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(54) **Ribbon cartridge with take-up spool back check.**

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DE-A-2 933 815
DE-A-2 951 610
DE-A-3 003 890
US-A- 81 729
US-A- 131 402
US-A-2 904 157
US-A-3 409 113
US-A-4 026 492

IBM TECHNICAL DISCLOSURE BULLETIN, vol. 18, no. 4, September 1975, page 1093, New York, US. E. J. LENNEY: "Ribbon drag wire"

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Description

Technical Field

This invention relates to ribbon cartridges and more particularly to a ribbon cartridge including a back check device associated with the take-up spool.

Background Art

Ribbon cartridges for typewriters provide convenient, more cleanhandling loading and unloading. The cartridge originally contains the supply spool of ribbon mounted to be controllably unwound, and a hub mounted to wind up the used ribbon.

Free unwinding of the take-up spool when the cartridge is off the typewriter can result in tangling of the ribbon. Also, insertion of a cartridge when the ribbon may unwind requires the operator to tighten the ribbon manually and to assure that used ribbon has been wound past the printing position. Where the cartridge design includes a high-friction contact with the take-up spool, such as, for example by the internal leaf spring in U.S. patent 3,356,202, back checking by the friction is inherent and a special mechanism is unnecessary.

A known prior cartridge such as described in the published article by E. J. Lenney entitled "Ribbon Drag Wire" in the *IBM Technical Disclosure Bulletin*, Vol. 18, No. 4, (September 1975), at p. 1093, employs a wire wrapped around the hub of the supply spool in a cartridge as a friction brake. One end of the wire is anchored in the cartridge and the ribbon rides upon a depending leg at the other end. As the ribbon is fed, it pulls on the end it rides upon to open the portion wrapped around the hub.

Braking assemblies for machinery having one-direction engagement are found in US—A—81,729 and US—A—131,402. US 3,409,113 discloses a spring biased, centrally pivoted, inflexible brake member having an eccentric face as a braking surface which operates against a frame mounted take-up spool in a typewriter.

A braking assembly for a ribbon supply spool having two-direction engagement is found in DE—A—2,951,610. The latter describes a ribbon cartridge having a supply spool with a single flange, which flange is provided with teeth at its periphery. A take-up spool hub is mounted within the cartridge to receive the ribbon which extends from the supply spool, out of the cartridge, and then back into said cartridge. A flexible member mounted inside the cartridge is positioned to normally engage, by means of a depending arm, the teeth of the supply spool flange, thereby constraining the supply spool from rotating. The ribbon extending from the supply spool is guided about said arm so that, when the tension in the ribbon increases as a result of rotation of the take-up spool in the take-up direction, the flexible members flexes outward, thus disengaging its depending arm from the teeth of the spool flange, thereby releasing the supply spool. Accordingly, the device of DE—A—2,951,610 is a supply spool braking device whose release is controlled by the tension of the ribbon and which acts on teeth provided at the periphery of the supply spool flange.

As it will appear hereinafter, the device according to the invention also includes a flexible member which provides positive holding of a spool, as distinguished by frictional holding. However, according to the invention, the spool whose rotation is prevented is the take-up spool inasmuch as, by contrast with the cartridge of DE—A—2,951,610, the cartridge of the present invention does not incorporate any ribbon drive sprocket permanently biased against the periphery of the ribbon disc wound on the take-up spool, which drive sprocket constrains the take-up spool from rotating when the cartridge is not being used. In addition, the flexible member of the present invention is so designed that it can cooperate with the smooth peripheral surface of the hub of the take-up spool, thus avoiding the need to provide special indentations or teeth at the periphery of the spool flange. Further, as no teeth are present on the hub, the device of the invention is infinitely variable in position of operation, whereas in the device of DE—A—2,951,610, a certain amount of ribbon slack is always present, due to the distance existing necessarily between two adjacent teeth.

No prior art is known employing the end of a flexible wire engaged with a take-up spool hub to prevent unwinding of the take-up spool in a cartridge.

Disclosure of the Invention.

The ribbon cartridge of the present invention is of the type having a supply spool hub mounted for rotation within the cartridge and a take-up spool hub mounted in said cartridge to receive a ribbon which extends from the supply spool, out of said cartridge, and then back into said cartridge.

