

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO RIBBON CARTRIDGES

(71) We, SCM CORPORATION, a Corporation organised under the laws 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:—

This invention relates to ribbon cartridges and more particularly to an improved stuffed or random storage ribbon cartridge for machines such as typewriters.

The present invention includes a ribbon cartridge for a ribbon, the cartridge having a storage chamber for the ribbon with a floor and a ceiling spaced apart by a distance greater than the width of the ribbon to be received, a shroud separating the storage chamber from an exit area for a single strand of the ribbon to exit from the storage chamber, the shroud having an inclined surface toward the exit area to reduce the width between the top of the shroud and the floor or ceiling to less than the width of the ribbon whereby to restrain all but a single strand of ribbon from being fed from the storage chamber.

The present invention also includes a ribbon cartridge for a ribbon, the cartridge having a storage chamber for the ribbon, an exit area for a single strand of the ribbon to exit from the storage chamber, and a shroud formed in an arc near the exit area for confining the width of the ribbon to a space less than the width of the ribbon to restrain all but the single strand of ribbon from being fed from the storage chamber.

In a preferred form of the invention, the shroud is a ridge positioned near the exit area of the cartridge on the floor of the storage chamber. The distance from the top of the shroud to the ceiling of the storage chamber is less than the width of the ribbon so that only one strand of the ribbon will be withdrawn from the storage chamber at a

time. The shroud is formed around the exit roller in an arc so that the single strand of ribbon being withdrawn from the storage chamber will cross the shroud substantially at right angles to the shroud from any direction that it is pulled from inside the storage chamber, so that none of the ribbon remaining in the storage chamber will be greatly disturbed. Convolutions of ribbon in the storage chamber remain poised in an arc around the shroud. Stuffed ribbon cartridges incorporating the invention have used ribbons with high coefficients of friction and the maximum length of ten yards of ribbon without clogging the exit areas and without fraying.

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

Figure 1 is a perspective view, partially broken away, of a stuffed ribbon cartridge embodying the invention;

Figure 2 is a detail view of the cartridge of Figure 1 with the ribbon extended around the exit roller;

Figure 3 is a section view taken substantially along line 3—3 in Figure 2; and

Figure 4 is a section view taken substantially along the line 4—4 in Figure 2.

A stuffed ribbon cartridge for a machine such as a typewriter is shown in Figure 1. The typewriter is not shown except for part of a cartridge support 10 and part of a feed mechanism 12. The feed mechanism has a gear 14 for interaction with the cartridge as hereinafter described.

The cartridge is of the type disclosed and claimed in our copending application No. 39283/73. (Serial No. 1416777). The cartridge has an arm 16 for guiding an endless loop of ribbon 18 toward a print point, which is not shown, of the typewriter. The arm is connected to a housing 20.

The housing includes a base 22 and a cover 24 connected to the base. A platform 26 is

5 mounted on the base to provide a storage chamber, indicated generally at 28, for the ribbon. The platform has a wall 30 and 32 around most of its periphery to confine the ribbon in the storage chamber. The inner surface of the platform serves as a floor 34 for the storage chamber, and the inner surface of the top of the cover serves as a ceiling 36. The distance between the floor and the ceiling is only slightly greater than the width of the ribbon.

10 The housing also has an entrance area, indicated generally at 38, and an exit area, indicated generally at 40. The entrance area has a knurled feed roller 42 and an integral gear 44 rotatably mounted on the housing with the gear in mesh with the gear 14 of the feed mechanism of the typewriter when the cartridge is in operating position on the support on the type-writer. A knurled idler roller 46 is rotatably mounted on a bell crank 48 that is pivotally mounted on the housing. The idler roller is biased in a counterclockwise direction against the feed roller by a spring lever 50 on the bellcrank. The idler roller squeezes a strand 18a of the ribbon entering the storage chamber from the arm against the feed roller.

25 The exit area has a barrel-shaped exit roller 52 rotatably mounted on a vertical pin 54 on the floor of the platform. As shown in Figure 2, the roller is used to change the direction of a strand 18b of the ribbon being withdrawn from the storage chamber. After passing the roller, the strand of ribbon traverses an exit ramp, indicated generally at 56, on its way to the arm. Projections 58 are formed along the sides of the exit ramp to guide the exiting strand of ribbon to prevent convolutions of ribbon from leaving the cartridge.

