

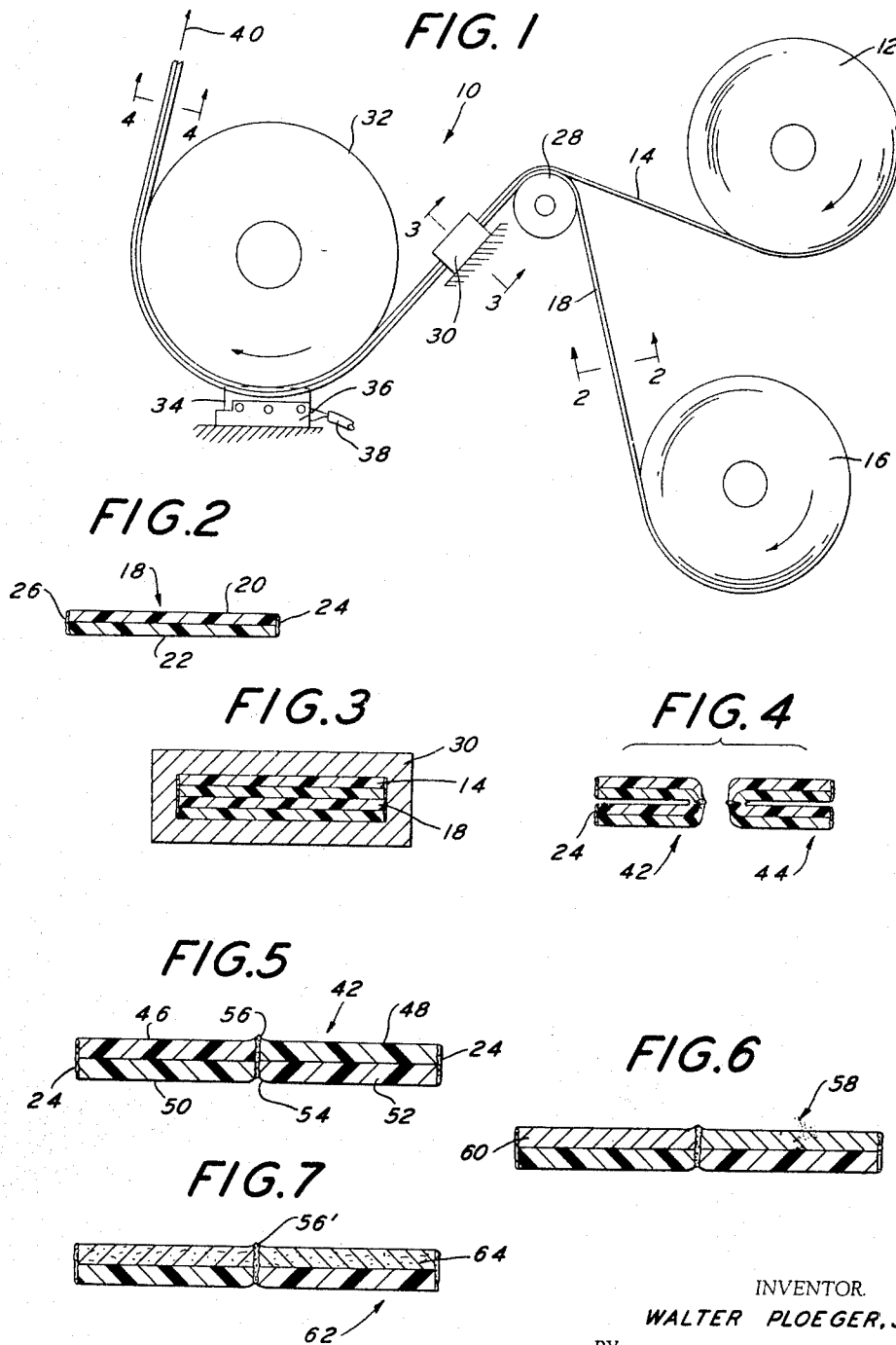
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METHOD OF MAKING PRINTING RIBBON

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METHOD OF MAKING PRINTING RIBBON

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9 Claims. (Cl. 156—251)

This invention relates to a novel printing ribbon and a method of making the same.

The application is a division of my copending application Serial Number 187,736 filed April 16, 1962, now abandoned.

In my prior Patent No. 3,010,559 there is disclosed a printing ribbon which is based on a principle which results in a printing ribbon structurally interrelated in a manner resulting in numerous advantages with respect to the printing ribbons proposed theretofore. The present invention is directed to a printing ribbon which is an improvement over the ribbon disclosed in the above-mentioned patent and a method for making the improvement ribbon. The printing ribbon disclosed in my above-mentioned patent has performed excellently and is being utilized in a wide variety of printing equipment. The present invention results in a printing ribbon which has an even greater field of use.

