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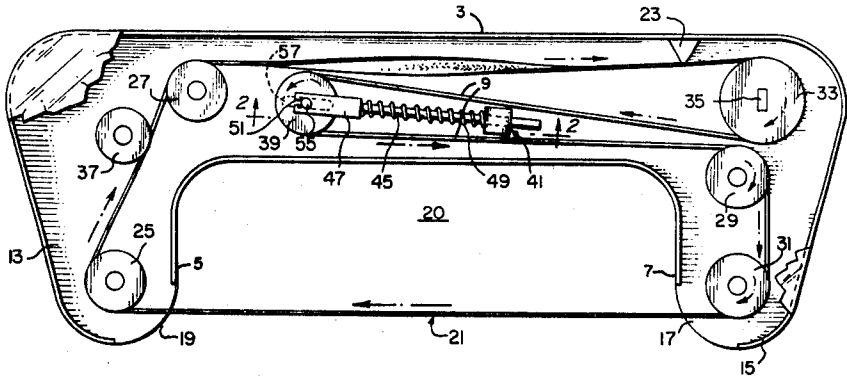
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[54] **RIBBON CARTRIDGE WITH MOBIUS LOOP IN RIBBON**
3 Claims, 3 Drawing Figs.
[52] U.S. Cl..... **197/151,**
197/168, 197/172, 101/336
[51] Int. Cl..... **B41j 33/14**
[50] Field of Search..... **197/151,**
168, 172; 101/336

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ABSTRACT: This invention relates to an inking ribbon cartridge for a typing or printing device comprising a case having a flat base and an inked ribbon in the form of an endless belt mounted therein for transport about several parallel aligned rollers. The inking ribbon has a half twist forming a Mobius loop configuration which thereby doubles its effective length. Ink deposits on the ribbon may be replenished by means of an ink pad mounted in contact with the ink ribbon. The ribbon is moved by means of a drive roller which has power coupled to it from the typing or printing machine.



