm 12 to the print point 22 and eliminates the need of threading the ribbon into a vibrator and thereafter placing separate spools into the machine ribbon spool support cups as encountered with the more conventional cartridge systems.

Referring now to Figure 2, the housing 10 is comprised of a top cover 24, a bottom cover 26, and a perimetric wall 28. An endless ribbon hub 30 which is shaped as a partial cone having its smaller diameter adjacent the bottom cover 26, is rigidly mounted to the bottom cover 26 by a screw 32 for supporting an endless ribbon 34 at its inner convolution. A rotor in the form of a roller 36 is pivotally mounted on a post 38 which in turn is rigidly mounted at its ends to the top and bottom covers 24 and 26 respectively. The roller 36 is in close proximity to an opening 39 in the perimetric wall 28.

A semicircular finger 40 is molded to the under side of the top cover 24 for the purpose of guiding the ribbon portion 42 out from its inner convolution when it is pulled from the periphery of hub 30. An opening 44 is provided within the rear portion of the perimetric wall 28 near the point at which the arm 12 joins the housing 10. The arm 12 has an opening 45 slightly

inward from the terminal end 20 and in vertical alignment with the print point 22 (see Figure 1) when the cartridge is positioned in the machine. The arm 12 also has a V-shaped aperture 46 to provide a guide 47 having two substantially 45° surfaces 49a and 49b and has an opening 51 at the extreme end thereof leading into aperture 46.

The ribbon loop, which extends from its inner convolution over the finger 40, lies against a portion of the periphery of roller 36 and egresses from within the housing 10; through the upper portion of the perimetric wall opening 44. Thereafter it extends along the upper rear surface of arm 12 and behind the arm opening 45, forward and around the upper surface 49a downwards and rearward around the lower surface 49b back to the housing 10 along the lower portion of an arm 12, through the lower portion of opening 44 and on to the outer convolution of the ribbon supply 34. The ribbon 34 can be incrementally advanced along this path by a mechanism driving a rotor or roller 50 sandwiching the ribbon 34 against roller 36.

The opening 45 in the arm 12 provides access to the ribbon 34 for a conventional typebar as it enters the type guide 23 (Figure 1) in response to a normal machine operated typing action.

Referring now to Figure 3, a second housing embodiment is shown to accommodate a double ribbon spool system for supporting a conventional ribbon 58. The housing 60 is substantially the same in construction as the housing for the endless ribbon system as it has top and bottom covers 62 and 64 respectively and a perimetric wall 66 with a ribbon egress-ingress opening 68. The supply spool 70 and the take-up spool 72 are coaxially and pivotally mounted on a hub 74 which is rigidly mounted between the top and bottom covers 62, 64. The lower or take-up spool 72 is provided with teeth 76 on the periphery of its lower flange for mating with a suitable drive gear (not shown) when the cartridge is inserted into the machine cartridge support.

The upper and lower spools 70 and 72 respectively are pivotal with respect to each other and ribbon 58 is guided from the housing 60 to the print point 22 near the terminal end of the arm 80 in the same manner as in the endless ribbon system cartridge embodiment.

It will be evident that the drive gear (not shown), which may incrementally rotate clockwise in response to typing actions will effect alike counterclockwise rotation of the take-up spool 72 and the ribbon 58 will in turn be incrementally fed from right to left behind the arm opening 78 and past the print point 22 of the typewriter.

Figures 4 and 5 illustrate an alternate

embodiment of the cartridge arm which may be employed with either the endless loop or double spool ribbon system. The arm 82 is constructed the same at its terminal end 84 and extends from the housing 86 the same distance as the previously described arm 12. However, the arm 82 instead of being molded integrally to the housing 86, extends behind the housing rear wall 88 and is pivotally mounted to this wall by a pivot in the form of a shoulder screw 90. The arm 82 is guided for oscillating movement about the screw 90 with respect to the housing wall 88 by a stud or pin 92 which is rigidly mounted to the housing wall 88 and extends through arcuate arm slot 94. The slot 94 and the pin 92 act as a stop to limit the pivotal movement of the arm. It will be evident that, when the cartridge is positioned within the machine, the arm 82 may be oscillated in response to typing actions by any suitable mechanism as would be common in oscillating a conventional machine ribbon vibrator.