The printing ribbon of the present invention includes a foolproof dividing line extending along the length thereof between and parallel to the side edges thereof. One face of the ribbon is an impervious flexible plastic material which is heat-sealable and inert to ink. The other face of the ribbon includes a portion on one side of the dividing line which is capable of bearing a printing ink. The portion of the ribbon on the opposite side of the dividing line from said last-mentioned portion may be an ink bearing member, carbon paper, type correcting material, or type obscuring material, etc. The dividing line is a solid homogeneous ink impervious weld which prevents transmission of ink across the dividing line by way of osmosis along the fibers of the ink bearing portions of the ribbon.

Heretofore, a multicolor ribbon capable of causing characters to be imprinted in two different colors, such as red and black, were manufactured by using inks which repelled each other. In other words, the inks utilized heretofore in a multicolor ribbon were inks which would not run together. The foolproof dividing line of the ribbon of the present invention enables ordinary inks which normally run together to be utilized. The dividing line of the ribbon of the present invention also enables a multilith ink to be utilized on one portion of the ribbon and a conventional printing ink on another portion of the ribbon.

The ribbon of the present invention may have the layers secured together only along the side edges by a weld as per the ribbon disclosed in my above-mentioned patent. A ribbon constructed in this manner provides an ink reservoir which materially increases the life of the ribbon. Where ink capacity is not important, the layers may be secured together across their full face in addition to the foolproof dividing line. Alternatively, the side edges of the two layers may be adhesively secured together along their extreme side edges where ink capacity and long life are not of great importance.

It is an object of the present invention to provide a novel method of making a printing ribbon.

It is another object of the present invention to provide a novel method for making a laminated printing ribbon.

It is yet another object of the present invention to provide a novel method for manufacturing a ribbon adapted to be utilized in office machinery.

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It is still another object of the present invention to provide a novel method for manufacturing two printing ribbons at the same time.

It is a still further object of the present invention to provide a novel method for making a laminated printing ribbon which facilitates inking of the layers of the ribbon prior to lamination thereof or after lamination thereof.

Other objects will appear hereinafter.

For the purpose of illustrating the invention there is shown in the drawings forms which are presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

FIGURE 1 is a schematic illustration of the apparatus for making the ribbon of the present invention.

FIGURE 2 is a sectional view taken along line 2—2 in FIGURE 1.

FIGURE 3 is a sectional view taken along line 3—3 in FIGURE 1.

FIGURE 4 is a sectional view taken along line 4—4 in FIGURE 1.

FIGURE 5 is a sectional view of a completed ribbon of one embodiment of the present invention.

FIGURE 6 is a cross-sectional view of a completed ribbon in accordance with another embodiment of the present invention.

FIGURE 7 is a cross-sectional view of a completed ribbon in accordance with a further embodiment of the present invention.

Referring to the drawings in detail, wherein like numerals indicate like elements, there is shown in FIGURE 1 a schematic illustration of apparatus designated generally as 10. The apparatus 10 includes a roll 12 which is rotatably supported for movement in the direction of the arrow thereon. The roll 12 contains a laminated ribbon 14 having a width corresponding to the width of the end product as will be made clear hereinafter. A second roll 16 is rotatably supported adjacent the roll 12 for rotation in the direction of the arrow thereon. The roll 16 contains a laminated ribbon 18 having a width corresponding to the width of the end product as will be made clear hereinafter.

Each of the ribbons 14 and 18 are identical. Accordingly, only the ribbon 18 will be described in detail and corresponding primed numerals will be applied to the ribbon 14 where applicable. As shown more clearly in FIGURE 2, the laminated ribbon 18 includes a layer of plastic material 20 having a thickness of approximately one-thousandth of an inch. The layer 20 is an impervious flexible plastic material capable of being heat sealed, is abrasion resistant, and is chemically inert to inks. The preferred embodiment of the present invention includes the making of the layer 20 from nylon. However, mylar or polyethylene may be utilized.

The layer 20 is juxtaposed to and secured to a layer 22. The layer 22 is indicated in FIGURE 2 as being secured to the layer 20 along the extreme side edges by welded joints 24 and 26. The provision of welded joints 24 and 26 only along the side edges provides space for a reservoir of ink between the layers 20 and 22 as per the ribbon in my above-mentioned patent. Where ink capacity is not important, the layers 20 and 22 may be adhesively secured to each other across the full width and length thereof.