30 It has been found that due to differing coefficients of friction of typewriter ribbon, even from the same supplier, the exiting strand of ribbon will drag convolutions of ribbon along with it into the exit area. If enough convolutions of ribbon are dragged into the exit area, the exit area can become clogged. Clogging increases the tension on the ribbon which may consequently break or become frayed along its heat-sealed top edge and break later. Using less ribbon than the maximum capability of the cartridge, for instance eight yards instead of ten yards, does not eliminate clogging completely.

35 In order to prevent convolutions of ribbon from being pulled out of the storage chamber by the exiting strand of ribbon with the attendant risk of clogging, a shroud 60 is formed around the exit roller 52. The shroud is a ridge preferably on the floor of the storage chamber. As shown in Figures 3 and 4, the distance from the top of the shroud to the ceiling of the storage chamber is less than the width of the ribbon. In one em-

bodiment of the invention, the height of the storage chamber is $0.355 \pm .010''$, the height of the shroud is $0.070 \pm .005''$, and the width of the ribbon varies from 0.305 to $0.320''$. At the worst condition, the distance ($0.365 - 0.065 = 0.300''$) from the top of the shroud to the ceiling of the storage chamber is $0.005''$ less than the minimum width of the ribbon. The foregoing dimensions are, of course, only an example, and numerous variations can be used to cater for different sizes of ribbon, for instance, without departing from the invention.

70 The shroud also has an inclined surface 62 sloping toward the storage chamber at a twenty degree angle. The angle also is only an example. However, if the angle of the inclined surface is too gradual, the shroud has to be very wide and thus will take up too much space from the storage chamber. If the angle is too steep, convolutions of ribbon in the storage chamber will be too tightly packed around the shroud. It is best to have a moderate angle so that each convolution of ribbon will find its own level on the shroud and not all of them will be at the same level. As shown in Figures 1 and 2, the shroud is formed around the exit roller in an arc so that the strand of ribbon being withdrawn from the storage chamber will cross the shroud substantially radial to or at right angles to the shroud no matter what direction it is pulled from inside the storage chamber so that none of the ribbon remaining in the storage chamber will be greatly disturbed.

80 In operation, with the cartridge in an operating position on the support on the typewriter, the gear 44 of the feed roller 42 is in mesh with the gear 14 of the feed mechanism 12 of the typewriter as shown in Figure 1. After each impact at the print point of a type character, not shown, the feed roller pulls the strand 18a of ribbon one character width from the arm and stuffs the strand of ribbon into the storage chamber of the housing. The strand of ribbon forms the convolutions of ribbon in the storage chamber. The convolutions of ribbon form an arcuate front with the crest of the arc pointing toward the exit area 40.

85 At the same time that the strand 18a of ribbon is being fed into the storage chamber from the arm, the strand 18b of ribbon is being pulled from the storage chamber to the arm at the exit area 40. The strand of ribbon is pulled across the shroud 60 substantially radial to or at right angles to the shroud no matter what direction it is pulled from inside the storage chamber. Since the strand of ribbon crosses the shroud substantially at right angles to the shroud, the convolutions of ribbon remaining in the storage chamber are only slightly disturbed by the withdrawal of the strand of ribbon. In

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crossing the shroud, the strand of ribbon might collapse to conform to the cross section of the shroud as shown in Figure 3 or might warp or tilt slightly. Since the convolutions of ribbon remaining in the storage chamber have no tensile pull to cross the shroud and the frictional force of the exiting strand of ribbon is insufficient to pull them across the shroud, they remain poised in an arc around the shroud, each finding its own level on the inclined surface 62 of the shroud. Tests conducted using cartridges with the shroud have shown very favourable results. The cartridges have used ribbons with high coefficients of friction and the maximum length of ten yards of ribbon without clogging the exit areas and without fraying.

WHAT WE CLAIM IS:—

1. A ribbon cartridge for a ribbon, the cartridge having a storage chamber for the ribbon with a floor and a ceiling spaced apart by a distance greater than the width of the ribbon to be received, an exit area for a single strand of the ribbon to exit from the storage chamber, a shroud on the floor of the storage chamber near the exit area and an inclined surface on the shroud rising from the floor toward the exit area until the distance from the top of the shroud to the ceiling of the storage chamber is less than the width of the ribbon to restrain all but the single strand of ribbon from being fed from the storage chamber.

2. The cartridge of claim 1 in which the inclined surface on the shroud rises from the floor of the storage chamber toward the exit area at a substantially uniform angle.

3. The cartridge of claim 2 in which the shroud is formed in an arc near the exit area.

4. The cartridge of claim 3 in which the shroud is formed around the exit area in an arc shaped so that the single strand of ribbon being fed from the storage chamber will cross the shroud substantially at right angles to the shroud from substantially any direction that the single strand of ribbon is pulled from inside the storage chamber.