The cartridge of the invention is characterized in that it comprises a flexible wire mounted inside said cartridge, said wire having a first section having an end biased against said take-up spool hub and a second section engaged with a post integral with said cartridge, said biased end being cut at an angle point to dig into said take-up spool hub when same turns counter to the take-up direction and to slide on said take-spool hub when same turn in the take-up direction.

An economic ribbon cartridge is thereby provided having a self-contained, infinitely variable back check to prevent unwinding of the take-up spool at any position the take-up hub adopts. Operation involves only the member biased against the hub, and no assisting mechanism at all is employed on the typwriter.

Typical alternatives to provide holding, as distinguished from frictional holding, would involve pawls, ratchets and the like, mounted in the cartridge or off the cartridge in a ribbon-feed

mechanism, which would be more intricate and expensive and yet not inifinitely variable in position of operation.

Brief Description of the Drawings

This invention is described in detail below with reference to the accompanying drawings, which illustrate the preferred embodiment, in which

Fig. 1 is a perspective view illustrating the top and the front of a cartridge incorporating this invention.

Fig. 2 is a perspective view from the rear illustrating the major elements within the cartridge of Fig. 1, and the bottom wall of the cartridge.

Fig. 3 is a view from the bottom with the bottom wall and spools removed showing the mounting of the flexible member and its position when relaxed.

Fig. 4 illustrates the braking action of the flexible member.

Detailed Description of the Invention

As shown in Fig. 1, this invention is embodied in a cartridge from which the typewriter ribbon 1 or the equivalent exits from a supply spool 3 (Fig. 2) by riding over a depending leg 5 of a wire 7. In the preferred embodiment the cartridge has integral, laterally spaced guide arms 9 which are pivoted to the cartridge and are biased downward by a spring 11 in top-central spring housing 13. Typewriter structures 14 contact the bottom of arms 9 and rotate upward to pivot arms 9 upward when ribbon 1 is to be raised for actual printing.

The cartridge has a top wall 15, side walls 17, and a bottom wall 19 (Fig. 2). Ribbon 1 exits the cartridge through an exit opening 21 formed in side wall 17 at the area of wire leg 5. Ribbon 1 reenters the cartridge in opening 23 on side wall 17 opposite exit opening 21.

Referring to Fig. 2, ribbon 1 is directed to a take-up spool 25, which is wound on take-up hub 27. In a manner now well known, a drive sprocket from the typewriter enters bottom wall 19 of the cartridge through an arcuate slot 29 and contacts the periphery of take-up spool 25 to wind the ribbon. Take-up hub 27 has a smooth shaft 31 above spool 25 on which rests the end of a second wire 32.

Wire 32 extends from the contact with shaft 31 to a mounting post 33 (Fig. 3, shown illustratively in Fig. 2), integral with the top wall 15 of the cartridge. Wire 7, not part of wire 32, is wrapped tightly around groove 35 of an extension of the supply spool hub 37. Wire 7 is deformed to a predetermined position approximately at right angles to form depending leg 5 upon which ribbon 1 rides as it exits the cartridge. A hooked end 39 of leg 5 prevents ribbon 1 from slipping downward off of leg 5.

Fig. 3 illustrates the mounting of the wire 32 in the cartridge by showing the position of wire 32 when neither spools not hubs are in the cartridge. Post 33 has grooves 41 on three sides, in which a corresponding, generally rectangularly shaped section 43 (Fig. 2) of wire 32 is inserted. Grooves 41 on post 33 form a three-sided outline whose plane is parallel to a line between the centers of the supply hub 37 and the takeup hub 27. Stated differently, with reference to Fig. 1, its plane is parallel to the span of ribbon 1 between arms 9.

Wire 32 is bent at the junction 45 of the rectangular section 43 and the straight section 49, which extends to hub 27. Thus, with reference to Fig. 2, wire 32 is bent 40 degrees counterclockwise at junction 45, thereby pointing section 49 of wire 32 to the relaxed position shown in Fig. 3. The position of section 49 in the completed cartridge is shown in Fig. 2. Section 49 is pulled across the location for take-up hub 27. Hub 27 is inserted and section 49 is released. The 40 degree bend thereby provides a recovery force biasing the end of section 49 firmly against shaft 31 of take-up hub 27.