The ribbons 14 and 18 are fed in overlapping relation around the guide roller 28 and through an alignment guide 30. The alignment guide 30 is fixedly supported in a position whereby the ribbons 14 and 18 may be fed there-through. The guide 30 assures that the side edges of the ribbons 14 and 18 are in alignment with one another. The ribbons 14 and 18 are fed through the guide 30 with the layer 20 of each ribbon juxtaposed to each other.

In other words, the layer of impervious plastic material on the ribbons 14 and 18 are juxtaposed to each other when fed through the guide 30. This relationship is critical since I have determined that the desirable results of the present invention cannot be obtained unless this relationship exists.

A back up roller 32 is rotatably supported in any convenient location. The back up roller is provided with a recess on its periphery in a conventional manner. A knife blade 34 is supported by a support block 36 and is connected to a source of electrical potential by electrical cable 38. The edge of the knife blade 34 is adapted to extend into the recess on the back up roller 32. The superimposed laminated ribbons 14 and 18 are fed between the back up roller 32 and the knife blade 34. The hot knife blade 34 slits the superimposed laminated ribbons 14 and 18 and simultaneously forms a welded joint as will be made clear hereinafter.

Thereafter, the ribbons are fed upwardly in a direction of arrow 40. As shown more clearly in FIGURE 4, the ribbons 14 and 18 have been separated into ribbons 42 and 44. The ribbons 42 and 44 are U-shaped at this point. The ribbons are then fed to a wind-up roll (not shown). Before being wound on the wind-up roll, the ribbons will be fed through a guide means which will flatten each ribbon to the disposition illustrated in FIGURE 5. Each of the ribbons 42 and 44 are identical. Accordingly, only ribbon 42 will be described in detail.

As shown more clearly in FIGURE 5, ribbon 42 includes a first layer and a second layer. The first layer has a portion 46 and a portion 48. The portion 46 was formerly a part of layer 22 on ribbon 14 and portion 48 was formerly a part of layer 22 on ribbon 18.

The second layer of ribbon 42 is juxtaposed to the first layer thereof. The second layer includes portions 50 and 52. Portion 50 was formerly a part of layer 20 on ribbon 14 and portion 52 was formerly a part of layer 20 on ribbon 18. The ribbon 42 is provided with a weld 54 extending the full length thereof substantially parallel to and spaced from the side edges of the ribbon. The weld 54 was formed by the hot knife 34 when the superimposed laminated ribbons were slit thereby. The weld 54 is provided with a readily distinguishable sharp ridge 56.

The weld 54 and the ridge 56 are a zone of impervious plastic material formed during the weldment and consists of the material of the layers 20 on each of the ribbons 14 and 18. If the layers 20 on the ribbons 14 and 18 were not juxtaposed to one another prior to the slitting operation, the weld 54 would not extend through the entire thickness of the ribbon 42 and the ridge 56 would not be provided. The ridge 56 and weld 54 are an ink impervious zone which prevents ink or other liquids from traveling across the weld from portion 46 to portion 48 by osmosis through the thread fibers.

In FIGURE 6, there is disclosed another embodiment of the present invention designated generally as 58. The ribbon 58 is identical with the ribbon 42 except as will be made clear hereinafter. In ribbon 58, the portion 60, which corresponds with the portion 48, may be carbon paper. Hence, it will be noted that the original ribbons 14 and 18 from which the ribbon 58 was made were not identical. One of the ribbons would be identical with ribbon 14 while the other ribbon would be a laminate of carbon paper and a layer of plastic material corresponding to layer 20. Otherwise, the ribbon 58 is made in the identical manner described above.

In FIGURE 7, there is disclosed another embodiment of the present invention designated generally as 62. The ribbon 62 is identical with ribbon 42 except that portion 64, corresponding to portion 48, is made from a layer of material sold commercially under the name Ko-Rec-Type. Ko-Rec-Type is a correction sheet which corrects mistakes made on a typewriter without removing the copy from the typewriter. In order to accomplish this desirable result, the correction sheet has a white powder impregnated

thereon which covers the typewritten letters in a well known manner.

Heretofore, it has been impossible to utilize the Ko-Rec-Type in a strip form such as a typewriter ribbon because the powder surface of the Ko-Rec-Type would erase or smear previously typewritten letters. Smearing or erasing is precluded by the ridge 56' on ribbon 62. The ridge 56' maintains the portion 64 spaced from the paper a sufficient distance so as to prevent smearing or erasing except when desired.