Figures 6 and 7 illustrate still another arm embodiment wherein the arm 96 is integrally molded with the housing rear wall 98 by way of a pair of fingers 100. The fingers 100 are each provided with substantially necked down portions 102 near their joining point 104. The cartridge is molded from a material such as polypropylene for providing each finger 100 with a commonly known pivot or living hinge at the necked down portion 102. The living hinge feature of each finger 100 provides the arm 96 with the ability of being oscillated at its terminal end by the same conventional typewriter mechanism as would be used in accordance with the pivotal arm shown in Figure 4. The arm 96 (Figures 6 and 7) is guided for oscillation by a plate 106 which is spaced slightly away from the housing rear wall 98, by a pin 108 which is rigidly mounted to the plate 106 and the rear housing wall 98. The pin 108 also acts as a stop providing the limit for the oscillation movements.

Referring next to Figures 10 and 11 there is shown an additional embodiment of the cartridge having a modified cartridge arm with means near the end thereof to engage a typewriter lift mechanism. The modified cartridge arm, may be used in either the endless loop or the double spool ribbon system although it has been shown in Figure 10 in a housing 110 having an aperture 139 such as employed in an endless loop system as shown in Figure 2. The cartridge 110 of Figures 10 and 11 includes a housing 186 having a cartridge arm 182 pivotally mounted to the rear wall 188 of the housing. The cartridge arm 182 is mounted to the housing 186 in the same manner as the cartridge arm of Figures 4 and 5. Specifically, a pivot in the form of a screw 190 pivotally connects

the cartridge arm 182 to the rear wall 188. A stud, screw or pin 192 extends from the rear wall 188 of cartridge housing through arcuate slot 194 in the cartridge arm. The pin 192 and arcuate slot 194 cooperate with the pivot pin 190 to maintain the cartridge arm 182 at a lateral orientation with respect to the cartridge housing 186 during rest conditions. The pin 192 and arcuate slot 4 further limit the pivotal movement of the cartridge arm 182 during a typing operation with the slot 194 acting as a stop. Ribbon 134 extends from the cartridge along the cartridge arm 182 to terminal end 184 of the cartridge arm and is returned to the cartridge housing 186 in the same manner as previously described. The cartridge arm 182 of Figures 10 and 11 is further provided with a projection or tab like portion 183 near its terminal end 184. The tab like portion 183 is L-shaped and projects downward from the print opening 145 and toward the terminal end 184 of the cartridge arm 182 to form a fork with an open slot 185. Tab like portion 183 is located on cartridge arm 182 so that it will enter the hole or channel provided in ribbon lift projection or element 187 upon the insertion of the cartridge into the typewriter when the cartridge arm 182 is maintained in a lateral orientation with respect to the housing of cartridge 110 thus enabling the lateral projections 183 and 187 to remain positively engaged during both downward and upward movements of the lift mechanism.

During operation of the typewriter, the ribbon lift element 187 is lifted during each typing action to cause pivotal movement of the cartridge arm 182 with respect to the cartridge housing 186 thereby bringing the print point aperture 145 into alignment with the print point of the typewriter. Thus the type bar is permitted to strike the ribbon and cause typing of the particular character. Element 187 is then returned to its rest position thereby lowering cartridge arm 182 and permitting visibility of the typed character.

Figure 12 shows a further embodiment of the cartridge arm. This embodiment is substantially the same as the cartridge arm of Figures 6 and 7 but further includes a projection or tab like portion 183a defining slot 185a to permit the cartridge arm to engage a typewriter lift mechanism as was described with respect to the embodiment of Figures 10 and 11. Like the cartridge arm of Figures 6 and 7 this embodiment may be used with either the endless loop or double spool ribbon system. The cartridge arm 96a is integrally molded with the housing rear wall 98a by way of fingers 100a. The fingers 100a are provided with pivots in the form of substantially necked down portions 102a near their joining point 104a. The arm 96a

is guided for oscillation by a plate 106a which is spaced slightly away from the housing rear wall 98a by a pin 108a which is rigidly mounted to the plate 106a and the rear housing wall 98a. The pin 108a acts as a stop to limit the pivotal movement of the arm.

