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Ribbon cassettes.

A ribbon cassette of the kind used to store a reel of typing ribbon, comprises a casing (6), a primary spool (8) mounted on a hub (16) and upon which unused ribbon is wound, and a secondary spool (10) in the casing upon which used ribbon is wound. The secondary spool (10) is provided with means (12) to be engaged by a drive member of (e.g.) a word processor or computer printer, to cause the secondary spool to rotate, and to draw ribbon from the primary spool onto the secondary spool.

The cassette comprises means to resist reverse winding of the primary spool, said means comprising a first toothed element (20) forming part of or fixedly mounted on the primary spool, and a secondary toothed element (21) mounted in a diametral slot (24), and which is urged into engagement with the first toothed element (20) by spring means (28). Engagement between the two toothed elements permits normal winding of tape onto the secondary spool from the primary spool, but resists reverse winding of the primary spool.

The spring element (28) engages the ribbon, to maintain tension in the ribbon during use.

Additionally, the ribbon cassette comprises an insert member (80) comprising an operative portion which may be inserted through a slot (78) in the base (6) into a position in which it engages the primary spool to prevent rotation thereof during transportation, the insert member comprising a supplementary

portion located on the exterior of the casing which may be manually grasped to enable the insert member to be removed from the casing of the ribbon cassette in preparation for use thereof.

Title: "Ribbon Cassettes"

This invention is concerned with improvements relating to ribbon cassettes, particularly of the kind (hereinafter referred to as being of the kind specified) as are used to store a reel of typing ribbon, and to transfer ribbon, or to allow ribbon to be transferred, from a primary spool to a secondary spool. Such ribbon cassettes are at present in use in large numbers in typing machines such as word processors, and in computer printers.

Thus a conventional ribbon cassette comprises a two-part casing, a primary spool upon which unused ribbon is wound, and a secondary spool upon which used ribbon is wound, the secondary spool being provided with means to be engaged by a drive member to cause ribbon to be drawn from the primary on to the secondary spool.

Conventionally a ribbon cassette of the kind specified comprising means to resist rotation of the primary spool to prevent overrun thereof, and to prevent reverse winding of the ribbon, which, whilst permitting the ribbon to be re-used introduces a risk of the ribbon jamming and causing machine damage. Said means may be afforded by a large diameter toothed disk fixedly mounted on the primary spool, the teeth of the disk extending circumferentially outwardly of the ribbon when the primary spool is fully loaded, and a member mounted on the casing which is engagable with the teeth so as to permit movement of the primary spool in one but not the other direction.

Such an arrangement is difficult to assemble correctly, and it is one of the various objects of the present invention to provide a ribbon cassette of the kind specified which is simpler in its constructions and/or assembly.

According to this invention there is provided a ribbon cassette of the kind specified, comprising means to resist reverse winding of the primary spool, said means in part at least being located within the spool on which the ribbon is wound.

In as much said means is not, as compared with conventional arrangements, located in a position in which it tends to increase the depth of the cassette, the operative elements of said means may be relatively robust compared with conventional means to resist reverse winding.

5 Preferably said means comprises a first toothed element forming part of or fixedly mounted on the spool, and a second toothed element rotationally fixed in relation to the spool, the two elements being urged into engagement with one another, with the teeth so arranged as to permit rotation of the spool in one direction (albeit under some restraint) but to subject rotation in the opposite direction to a significantly higher restraint.

Preferably spring means is provided to urge the toothed elements into engagement, and the spring element (or part thereof) may extend outside the spool, e.g. beyond the axial limits of the spool.

10 Advantagously however the spring means is mounted on the spool, as distinct from being mounted on the casing.

Conventionally a ribbon cassette of the kind specified also comprises means to maintain tension in the ribbon, and which is operative to take up a small degree of slack which may be produced when the primary spool is caused to move in discrete steps. Conventionally said means is provided by a spring element mounted on the casing, around which spring element the ribbon is passed, the spring element moving to vary the path length of the ribbon in its passage through the casing.

20 According to this invention there is provided a ribbon cassette of the kind specified, comprising a spring element to maintain tension on the ribbon, said spring element being mounted on the primary spool of the cassette.

By the mounting of the spring element on the primary spool, a simpler construction of casing may be utilised, and a simpler assembly is obtained.