Wire 7 in the configuration as disclosed is substantially identical to prior published and commercially sold tensioning systems for a supply ribbon in a cartridge. It therefore constitutes no part of this invention and will not be discussed in detail. One end of wire 7 is anchored to the cartridge. The end carrying depending leg 5 is pulled by ribbon 1 as the ribbon is fed. This relaxes the normally firm grip of wire 7 around hub 37 and allows rotation of hub 37 to thereby feed ribbon from supply spool 3.

The generally rectangular section 43 of wire 32 is actually bent somewhat to create a grasping bias on post 33. This is accomplished by a bend in junction 53, the next corner of part 43 from junction 45. That bend is inward so that the opening at the central leg 55 of the section 43 is about one-third larger than the opening between junction 45 and the end 47 of rectangular section 43 when relaxed.

It will be apparent that the foregoing dimensions are essentially only matters of optimum design. Increasing the disclosed angle at junction 45 requires a greater bending of section 49 after the cartridge is assembled and therefore provides a greater biasing force. The degree of inward bending of part 43 controls grasping bias when the part is flexed over post 33, which bias provides friction to keep wire 32 in place. As indicated best in Fig. 3, a moderately stiff plastic disk 57, with a central hole to admit supply spool hub 37 is included in the cartridge. Top wall 15 has a series of ridges or ribs 58 which hold disk in a plane between supply spool 3 and wire 7. Disk 57 holds ribbon 1 against taking a coned or telescoped configuration under unwinding pressures which would bind wire 7 from its intended movement.

Finally, the end of section 49 of wire 32 is cut at 45 degrees so as to provide a sharp, digging contact with hub 27.

The mounting of wire 32 employing generally rectangular section 43, the configuration and interaction of wire 7 with supply spool 3 and supply-spool hub 37 and the interaction of ribbon 1 with wire 7 form no part of the essential

contribution of this invention. This invention contributes the section 49 and the interaction with take-up hub 27 as described.

The final cartridge is as it appears in Fig. 1 with significant internal elements as shown in Fig. 2 and Fig. 3. The cartridge is simply placed on a typewriter or other printer adapted to use such a cartridge. As is generally conventional, the cartridge fits on mating members on the typewriter so as to be positioned for printing. A drive sprocket from the typewriter enters the bottom of the cartridge through slot 29 and rests against the outside of take-up spool 25. The drive sprocket and slot interaction is now well known as shown, for example, in U.S. patent no. 3,731,781.

Operation of the unwinding check mechanism is as shown in Fig. 4. The arrows through section 49 represent the direction of the spring recovery bias force. Fig. 4a illustrates take-up hub 27 rotating in the normal direction to wind ribbon. The body of section 49 is located so that the hub movement is in the direction from the body toward the end, and a sliding contact with the hub results. Movement is substantially unobstructed.

Fig. 4b illustrates the inherent backchecking operation. When hub 27 moves in the unwind direction, movement is toward the end of section 49. Section 49 is firmly tensioned towards the center of hub 27 and therefore engages the hub 27. The 45 degree angle at the end of section 49 presents a point which assists in providing a firm engagement. This applies a force which, being along the length of section 49, is strongly resistive to flexing. A strong counter force effective to brake the hub 27 results. In the preferred embodiment hub 27 is made of a hard synthetic resin which yields slightly to the digging action of wire 32.

Claims

1. A ribbon cartridge of the type having a supply spool hub (37) mounted for rotation in the cartridge and a take-up spool (27) mounted in said cartridge to receive a ribbon (1) which extends from the supply spool, out of said cartridge, and then back into said cartridge, said cartridge being characterized in that it comprises a flexible wire (32) mounted inside said cartridge, said wire (32) having a first section (49) having an end biased against said take-up spool hub (27) and a second section (43) engaged with a post (33) integral with said cartridge, said biased end being cut at an angle point to dig into said take-up spool hub (27) when same turns counter to the take-up direction and to slide on said take-up spool hub (27) when same turns in the take-up direction.

2. A ribbon cartridge as in claim 1 in which said post (33) has at least two grooves (41) and said second section (43) of the wire is bent to form three sides of a generally rectangular configuration, opposite sides of said three sides fitting in said two grooves (41), said wire (32) being bent at the corner (45) of said first section (49) and said section (43) to provide a recovery force biasing the end of said first section (49) against said take-up spool hub (27).

