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METHOD OF MAKING TYPEWRITER RIBBONS

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Fig.1.

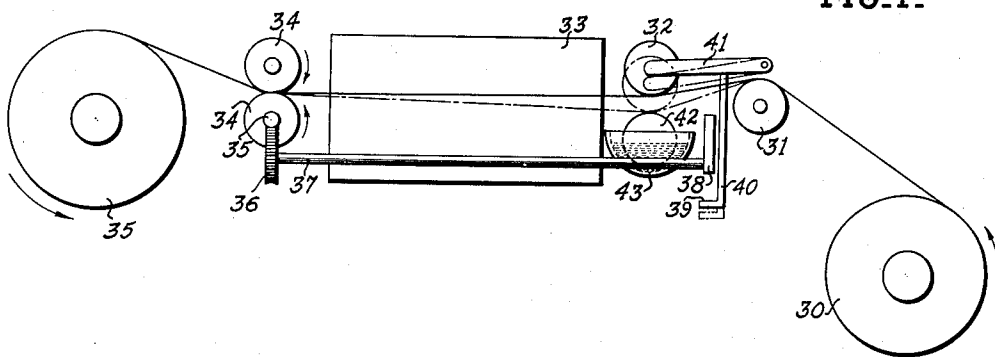


Fig.2.

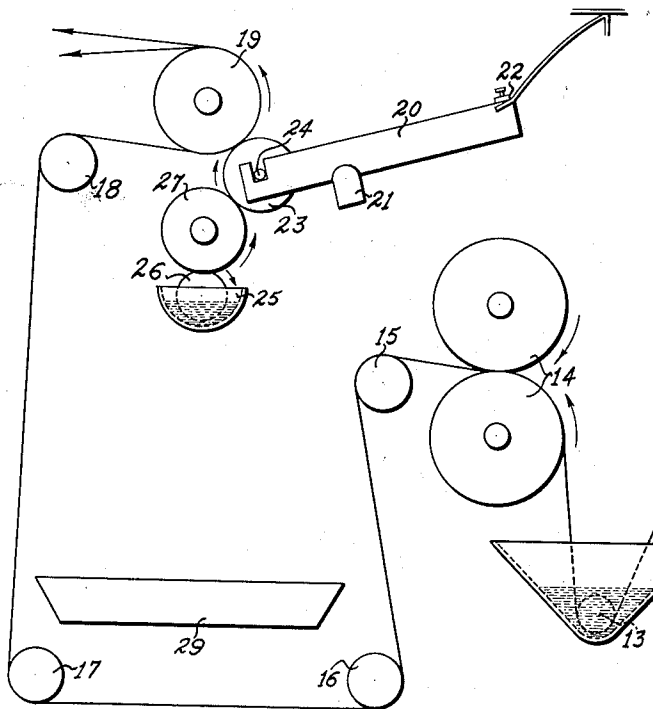
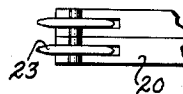


Fig.3.



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## UNITED STATES PATENT OFFICE

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METHOD OF MAKING TYPEWRITER  
RIBBONS

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meane assignments, to Underwood Elliott Fish-  
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of Delaware

Original application February 28, 1936, Serial No.  
66,239. Divided and this application June 30,  
1936, Serial No. 88,184

8 Claims. (Cl. 91—68)

This invention relates to a method of making typewriter ribbons or ribbons of similar character for use in adding or calculating machines, time and date stamps, and all analogous uses. This application for patent is a division of an applica-  
5 tion filed by me for Typewriter ribbon and method of making same under date of Feb. 28, 1936, Serial No. 66,239.

It is an object of the invention to provide an improved method of making such ribbons where-  
10 in fabric in the form of a wide web may be fed to an ink supply and saturated with ink prior to the formation of separate ribbons therefrom, and the ink-saturated web subsequently cut into a multiplicity of ribbons. This method involves ad-  
15 vantages in the saving of labor and time over the former methods of separately and primarily producing the ribbons from the clean sheet or web and subsequently separately ink-treating each  
20 ribbon. The present method also includes a feature of intermittently treating the clean fabric web as it is fed to render portions of it non-absorbent to the ink so that as the web is subse-  
25 quently fed through the ink bath an ink-repellent area will be provided at equi-spaced points along the web corresponding to the desired lengths of the ribbons to be cut therefrom.