25 Additionally, such construction permits a spring element having a relatively greater length to be utilised, permitting a greater degree of slack take up to be obtained, or permitting the same degree of take-up to be obtained more reliably.

30 Preferably the cassette also comprises means to resist reverse rotation of the primary spool, and preferably said means is afforded in part at least by the spring element which affords the means to maintain tension on the ribbon.

An additional problem encountered in ribbon cassettes of the kind specified is that during transport, the primary spool may move in the casing, causing the ribbon to become de-spoiled.

35 According to this invention there is also provided a ribbon cassette of the kind specified, wherein the casing is provided with a mounting element

upon which the primary spool is mounted for rotation, and an insert member which may be inserted into the casing to engage the primary spool to restrain rotation of the spool.

5 Preferably the casing is provided with a slot so positioned as to enable the insert member to be engaged within a boss of the casing upon which the spool is mounted, and so as to project a small extent beyond the circumference of the boss, to engage the spool.

10 Preferably the insert member is resiliently deformable, and is of such a size that such insertion involves deformation thereof, frictional engagement between the insert member and the casing under the action of the resilience of the insert member frictionally restraining rotation of the spool and frictionally retaining the insert member in its inserted position.

15 Preferably the insert member comprises an operative portion to perform the restraint to rotation of the spool, and a supplementary portion, adapted for manual grasping, which remains exterior of the casing to enable the operative portion to be withdrawn from its inserted position.

For example the supplementary portion may bear the legend "remove before use", to alert an operative that removal of the insert member is necessary to permit rotation of the primary spool.

20 The operative portion and the supplementary portion may be generally co-planar, but preferably the supplementary portion is adapted to lie flat against the casing when the insert member has been inserted into its operative position. Thus, the operative portion may lie in a plane extending generally at right angles to the plane of the supplementary portion.

25 In this manner restraint to rotation of the primary spool as tends to occur during transist, and which may cause de-spooling of the tape, can be prevented with minimal modification to the existing cassette casing, and without any undue increase in the cost of assembly of the cassette.

30 There will now be given a detailed description, to be read with reference to the accompanying drawings, of a ribbon cassette which has been selected for the purposes of illustrating the invention by way of example.

In the accompanying drawings:-

FIGURE 1 is a plan view of the preferred embodiment, part of the casing having been removed;

35 FIGURE 2 is a cross-sectional view through the primary spool of the cassette, showing in detail means to prevent reverse rotation of the primary spool.

FIGURE 3 is a schematic perspective view showing the reverse side of the cassette which is the preferred embodiment;

5 FIGURE 4 is a cross-sectional view of the boss of the cassette upon which the primary spool is mounted, together with an insert member for preventing rotation of the spool, the spool having been removed from the boss;

FIGURE 5 is a cross-sectional view taken at right angles to that shown in Figure 4;

10 FIGURE 6 is a plan view, taken in the direction of the arrow A in Figure 4; and

FIGURE 7 is a view of a modified insert member.

15 The ribbon cassette which is the preferred embodiment of this invention is particularly of the kind specified, comprising a two-part casing, only one, base part 6 being shown, a primary spool 8 upon which unused ribbon is wound, and a secondary spool 10 upon which used ribbon is wound. The secondary spool 10 is provided with means 12 to be engaged by a drive member of (e.g.) a word processor or computer printer, to cause the secondary spool to rotate, and to draw ribbon through the gap between spaced arms 12, 14 wherein the ribbon is used.

20 The primary spool 8 is mounted on a hub 16 provided by the casing part 6, permitting the spool to rotate freely.

25 The spool 8 is generally hollow, and provides an upwardly-facing annular surface 18, on which is provided a toothed ring 20. In the preferred embodiment the toothed ring 20 is integral with the spool 8, but may if desired be formed separately and secured thereto.

Mounted above the surface 18 is a second toothed element, in the form of a bar 21 extending generally diametrically within the hub 8, said bar 21 comprising a tongue 22 which extends into a diametral slot 24 in the lower part of the hub 16.

30 Thus the bar 21 is retained captive against rotation with the spool 8.

Extending upwardly from the bar 21 are walls 26, within which slots are provided. Press-fitted into the slots is a spring element 28, which comprises a portion 30 which is operative to press the bar 21 into engagement with the toothed ring 20.