Patentansprüche

1. Farbband vom Typ mit einer Abgabespule (37), drehbar in die Kartusche montiert, und einer Aufnahmespule (27), in besagte Kartusche montiert, um ein Band (1) aufzunehmen, das aus der Abgabespule aus der Kartusche kommt und dann in die Kartusche zurückgeführt wird, wobei die Kartusche dadurch gekennzeichnet ist, dass sie einen flexiblen Streifen (32) besitzt, der in der besagten Kartusche montiert ist, sodass der besagte Streifen einen ersten Abschnitt (49) mit einem abgeschrägten Ende aufweist, das gegen besagte Aufnahmespulnabe (27) gerichtet ist und einen zweiten Abschnitt (43), der mit einem Ständer verbunden ist, der Bestandteil der Kartusche ist, und das schräge Ende in einem Winkel geschnitten ist, sodass es in die besagte Aufnahmespule (27) eingeführt wird, wenn diese sich in der zur Aufnahmerichtung entgegengesetzten Richtung dreht und auf der besagten Aufnahmespule (27) gleitet, wenn sie sich in Aufnahmerichtung dreht.

2. Farbband gemäss Anspruch 1, in dem der besagte Ständer (33) mindestens zwei Nuten (41) besitzt und besagter zweiter Abschnitt (43) des Streifens gebogen ist, um drei Seiten in normalerweise rechteckiger Konfiguration zu bilden, sodass sich die entgegengesetzten Seiten der besagten drei Seiten in die besagten beiden Nuten (41) einfügen, während der besagte Streifen (32) an der Ecke (45) des besagten ersten Abschnittes (49) und des besagten zweiten Abschnittes (43) gebogen wird, um eine Rückholkraft abzugeben, die das Ende des besagten ersten Abschnittes (49) gegen besagte Aufnahmespulnabe (27) vorspannt.

Revendications

1. Une cartouche de ruban du type comportant un moyeu de bobine d'alimentation (37) monté à rotation dans la cartouche et une bobine de réception (27) montée dans ladite cartouche pour recevoir un ruban (1) qui se déroule de la bobine d'alimentation, sort de ladite cartouche et revient dans ladite cartouche, ladite cartouche étant caractérisée en ce qu'elle comprend un fil flexible (32) monté à l'intérieur de ladite cartouche, ledit fil (32) présentant une première partie (49) dont une extrémité est rappelée contre ledit moyeu de bobine de réception (27) et une seconde partie (43) en contact avec un élément (33) solidaire de ladite cartouche, ladite extrémité rappelée étant découpée en pointe pour s'enfoncer dans ledit moyeu de bobine de réception (27) lorsque celui ci tourne à l'inverse du sens de réception et glisser sur ledit moyeu de bobine de réception (27) lorsque celle ci tourne dans le sens de réception.

2. Une cartouche de ruban selon la revendication 1, dans laquelle ledit élément (33) présente au moins deux gorges (41) et dans laquelle ladite seconde partie (43) du fil est recourbée pour

former trois côtés d'une configuration généralement triangulaire, des côtés opposé desdits trois côtés étant disposés dans lesdites gorges (41), ledit fil (32) étant replié au coin (45) de ladite première partie (49) et de ladite seconde partie (43) pour générer une force de récupération rappelant l'extrémité de ladite première partie (49) contre ledit moyeu de bobine de réception (27).