It is a further object of the invention to provide a simple and inexpensive method of sealing  
30 the longitudinal edges of ribbons cut from a web and preferably to effect this sealing by fusing or coalescing the ends of the filler threads of the fabric with the longitudinal or warp threads ad-  
35 jacent the edges. Preferably this is done by the application of a solvent such as acetone, and it has been found advantageous to apply this sol-  
vent simultaneously with the cutting of the web into ribbons.

It has been a problem in this art to produce a  
40 light, thin, flexible ribbon which will insure sharp writing in transfer, which is of suitable strength to withstand the heavy and constantly repeated impacts of the type of a typewriter or other busi-  
45 ness machine; which shall be devoid of lint or other releasable fibrous matter which would clog the types and interfere with the sharpness of future writing and in which the ink is so loaded that its delivery may be only in such amount as  
50 is necessary for proper marking, so as to carry in

reserve a large quantity of the ink suitably re-  
distributed for successive type impacts.

To the end of producing such a ribbon, the present invention contemplates the use of a fabric  
5 base which is in major part, if not entirely, of artificial silk yarns preferably of cellulose acetate, each yarn being made from a plurality of fila-  
ments which may be originally processed in any of the known ways to increase their strength.

The cellulose acetate filaments in the yarn have  
10 no absorbency of consequence with respect to the ink compound, but have high capillary action tending to lead the ink deep into the interstices between the associated filaments and maintain it  
15 there until a type impact forces a part of it against the work sheet. It appears that as a part of the ink is delivered to the work sheet a re-  
distribution of the ink takes place in the ribbon and continuous repeated type impacts on the  
20 same area of the ribbon will deliver suitable quantities of the ink over an extremely long period of time. This is accounted for in part by the fact that the material of the filaments is non-  
25 absorbent and that the slightly viscous ink is not taken into the material of the filament but, on the other hand, travels by capillary action along the filaments of the yarns and transiently locates in  
30 the interstices between the filaments so as to be capable over a long period of time of easy transfer to the work sheet in small but sufficient quantity  
35 on each type impact and general redistribution following any applied pressures. Using a size for the warp and filling yarns of approximately  
50 (denier) and each yarn having a filament count of approximately 10 to 18, sufficient space  
35 is provided between the filaments for the heavy loading of the typewriter-ribbon ink and for the delivery of the same in small amounts under the  
40 impacts of the type. Obviously the ink is loaded to some extent between the individual yarns of the weave, as well as between the associated fila-  
45 ments of the yarns, but it appears that the major portion of the ink is transiently stored between the filaments.

Referring now to the drawing in which is illus-  
trated a preferred series of steps employed in the improved method of manufacture of artificial silk  
ribbons:—

Figure 1 of the drawing is a diagrammatic view 50

showing how an artificial silk web is treated to produce a clean-end ribbon.

Figure 2 is a diagrammatic view showing how an artificial silk web, either with or without the processing illustrated in Figure 1, is loaded with ink and subsequently cut into a multiplicity of ribbons and the longitudinal edges of each ribbon sealed against raveling, and

Figure 3 is a fragmentary view of spaced cutters employed in carrying out the method.

The method steps illustrated by Figure 2 of the drawing will be described first.

At 10 there is indicated a roll of artificial silk fabric of a width, for example, of 18 inches. The leading end of this web is passed over an idler 11, thence downwardly into a container 12 partly filled with the before mentioned non-drying ink or any other suitable dyeing composition or solution. The web end is led around a roller 13 in the container 12 and upwardly to pressure rollers 14 where the compound is forced into the interstices of the fabric and yarns and excess compound is squeezed out of the web. Then the web is led over guide rollers 15, 16, 17 and 18 around a hard steel roller 19 and thence to a wind up roller (not shown). Cutter frames 20 are slidably supported at 21 and spring urged at 22 to force a plurality of spaced circular cutters 23 against the web backed by the steel roller 19. The rollers 23 are loosely journaled in the frame 20 as indicated at 24 and are rotated in the cutting operation in consequence of their contact with the moving web. Below the steel roller 19 a container 25 is supported and carries a loosely mounted roller 26 contacting with a roller 27 which in turn contacts the cutters 23.

The container 25 carries a suitable edge-sealing medium which is transferred by the roller 26 to the intermediate roller 27 which latter is preferably of soft rubber and the sealing medium is in turn transferred to the cutting edges of the cutters 23 and deposited on the longitudinal edges of the ribbons simultaneously with the cutting of the same from the web.