5. The cartridge of claim 4 in which the exit area includes a roller to change the direction of the single strand of ribbon exiting from the storage chamber and the shroud is formed around the roller.

6. The cartridge of claim 5 in which the cartridge has an entrance area for the ribbon to enter the storage chamber and a feed roller near the entrance area to stuff the ribbon into the storage chamber.

7. A ribbon cartridge for a ribbon, the cartridge having a storage chamber for the ribbon, an exit area for a single strand of the ribbon to exit from the storage chamber, and a shroud formed in an arc near the exit area for confining the width of the ribbon to a space less than the width of the ribbon to restrain all but the single strand of ribbon from being fed from the storage chamber.

8. The cartridge of claim 7, in which the storage chamber has two substantially parallel surfaces greater than a ribbon's width apart to confine the ribbon in the storage chamber with the width of the ribbon substantially perpendicular to the surfaces, and the shroud is a ridge on one of the surfaces with the distance from the top of the ridge to the other surface less than the width of the ribbon.

9. The cartridge of claim 8, in which the shroud has an inclined surface extending from one of the surfaces of the storage chamber toward the storage area.

10. The cartridge of claim 9, in which the shroud is formed around the exit area in an arc shaped so that the single strand of ribbon being fed from the storage chamber will cross the shroud substantially at right angles to the shroud from substantially any direction that the single strand of ribbon is pulled from inside the storage chamber.

11. The cartridge of claim 10 in which the exit area includes a roller to change the direction of the single strand of ribbon exiting from the storage chamber and the shroud is formed around the roller.

12. The cartridge of claim 11 in which the cartridge has an entrance area for the ribbon to enter the storage chamber and a feed roller near the entrance area to stuff the ribbon into the storage chamber.

13. A ribbon cartridge substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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1. A ribbon cartridge for a ribbon, the cartridge having a storage chamber for the ribbon with a floor and a ceiling spaced apart by a distance greater than the width of the ribbon to be received, an exit area for a single strand of the ribbon to exit from the storage chamber, a shroud on the floor of the storage chamber near the exit area and an inclined surface on the shroud rising from the floor toward the exit area until the distance from the top of the shroud to the ceiling of the storage chamber is less than the width of the ribbon to restrain all but the single strand of ribbon from being fed from the storage chamber.

2. The cartridge of claim 1 in which the inclined surface on the shroud rises from the floor of the storage chamber toward the exit area at a substantially uniform angle.

3. The cartridge of claim 2 in which the shroud is formed in an arc near the exit area.

4. The cartridge of claim 3 in which the shroud is formed around the exit area in an arc shaped so that the single strand of ribbon being fed from the storage chamber will cross the shroud substantially at right angles to the shroud from substantially any direction that the single strand of ribbon is pulled from inside the storage chamber.

5. The cartridge of claim 4 in which the exit area includes a roller to change the direction of the single strand of ribbon exiting from the storage chamber and the shroud is formed around the roller.

6. The cartridge of claim 5 in which the cartridge has an entrance area for the ribbon to enter the storage chamber and a feed roller near the entrance area to stuff the ribbon into the storage chamber.

7. A ribbon cartridge for a ribbon, the cartridge having a storage chamber for the ribbon, an exit area for a single strand of the ribbon to exit from the storage chamber, and a shroud formed in an arc near the exit area for confining the width of the ribbon to a space less than the width of the ribbon to restrain all but the single strand of ribbon from being fed from the storage chamber.

8. The cartridge of claim 7, in which the storage chamber has two substantially parallel surfaces greater than a ribbon's width apart to confine the ribbon in the storage chamber with the width of the ribbon substantially perpendicular to the surfaces, and the shroud is a ridge on one of the surfaces with the distance from the top of the ridge to the other surface less than the width of the ribbon.

9. The cartridge of claim 8, in which the shroud has an inclined surface extending from one of the surfaces of the storage chamber toward the storage area.

10. The cartridge of claim 9, in which the shroud is formed around the exit area in an arc shaped so that the single strand of ribbon being fed from the storage chamber will cross the shroud substantially at right angles to the shroud from substantially any direction that the single strand of ribbon is pulled from inside the storage chamber.

11. The cartridge of claim 10 in which the exit area includes a roller to change the direction of the single strand of ribbon exiting from the storage chamber and the shroud is formed around the roller.

12. The cartridge of claim 11 in which the cartridge has an entrance area for the ribbon to enter the storage chamber and a feed roller near the entrance area to stuff the ribbon into the storage chamber.

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