35 The element 28 extends radially outwardly from the spool 8, and terminates in an arm 32, around which ribbon drawn from the spool 8 passes.

The length of the element 28, and the material from which it is formed, is such as to permit some degree of movement of the arm 28, sufficient to take up slack produced in the ribbon as it is drawn from the spool 8, in the use of the cassette.

5 It will be appreciated that the profiles of the teeth of the ring 20 and the bar 21 are such as to permit rotation of the spool in a first (clockwise as seen in Figure 1) direction under some degree of restraint, but to provide a much higher degree of restraint to rotation of the spool in the opposite direction.

10 In this manner a ribbon cassette may be provided which is simpler and less expensive in its construction, and relatively easy to assemble.

 Extending through the casing along a line extending diametrically of the boss 16 upon which the primary spool is mounted, there is provided a slot 78, said slot extending part-way along the boss 16 in the axial dimension (see
15 Figure 4).

 The preferred embodiment also comprises an insert member 80, comprising an operative portion 82, and a supplementary portion 84. The dimensions of the operative portion 82 are such that it may be inserted into the slot, and under rest conditions would project diametrically from the slot
20 78, as is shown in Figure 4. However when a spool 8 is mounted on the boss 16, the sides of the operative portion 82 on movement of the insert member into its operative position engage the interior circumferential surface of the spool 8, causing the portion 82 to be resiliently deformed as is shown in Figure 6. Such resilient deformation of the portion 82 serves to maintain
25 frictional contact between the insert member and the spool 8 through the slot 78, to prevent rotation of the spool under forces normally occurring during transit, and to retain the insert member 84 in its inserted position.

 As is shown in Figures 4 and 5, the operative portion 82 and the supplementary portion 84 may be generally co-planar, but preferably, as is
30 shown in Figures 3 and 7, the supplementary portion 84 is adapted to lie generally flat against the outer surface of the casing, so as not to interfere in normal packaging. Preferably the supplementary portion bears a legend, such as "remove before use", to alert a user of the cassette to the need to remove the insert member prior to mounting in a machine. Thus, a secretary
35 may lift the tab 84, and pull the portion 82 from its inserted position, to free the primary spool for rotation, and the cassette thus for use.

CLAIMS:

1. A ribbon cassette comprising a casing (6), a primary spool (8) in the casing upon which unused ribbon is wound, and a secondary spool (10) in the casing upon which used ribbon is wound, the secondary spool being provided with means (12) to be engaged by a drive member to cause ribbon to be drawn from the primary spool (8) on to the secondary spool (10), wherein the cassette comprises means (20, 21) to resist reverse winding of the primary spool, said means in part at least being located within the spool on which the ribbon is wound.
2. A ribbon cassette according to Claim 1 wherein said means comprises a first toothed element (20) forming part of or fixedly mounted on the spool (10), and a second toothed element (21) rotationally fixed in relation to the spool, the two elements being urged into engagement with one another, with the teeth so arranged so as to permit rotation of the spool in one direction but to subject rotation in the opposite direction to a significantly higher restraint.
3. A ribbon cassette according to Claim 2 wherein spring means (28, 30) is provided to urge the toothed elements into engagement.
4. A ribbon cassette according to Claim 3 wherein the spring means (28, 30) is mounted on the spool (20, 26).
5. A ribbon cassette comprising a casing (6), a primary spool (8) in the casing upon which unused ribbon is wound, and a secondary spool (10) in the casing upon which used ribbon is wound, the secondary spool being provided with means (12) to be engaged by a drive member to cause ribbon to be drawn from the primary spool onto the secondary spool, the cassette comprising a spring element (28, 30, 32) to maintain tension on the ribbon, said spring element being mounted on the primary spool (20, 26).
6. A ribbon cassette according to Claim 5 wherein said spring element (28, 30, 32) affords in part at least means to resist reverse rotation of the primary spool.

7. A ribbon cassette according to Claim 6 wherein said spring element (28, 30, 32) is afforded by the spring means of Claim 3.

5 8. A ribbon cassette comprising a casing (6), a primary spool (8) in the casing upon which unused ribbon is wound, a secondary spool (10) in the casing upon which used ribbon is wound, the secondary spool (10) being provided with means (12) to be engaged by a drive member to cause ribbon to be drawn from the primary spool onto the secondary spool, wherein the casing is provided with a mounting element (16) upon which the primary spool is mounted for rotation, and an insert member (80) which may be inserted into
10 the casing (6) to engage the primary spool (8) to restrain rotation of the spool.