In producing ribbons of the type hereinbefore referred to, acetone, preferably rendered somewhat viscous by the addition of cellulose acetate, is carried in the container 25 and transferred, as described, to the cutters where its action upon the edges of the cut ribbon is to fuse the ends of the short filler threads with one or more of the warp threads at the edges of the ribbon. A drip pan for catching solution from the cutters 23 and the rollers 26 and 27, is indicated at 29.

The web indicated at 10 in Figure 2 may be a clean weave or it may have been treated according to the method steps illustrated by Figure 1 which will now be described.

In that figure, 30 illustrates a roll of artificial silk webbing the end of which is led over a roller 31, under a roller 32, through a drying chamber 33, between feed rolls 34 to a wind-up roll 35. If, for example, it is desired to produce typewriter ribbons having a length of 12 yards, one of the feed rolls 34, in the present case the lower one, is provided with a worm 35 meshing with a worm gear 36 having 36 teeth. The feed or pull rolls 34 in such case have a circumference of exactly 12 inches so that 36 revolutions of these rollers will feed the web 12 yards and at the same time effect one revolution of the worm gear 36 and its shaft 37. The shaft carries a cam 38 adapted to engage a lip 39 on a bar 40 once every rotation of the worm gear 36, and actuate the bar 40 to the position indicated by the dotted lines

in the drawing. The other end of the bar 40 is suitably connected to a pivotally supported frame 41 for the roller 32, and that roller is depressed by the action of the cam to bring the web temporarily into contact with a roller 42 loosely mounted in a container 43. Obviously the cam may be suitably shaped to continue the contact for a desired feed of the web, 8 or 10 inches of contact being considered suitable for the preparation of ordinary typewriter ribbon. With respect to the herein described ribbons of cellulose acetate weave the container 43 carries a suitable solvent such as acetone and for the period of feed, while the roller 32 is depressed to contact the web with the roller 42, the acetone is supplied to the fabric. The treated area of the fabric then passes through the drier 33 which evaporates the solvent prior to the cloth coming in contact with the feed rollers 34. Thereafter the intermittently treated web may be passed through the steps illustrated in Figure 2 and all portions of the web are loaded with the ink except the treated areas of 8 or 10 inches length which occur every 12 yards. These areas are non-absorptive of the ink compound due to the effect of the acetone on the acetate and consequently these areas pass through the apparatus illustrated in Figure 2 without saturation by the ink.

What is claimed is:—

1. The method of making a typewriter ribbon which comprises subjecting a cellulose acetate weave at spaced regions to the action of a solvent such as acetone and subsequently passing the weave through an ink bath.

2. The method of making typewriter ribbons which comprises inking a wide cellulose acetate fabric and subsequently fusing the longitudinal edges of narrow strips of said fabric by the application of a solvent.

3. The method of making typewriter ribbons from a web of artificial silk which consists of treating the web at ribbon lengths with ink repellent material, subsequently feeding the web through a bath of an oil base ink composition to cause the web to be saturated with the composition except where treated with the ink repellent material, and feeding the web to cutters to separate the web into ribbons by lengthwise cuts.

4. The method of making typewriter ribbons from a web of artificial silk which consists of continuously feeding the web and periodically treating it for short lengths with ink repellent material, drying the treated web, subsequently feeding the web through an ink composition and saturating it with ink except where treated, then cutting the web into ribbons lengthwise as it is fed and applying a sealing medium continuously along the edges of the ribbons.

5. The method of making typewriter ribbons from a web composed at least in part of an organic derivative of cellulose, which consists of feeding the web and periodically applying for a short length of feed a solvent for the cellulose derivative, evaporating the solvent, then passing the web through an ink composition to saturate it with the composition except where the solvent was applied, cutting the web in the direction of feed into ribbons, and sealing the inked edges of the ribbons.

6. The method of making typewriter ribbons from a web composed at least in part of an organic derivative of cellulose, which consists of feeding the web and periodically applying, for a

short length of feed, a solvent for the cellulose derivative, evaporating the solvent, then passing the web through an ink composition to saturate it with the composition except where the solvent was applied, cutting the web in the direction of feed into ribbons and sealing the inked edges of the ribbons by the continuous application to the edges of a solvent for the cellulose derivative.

7. The method of making typewriter ribbons of a weave which is at least in part of an artificial silk, which consists of inking the weave and sub-

sequently feeding it and continuously applying a sealing medium to its edges.

8. The method of making typewriter ribbons of a weave which is at least in part of cellulose acetate, which consists of inking the weave, feeding the inked weave to cutters to separate it into ribbons, and continuously applying a cellulose acetate solvent to the cutters for transfer to the edges of the ribbons.

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