

# PATENT SPECIFICATION

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## (54) IMPROVEMENTS IN OR RELATING TO A RIBBON CASSETTE FOR A PRINTING MACHINE

- (71) We, TRIUMPH WERKE NÜRNBERG AKTIENGESELLSCHAFT, a German corporate body of Fürther Strasse 212, 8500 Nürnberg, Federal Republic of Germany, 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:—
- 10 The present invention relates to improvements in or relating to ribbon cassettes for printing machines. The invention is particularly, but not exclusively, applicable to endless ribbon cassettes.
- 15 Inking ribbon cassettes of this kind are known for use with a variety of printer mechanisms and have generally proved themselves to be satisfactory. However, as printer units of this kind are often employed in data stations which operate largely automatically, in some cases during the night without any supervision, failure of the inking ribbon feed can occur unobserved. This can happen, for example, if the inking ribbon breaks or if some other kind of damage is sustained by the ribbon feed mechanism in the cassette. The information to be printed out is then lost although the printer unit continues to print.
- 30 It is therefore an object of the present invention to overcome or substantially reduce this drawback.
- The invention, the scope of which is defined in the appended claims, provides a ribbon cassette for a printing machine, said cassette including a rotatable member arranged to be driven by feed movement of the ribbon of the cassette, which rotatable member forms part of a shut down system for the machine which system includes means for detecting rotation of the rotatable member and operable for activating a shut down switch of the machine when feed movement of ribbon ceases or falls below a predetermined rate.

Preferably the ribbon cassette is arranged such that rotation of the rotatable member causes rotation of means adapted to be sensed by a sensing head of the shut down system for generating electrical pulses in relation to the rate of feed movement of the ribbon, and there may also be provided a rotatable part rotatable with rotatable member and provided with said means adapted to be sensed by the sensing head of the shut down system.

In the described embodiment the rotatable member is provided with means extending through the cassette casing for driving the rotatable part, which part is mounted on the machine.

The invention also includes a printing machine provided with a ribbon cassette as defined in any of the three preceding paragraphs, wherein the rotatable member of the cassette forms a part of a shut down system for the machine, which shut down system includes means for detecting rotation of the rotatable member and is operable for activating a shut down switch of the machine when feed movement of ribbon ceases or falls below a predetermined rate.

In order that the invention may be well understood an embodiment thereof will now be described, by way of example only, with reference to the accompanying drawing, which shows a view in perspective and partially cut away of a ribbon cassette and parts of a shut down system for a printing machine.

The drawing shows a ribbon cassette 1 for a printing machine. The ribbon cassette has an endless loop inking ribbon 2 which is folded in chamber 3 formed within the cassette casing. The ribbon 2 is fed from the chamber 3 through an upright slot 21 in a wall 22 thereof between a pair of rollers 5 and 6, through a guide 23, across a gap 24 and into another guide 25. The ribbon is then fed round post 26 between drive means 90

such as driven rollers 4 and back into the chamber 3. The feed rollers 4 are driven in known manner by a suitable mechanism not shown to draw the ribbon 2 from the chamber 3 and feed it across the gap 24 and back into the chamber 3.

The roller 6 is rotatably mounted on an arm 8 pivotally fixed by pin 7 to the cassette casing, the arm 8 being biased towards the ribbon 2 under the action of spring 9. In order to improve the drive provided by the rollers 5, 6 one of the rollers can be provided with drive teeth or spikes 10. In this case, the mating roller preferably is provided with an elastic or resilient surface 11 at least in the region opposite the teeth.

In the illustrated example, a shut down system for the printing machine comprises a rotatable member formed by the roller 5 which is rotatably assembled in the cassette 1 and has an extension 12 which carries a driver 13, and a rotatable part in the form of a disc 16 mounted on the printing machine and provided with a hub 15 having a cross slot 14 engaged by the driver 13. The disc 16 is provided with slots 17 and is assembled in a housing 18 including a sensing head, i.e. a luminescent diode 19 at the top of the housing and a phototransistor 20 arranged opposite thereto, the disc 16 rotating therebetween. The rotatable part 16 together with the sensing head 19, 20 is adapted to generate electrical pulses in relation to the rate of feed movement of the ribbon 2 through the cassette.