15 9. A ribbon cassette according to Claim 8 wherein the casing is provided with a slot (78) so positioned as to enable the insert member (80) to be engaged within a boss (16) of the casing upon which the spool (8) is mounted, and so as to project a small extent beyond the circumference of the boss, to engage the spool (8).

20 10. A ribbon cassette according to Claim 9 wherein the insert member (80) is resiliently deformable, and is of such a size that such insertion involves deformation thereof, frictional engagement between the insert member (80) and the casing (6) under the action of the resilience of the insert member (80) frictionally restraining rotation of the spool and frictionally retaining the insert member in its inserted position.

25 11. A ribbon cassette according to Claim 8 wherein the insert member (80) comprises an operative portion (82) to perform the restraint to rotation of the spool, and a supplementary portion (84) adapted for manual grasping, which supplementary portion (84) remains exterior of the casing to enable the operative portion to be withdrawn from its inserted position.

30 12. A ribbon cassette according to Claim 11 wherein the operative portion (82) lies in a plane generally at right angles to the plane of the supplementary portion (84).

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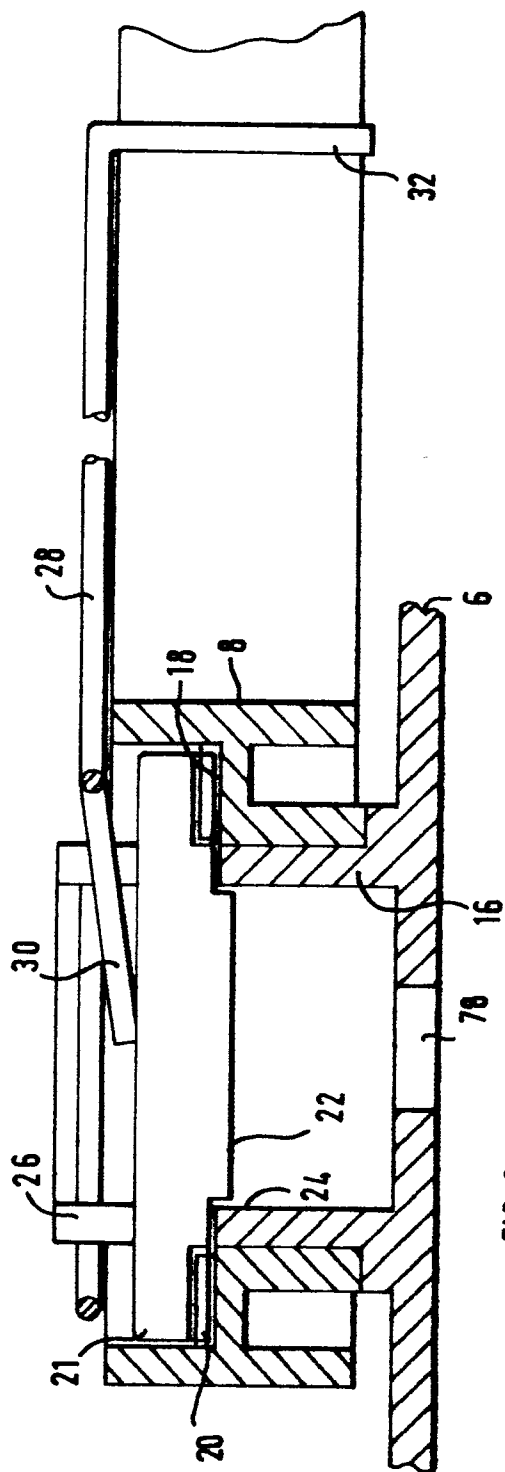