It can be seen from the aforementioned detailed description in reference to the accompanying drawings that the present invention provides a typewriter ribbon cartridge which clearly overcomes the disadvantages of the more commonly known separable type ribbon cartridges. More specifically, the present invention provides a ribbon cartridge which, to effect a ribbon installation within the machine, eliminates the need of having to thread the ribbon into the machine vibrator. This is accomplished by providing a cartridge with an arm for guiding the ribbon to a print point and back to the housing when the cartridge is positioned in the machine.

#### 25 WHAT WE CLAIM IS:—

1. A typewriter ribbon cartridge comprising a housing for ribbon, a pivot on the housing, an arm pivotally connected to the housing by the pivot for guiding the ribbon from the housing toward the free end of the arm and back to the housing and having means for exposing a portion of the ribbon, a stop for limiting downward pivotal movement of the arm to maintain the arm substantially horizontal when the cartridge is substantially horizontal, a rotor journaled in the housing for moving the ribbon, and means on the arm for automatically engaging a lift mechanism in a typewriter while the cartridge is being inserted into the typewriter.

2. A cartridge as claimed in claim 1, wherein the automatic engaging means on the arm is a lateral projection on the arm.

3. A cartridge as claimed in claim 2, wherein the lateral projection on the arm forms a fork that points in substantially the same direction as the arm points.

4. A cartridge as claimed in any one of the preceding claims, wherein the stop includes a stud and an elongated slot for the stud interacting between the housing and the arm.

5. A cartridge as claimed in any one of the preceding claims, wherein the arm and at least a portion of the housing are integrally composed of a plastic and the pivot is a portion of the arm that is relatively thin compared to the rest of the arm.

6. A cartridge substantially as herein described with reference to Figures 10 to 12 of the accompanying drawings.

7. A cartridge typewriter comprising

means for defining a print point, a lift mechanism, a cartridge support having substantially horizontal spaced guides, a removable cartridge having a housing and an arm on the housing for guiding ribbon from the housing toward the free end of the arm and back to the housing, opposed surfaces on the housing for cooperation with the spaced guides to permit lateral insertion of the cartridge into the support, means on the arm for automatically engaging the lift mechanism while the cartridge is being inserted into the support, and means on the arm for exposing a portion of the ribbon at the print point in the typewriter.

8. A typewriter as claimed in claim 7, wherein the automatic engaging means on the arm of the cartridge is a lateral projection, the lift mechanism has a lateral projection, and one of the lateral projections forms a fork that points substantially toward the other lateral projection and partially surrounds the other lateral projection when the cartridge is in the support to enable the lateral projections to remain physically engaged during downward as well as upward movements of the lift mechanism.

9. A typewriter as claimed in claim 8, wherein the lateral projection on the lift mechanism has a hole, the lateral projection on the arm forms the fork, and the fork engages the hole in the lateral projection on the lift mechanism.

10. A typewriter as claimed in any one of claims 7 to 9, further comprising a rotor journaled in the housing for moving the ribbon and means in the typewriter for rotating the rotor.

11. A typewriter as claimed in claim 10, wherein the rotating means in the typewriter includes a rotor, and the rotors are positioned so that the ribbon will be automatically sandwiched between the rotors while the cartridge is being inserted into the support.

12. A typewriter as claimed in any one of claims 7 to 11, further comprising a pivot for pivotally connecting the arm to the housing and a stop for limiting downward pivotal movement of the arm to maintain the arm substantially horizontal when the cartridge is substantially horizontal to facilitate insertion into the support.

13. A typewriter as claimed in claim 12, wherein the stop includes a stud and an elongated slot for the stud interacting between the housing and the arm.

14. A typewriter as claimed in any one of claims 12 and 13, wherein the arm and at least a portion of the housing are integrally composed of a plastic and the pivot is a portion of the arm that is relatively thin compared to the rest of the arm.

15. A typewriter substantially as herein described with reference to the accompany-



is guided for oscillation by a plate 106a which is spaced slightly away from the housing rear wall 98a by a pin 108a which is rigidly mounted to the plate 106a and the rear housing wall 98a. The pin 108a acts as a stop to limit the pivotal movement of the arm.