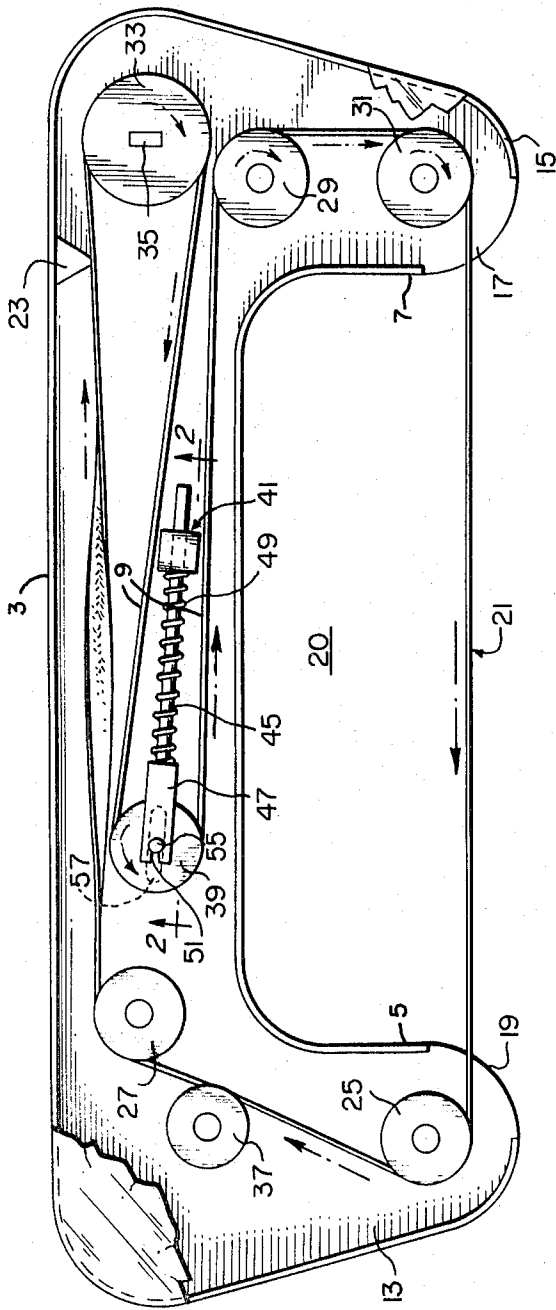


FIG. 1

FIG. 1a

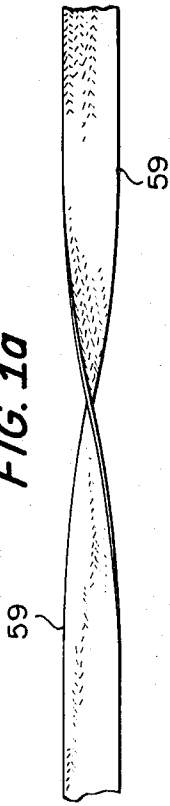
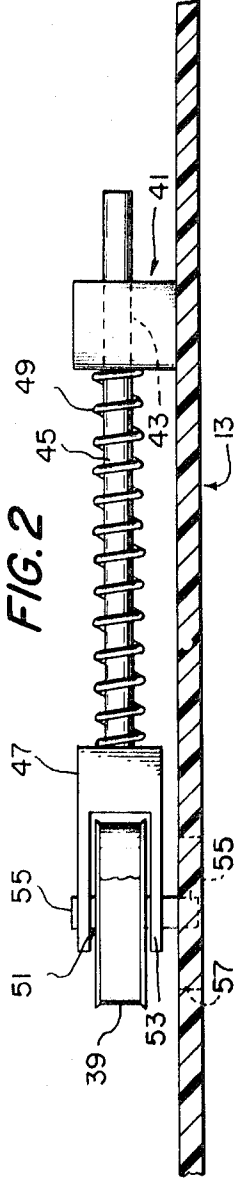


FIG. 2



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RIBBON CARTRIDGE WITH MOBIUS LOOP IN RIBBON

BACKGROUND OF THE INVENTION

In the past, worn out ink ribbons were replaced by hand in a process that was often dirty and always time consuming. Because of this, a need was appreciated for a faster and more convenient way of changing ink ribbons. Therefore, endless belt ink ribbons were mounted in cartridges which were then attached to a typing machine. This reduced the time required to change ribbons and furthermore insured a clean, simplified, changing process. Since these ink ribbon cartridges had to be changed often when in heavy use, a means was provided for continuously depositing a layer of ink on the ribbon after it had moved past the hammer strike area of the typing machine. This allowed the ribbon to be used many times until the ribbon fabric wore out. However, because of the constant use of typewriters and other printing devices today, there is a need for an even longer lasting and more efficient ink ribbon that will reduce the frequency with which ink ribbon cartridges have to be replaced.

Therefore, an object of this invention is to increase the relative lifetime of an inking ribbon by a simple and economic means.

Another object is to provide a more efficient and longer lasting inking ribbon for utilization in a cartridge for attachment to a typing or printing machine.

SHORT STATEMENT OF THE INVENTION

In carrying out the objects of the invention, a ribbon cartridge was improved by placing a half twist in the ribbon between two parallel aligned rollers to form an endless belt Mobius loop configuration. The effective area of utility on the ribbon surface is thereby doubled and consequently, for a given length of ink ribbon, the amount of wear per unit of time is halved.

The objects, advantages, and features of the invention will become more fully apparent from the following specification, including appended claims, and accompanying drawing in which:

FIG. 1 is an illustration of applicant's re-inking cartridge, including a ribbon with a Mobius loop;

FIG. 1a is a magnified view of the half twist in the ribbon of FIG. 1;

FIG. 2 is a sectional view of the tension roller construction taken along line 2-2 of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, applicant's ribbon cartridge includes a housing, preferably of plastic material, having a flat base portion 13 and an upwardly extending sidewall 15. The shape of the housing is such that it has an elongated middle portion 3 with two substantially parallel end portions 5 and 7 protruding therefrom substantially perpendicular to the middle portion and integral therewith. Opposing slits 17 and 19 are formed in sidewall 15 at the end portions 5 and 7 of the housing for permitting an ink ribbon 21 to pass outside the cartridge, through a printing area 20, and back into the cartridge housing along a single longitudinal axis, thereby obviating the need for any ribbon transport rollers outside the cartridge.