FIG 2

FIG 3

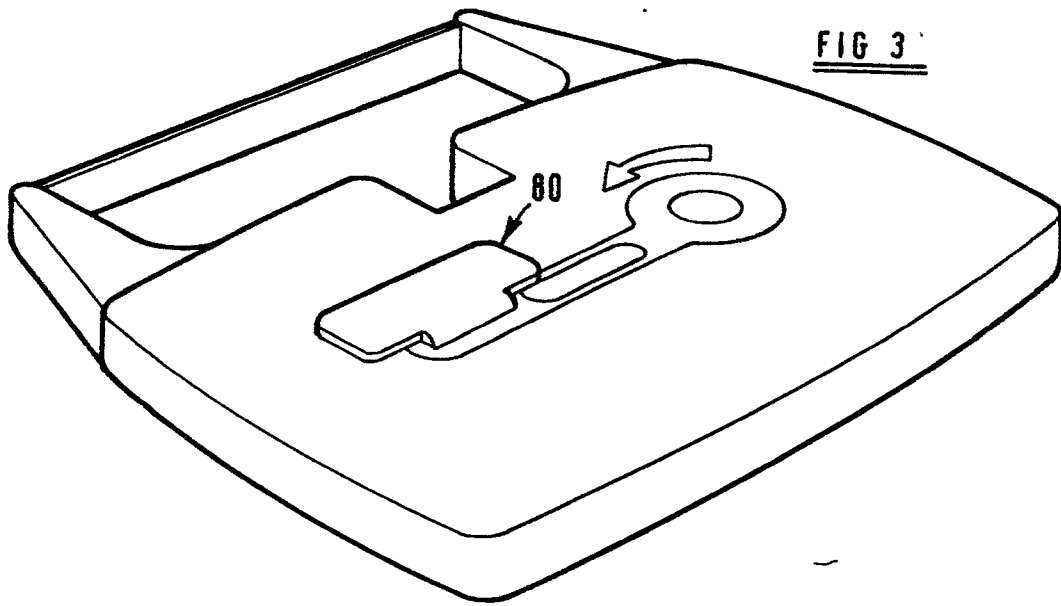


FIG 4

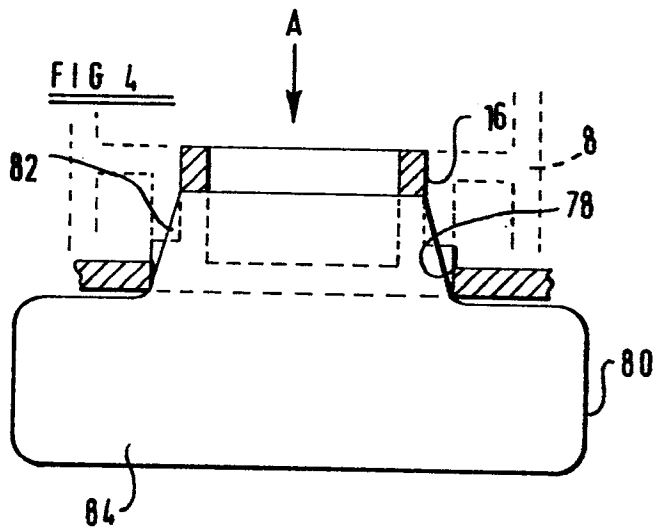


FIG 5

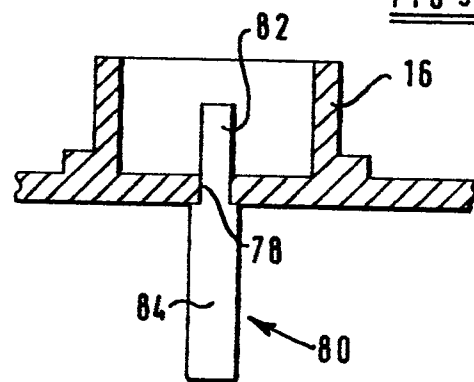


FIG 6

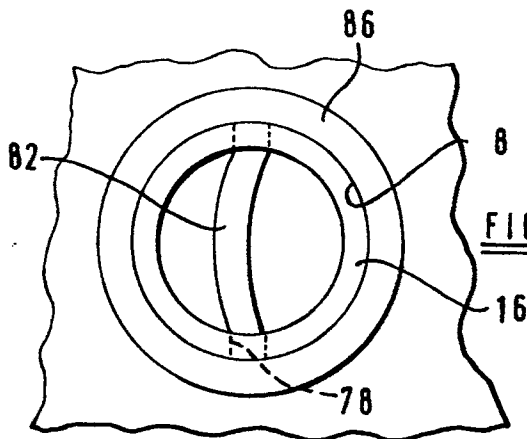


FIG 7