It can be seen from the aforementioned detailed description in reference to the accompanying drawings that the present invention provides a typewriter ribbon cartridge which clearly overcomes the disadvantages of the more commonly known separable type ribbon cartridges. More specifically, the present invention provides a ribbon cartridge which, to effect a ribbon installation within the machine, eliminates the need of having to thread the ribbon into the machine vibrator. This is accomplished by providing a cartridge with an arm for guiding the ribbon to a print point and back to the housing when the cartridge is positioned in the machine.

#### WHAT WE CLAIM IS:—

1. A typewriter ribbon cartridge comprising a housing for ribbon, a pivot on the housing, an arm pivotally connected to the housing by the pivot for guiding the ribbon from the housing toward the free end of the arm and back to the housing and having means for exposing a portion of the ribbon, a stop for limiting downward pivotal movement of the arm to maintain the arm substantially horizontal when the cartridge is substantially horizontal, a rotor journaled in the housing for moving the ribbon, and means on the arm for automatically engaging a lift mechanism in a typewriter while the cartridge is being inserted into the typewriter.

2. A cartridge as claimed in claim 1, wherein the automatic engaging means on the arm is a lateral projection on the arm.

3. A cartridge as claimed in claim 2, wherein the lateral projection on the arm forms a fork that points in substantially the same direction as the arm points.

4. A cartridge as claimed in any one of the preceding claims, wherein the stop includes a stud and an elongated slot for the stud interacting between the housing and the arm.

5. A cartridge as claimed in any one of the preceding claims, wherein the arm and at least a portion of the housing are integrally composed of a plastic and the pivot is a portion of the arm that is relatively thin compared to the rest of the arm.

6. A cartridge substantially as herein described with reference to Figures 10 to 12 of the accompanying drawings.

7. A cartridge typewriter comprising

means for defining a print point, a lift mechanism, a cartridge support having substantially horizontal spaced guides, a removable cartridge having a housing and an arm on the housing for guiding ribbon from the housing toward the free end of the arm and back to the housing, opposed surfaces on the housing for cooperation with the spaced guides to permit lateral insertion of the cartridge into the support, means on the arm for automatically engaging the lift mechanism while the cartridge is being inserted into the support, and means on the arm for exposing a portion of the ribbon at the print point in the typewriter.

8. A typewriter as claimed in claim 7, wherein the automatic engaging means on the arm of the cartridge is a lateral projection, the lift mechanism has a lateral projection, and one of the lateral projections forms a fork that points substantially toward the other lateral projection and partially surrounds the other lateral projection when the cartridge is in the support to enable the lateral projections to remain physically engaged during downward as well as upward movements of the lift mechanism.

9. A typewriter as claimed in claim 8, wherein the lateral projection on the lift mechanism has a hole, the lateral projection on the arm forms the fork, and the fork engages the hole in the lateral projection on the lift mechanism.

10. A typewriter as claimed in any one of claims 7 to 9, further comprising a rotor journaled in the housing for moving the ribbon and means in the typewriter for rotating the rotor.

11. A typewriter as claimed in claim 10, wherein the rotating means in the typewriter includes a rotor, and the rotors are positioned so that the ribbon will be automatically sandwiched between the rotors while the cartridge is being inserted into the support.

12. A typewriter as claimed in any one of claims 7 to 11, further comprising a pivot for pivotally connecting the arm to the housing and a stop for limiting downward pivotal movement of the arm to maintain the arm substantially horizontal when the cartridge is substantially horizontal to facilitate insertion into the support.

13. A typewriter as claimed in claim 12, wherein the stop includes a stud and an elongated slot for the stud interacting between the housing and the arm.

14. A typewriter as claimed in any one of claims 12 and 13, wherein the arm and at least a portion of the housing are integrally composed of a plastic and the pivot is a portion of the arm that is relatively thin compared to the rest of the arm.

15. A typewriter substantially as herein described with reference to the accompany-

ing drawings.

16. A typewriter ribbon cartridge substantially as herein described with reference to Figures 2 to 9 of the accompanying drawings.

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