In operation, the disc 16 with its slots 17 is rotated by the feed movement of the inking ribbon 2 and the rollers 5 and 6. In so doing, light pulses are produced in association with the luminescent diode 19 and these are picked up by the phototransistor 20. The latter relays the resulting electrical pulses to a monitoring device which is a computer in whose programme the pulse interval is determined by time measurement, and in the event that the predetermined value is undershot, the printer is switched off by means of a shut down switch. This makes it possible to reliably prevent the printer to which the cassette is fitted from continuing to operate if the inking ribbon feed system is not operating normally. Amongst other things, this avoids mechanical failures in the printer.

The cassette and shut down system can advantageously be applied to printers of various kinds. It is immaterial, for example, whether the printer is designed as a needle printer, thermal printer head, type disc printer or printer with a prismatic printer head.

Whilst the described shut down system utilises a slotted disc 16 with luminescent diode 19 and phototransistor 20 as the sensing head it is contemplated that the disc 16

could be provided with one or more permanent magnets, the sensing head then comprising a Hall effect generator.

It will be appreciated that numerous different forms of shut down systems may be fitted to the printing machine which are operable to activate a shut down switch in the event that the ribbon breaks or is no longer fed through the cassette at a satisfactory rate, for instance, the detector means may be located inside the cassette casing.

#### WHAT WE CLAIM IS:

1. A ribbon cassette for a printing machine, said cassette including a rotatable member arranged to be driven by feed movement of the ribbon of the cassette, which rotatable member forms part of a shut down system for the machine which system includes means for detecting rotation of the rotatable member and is operable for activating a shut down switch of the machine when feed movement of ribbon ceases or falls below a predetermined rate.

2. A ribbon cassette as claimed in claim 1, wherein the ribbon thereof forms an endless loop.

3. A ribbon cassette as claimed in claim 1 or 2, wherein the rotatable member comprises a roller which is engaged by the ribbon so as to be rotated on feed movement thereof.

5. A ribbon cassette as claimed in claim 3, or 4 wherein the or one of the rollers is spring biased towards the ribbon in use.

4. A ribbon cassette as claimed in claim 3, wherein a further roller is provided, one of the rollers being provided with a series of teeth around its periphery, the other roller having a resilient surface at least in the region opposite said teeth.

6. A ribbon cassette as claimed in any one of the preceding claims, wherein rotation of the rotatable member is arranged to cause rotation of means adapted to be sensed by a sensing head of the shut down system for generating electrical pulses in relation to the rate of feed movement of the ribbon.

7. A ribbon cassette as claimed in claim 6, wherein the rotatable member is rotatable with a rotatable part of the shut down system and such part is provided with said means adapted to be sensed by the sensing head of the shut down system.

8. A ribbon cassette as claimed in claim 7, wherein said rotatable member is provided with means extending through the cassette casing for driving the rotatable part, which part is mounted on the machine.

9. A printing machine provided with a ribbon cassette as claimed in any one of the preceding claims, wherein the rotatable member of the cassette forms a part of a shut down system for the machine, which

- shut down system includes means for detecting rotation of the rotatable member and which is operable for activating a shut down switch of the machine when feed movement of ribbon ceases or falls below a predetermined rate.
10. A printing machine as claimed in claim 9, wherein the ribbon cassette is as claimed in claim 6, 7 or 8, and wherein the means adapted to be sensed by a sensing head of the shut down system comprises at least one slot.
11. A printing machine as claimed in claim 10, wherein the sensing head comprises a light emitter and a light receiver located one on each side of the path of the or each slot.
12. A printing machine as claimed in claim 11, wherein the light emitter is a luminescent diode.
13. A printing machine as claimed in claim 11 or 12, wherein the light receiver is a phototransistor.
14. A printing machine as claimed in claim 9, wherein the ribbon cassette is as claimed in claim 6, 7 or 8, and wherein the means adapted to be sensed by the sensing head of the shut down system comprises one or more permanent magnets.
15. A printing machine as claimed in claim 4, wherein the sensing head comprises a Hall effect generator.
16. A printing machine as claimed in any one of claims 9 to 15, wherein the ribbon cassette is as claimed in claim 6, 7 or 8, further comprising a monitoring device by means of which the electrical pulses generated in use, may be compared with an acceptable predetermined pattern of pulses.
17. A ribbon cassette substantially as herein described with reference to the accompanying drawing.

A. A. THORNTON & CO.  
Chartered Patent Agents  
Northumberland House  
303/306 High Holborn  
London, W.C.1.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*