A plurality of transport rollers 25, 27, 29 and 31 which may be of plastic material, are rotatably mounted on base 13 for spacing and transporting ink ribbon 21 in a path parallel to base 13. Each roller is mounted with its rotational axis perpendicular to base 13. A drive roller 33 having a keyed slot 35 therethrough is mounted over an aperture (not shown) in the cartridge base 13. A male interposer (not shown) is inserted through the base aperture and engages the keyed slot 35 in the drive roller 33. The interposer conveys rotating motion from a power source (not shown) in a typing or other printing machine to the drive roller 33 for moving ink ribbon 21.

An inking pad 37 is rotatably mounted in the cartridge with

its axis of rotation perpendicular to base 13, as known in the art. As ink ribbon 21 moves past and in tangential contact with the pad 37, a layer of ink is deposited on the ink ribbon 21. Any excess ink deposited on the ribbon 21 is scraped away, as ribbon 21 moves past and in contact with wedge 23, which may be integral with the plastic housing.

A tension roller 39 is provided in a known manner, to insure that ink ribbon 21 is always maintained in proper tension as it wears, or changes length because of changes in environmental conditions. Referring to FIG. 2, a support block 41 with a horizontal hole 43 therethrough is rigidly attached to base 13. A rod 45 is slidably inserted through hole 43 at one end and connected to a bifurcated mount 47 at the other end. A helical compression spring 49 mounted around rod 45 biases mount 47 away from support block 41. Bifurcated mount 47 has slots 51 and 53 in each arm for receiving the axial portions 55 of tension roller 39 which is biased into the closed end of an elongated bight 9. The bottom portion of axle 55 extends through an oblong slot 57 in base 13 for maintaining tension roller 39 at a constant angular disposition with respect to support block 41.

In order to double the utilizable area of ribbon 21 and thereby increase its life, ribbon 21 is formed with a half twist thereby establishing a topological configuration in the ribbon 21 which is usually designated as a Mobius loop. In the illustrated embodiment a span of ribbon 21 containing the half twist is supported across at least half the width of the cartridge between transport roller 27 and drive roller 33, and the axis about which the twist is generated extends between rollers 27 and 33 and parallel to base 13. Thus, as shown in FIG. 1a, a point 59 on the top edge of ribbon 21 at roller 27 spirals to the bottom edge at roller 33. By tracing the path of point 59 about the rollers, 25, 27, 33, 39, 29 and 31 it can be seen that a point such as 59 will return to its original position after having been transported twice through the printing area 20. Consequently, a given surface area of the ribbon 21 is struck by a print hammer (not shown) only once every two cycles rather than once every cycle. Thus, for a given length of ribbon 21, the amount of wear per unit of time is halved.

The Mobius loop configuration on applicant's inking ribbon 21 is greatly simplified over the prior art which required the ribbon to be transported out of a path parallel to the cartridge base 13. With applicant's Mobius loop configuration, the endless inking ribbon 21 can be readily mounted in a flat cartridge of minimum height. The amount of room required for the inking cartridge in the printing device is reduced, and the cartridge itself can be more economically produced.

What is claimed is:

1. In an inking ribbon cartridge for a printing device, said cartridge having a flat base, the improvement comprising:
 - a plurality of rollers each rotatably mounted in said cartridge and each having a rotational axis perpendicular to the base of said cartridge and
 - an endless belt inking ribbon supported by said rollers entirely within a plane parallel to said base, a pair of said rollers being positioned for supporting a span of said ribbon across at least half the width of said cartridge, said span of ribbon containing a half twist to form a Mobius loop in said ribbon.
2. The inking ribbon cartridge improvement of claim 1 wherein said ribbon contains an elongated bight substantially parallel to said span, and wherein one of said rollers is biased into the closed end of said bight for tensioning said ribbon.
3. The inking ribbon cartridge improvement of claim 1 wherein said cartridge includes a sidewall defining an elongated middle portion and two substantially parallel end portions protruding from said middle portion substantially perpendicular to, and integral with, the middle portion, said sidewall having two opposed slits for passage of said ribbon through a printing area, one of said slits being located near the tip of each of said end portions, and said rollers being entirely surrounded by said sidewall.

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