The ink bearing portions of the ribbons of the present invention may be inked prior to being unwound from the rolls 12 and 16. This is the preferred embodiment. Alternatively, the ink bearing portions of the ribbons 42, 58 and 62 could be inked subsequent to the manufacture thereof by the slitting operation. The knife blade 34 is preferably reciprocally mounted on the support block 36 so that the knife blade 34 may be reciprocated with respect to the roller 32. In this manner the location of the weld 54 may be varied so as to produce ribbons of diverse widths. When the ink bearing portions, such as portions 46 and 48 of ribbon 42, are made from a woven nylon material, the nylon material thereof is blended into the weld 54 and forms a part thereof. No difficulties were encountered in providing the weld 54 and ridge 56' when one of the portions of the first layer of the ribbons was a paper material such as in ribbons 58 and 62.

I have found that a true weld such as weld 54 cannot be obtained merely by superimposing two layers of material and causing the same to be passed beneath a heated pressure roller. The last-mentioned roller merely embosses the two layers and joins the same with a joint. However, such joint is not a true weld which is capable of preventing osmosis of the ink from one side of the ribbon to another across the weld through fibers disposed in a central plane of the ribbon. Also, the utilization of a hot pressure roller does not result in a thin hairline weld having a ridge thereon as illustrated in the drawings.

The woven fabric portions adapted to bear ink may be nylon, dacron, silk, etc. The ink bearing portions may have different color inks of the same type or may have completely different inks which heretofore could not possibly be utilized in a multicolored ribbon. The ribbons of the present invention may have conventional ink on one portion and lithographic ink on another portion. The lithographic ink may be of the same color as the conventional printing ink on the other portion of the ribbon. In this manner, it will be possible to accentuate a word in a sentence by typing that word only on the lithographic portion of the ribbon. It will be obvious that the ability of the ribbon of the present invention to utilize two different inks which are normally capable of being mixed will materially reduce the cost of a multicolor ribbon.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification as indicating the scope of the invention.

I claim:

1. A method of making a laminated printing ribbon comprising the steps of overlapping first and second laminated ribbons each of which has a layer of impervious flexible plastic material which is heat sealable and inert with respect to ink, said overlapping step being accomplished in a manner so that the layers of impervious flexible plastic material of each ribbon are overlying one another in direct abutting contact and extending in the same direction, then heat sealing an ink impervious weld through each layer of each ribbon substantially parallel to and spaced from side edges of each ribbon, cutting the ribbons along the weld to provide third and fourth ribbons with each of the third and fourth ribbons containing a part of the first and second laminated ribbons and then flattening said third and fourth ribbons so that the third and fourth ribbons are substantially planar.

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2. A method in accordance with claim 1 including the step of aligning the side edges of said first ribbon with respect to the side edges of said second ribbon, said aligning step being accomplished prior to the step of providing an ink impervious weld.

3. A method in accordance with claim 1 wherein said step of providing a weld and said step of cutting the ribbons are accomplished simultaneously by moving the ribbons relative to a heated cutting tool.

4. A method in accordance with claim 1 including the step of inking at least one of said first and second ribbons prior to said step of overlapping said first and second ribbons.

5. A method in accordance with claim 4 including the step of inking each of said first and second ribbons with different non-repelling inks prior to the step of overlapping said first and second ribbons.

6. A method in accordance with claim 1 wherein one layer of said first laminated ribbon is a layer of paper material.

7. A method in accordance with claim 6 wherein said paper material has a material associated therewith capable of obscuring type of a typewritten page.

8. A method in accordance with claim 1 wherein said first and second layers are of the same width, and aligning the side edges of said first and second ribbons prior to said step of providing a weld.

9. In a method of making printing ribbon comprising

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unwinding a first strip of impervious polymeric plastic material from a roll, unwinding a second strip of material capable of transmitting an impression from a roll, aligning said first and second strips so that the side edges of said strips are substantially parallel and said strips are in juxtaposed abutting relationship, unwinding a third strip of polymeric plastic material from a roll, unwinding a fourth strip of woven nylon fabric from a roll, aligning said third and fourth strips so that the side edges of said strips are substantially parallel, juxtaposing said first strip against said third strip, said juxtaposing step being accomplished in a manner so that said first strip is in direct abutting contact with the third strip, cutting the strips with a heated tool and simultaneously welding a cut edge of said polymeric plastic materials to the cut edges of each of said second and fourth strips, said cutting step being accomplished by simultaneously moving said strips relative to said tool in a direction substantially parallel to the side edges of said strips, and inking said woven nylon fabric.

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