FIG. 1

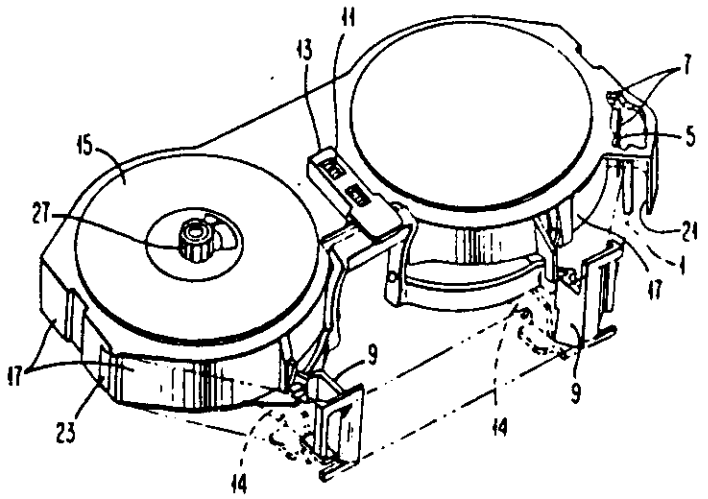
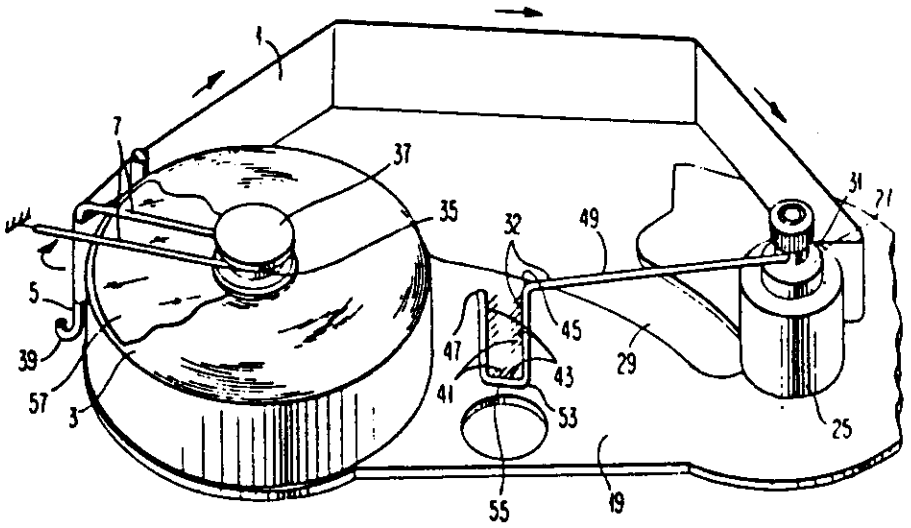

11
13
7
5
15
27
21
1
17
17
9
9
23
14
14

FIG. 2


1
7
37
35
32
49
31
71
5
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57
3
47
41
43
45
29
53
25
55
19

FIG 4a

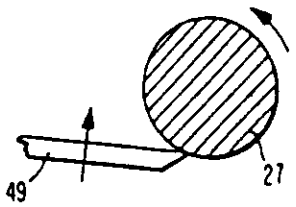


FIG. 4b

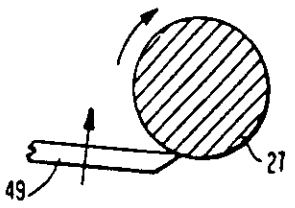
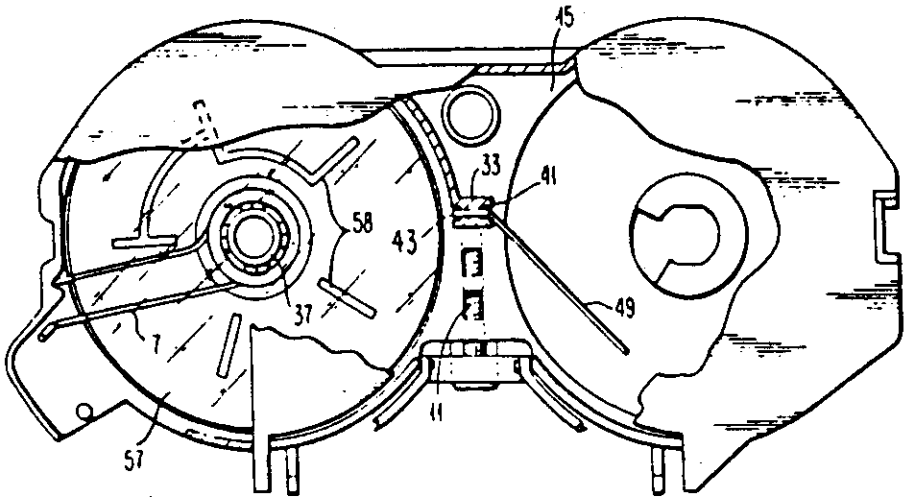


FIG. 3



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Ribbon cartridge with take-up spool back check.

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