

Nov. 10, 1964

W. PLOEGER, JR

3,156,338

ENDLESS LAMINATED PRINTING TAPES

Original Filed March 24, 1960

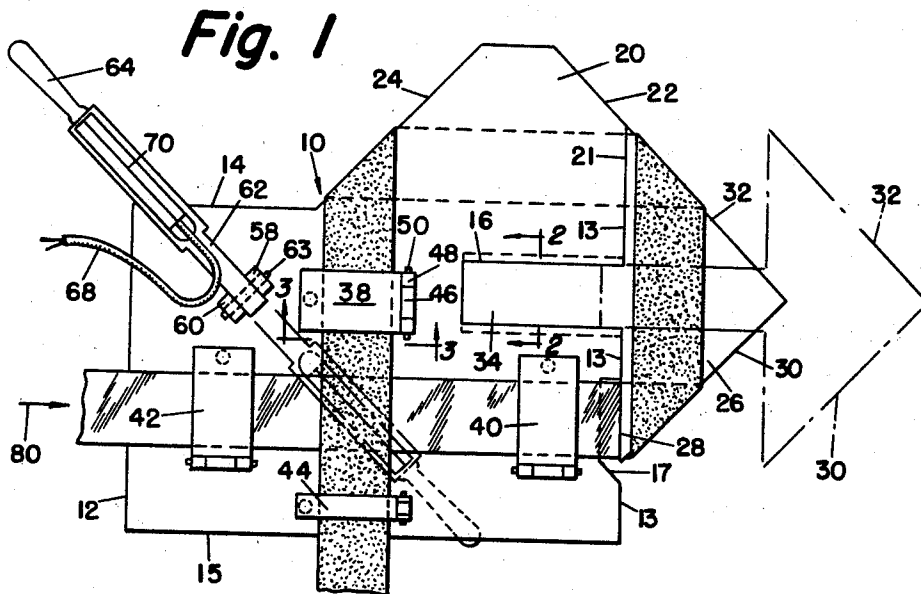


Fig. 2

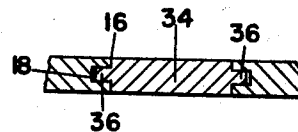


Fig. 4

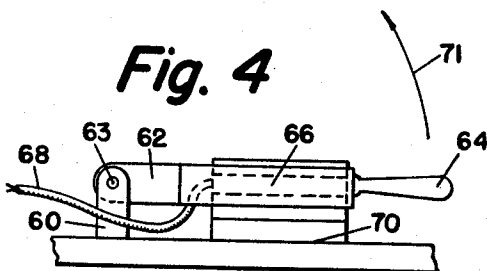


Fig. 3

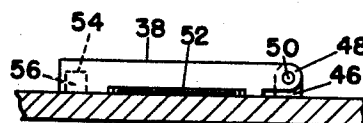


Fig. 5

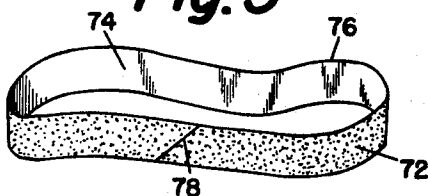


Fig. 6



INVENTOR.
WALTER PLOEGER, JR.

BY *Arthur H. Seidel*

ATTORNEY

1

3,156,338

ENDLESS LAMINATED PRINTING TAPES

Walter Ploeger, Jr., North Bellmore, N.Y., assignor, by mesne assignments, to Filmon Process Corp., New York, N.Y., a corporation of New York
Original application Mar. 24, 1960, Ser. No. 17,391, now Patent No. 3,086,901, dated Apr. 23, 1963. Divided and this application July 23, 1962, Ser. No. 214,179
5 Claims. (Cl. 197-172)

The present invention relates to endless printing ribbons, and more particularly to an endless printing ribbon for typewriters, adding machines, and similar machines which print characters on paper.

The use of endless printing tapes for office equipment has found wide acceptance in the trade. The endless printing ribbons which have been made prior to this invention had several disadvantages and drawbacks. The tapes or ribbons made heretofore were made by a method which was costly and time consuming.

One known method of making an endless printing tape or ribbon comprised weaving a tube of fabric on a special loom, the tubes then had to be finished in accordance with methods known to the finishers of the type of cloth, then the tubes were cut or slit to the required widths. In this method of making endless tapes or ribbons, each individual endless tape or ribbon had to be inked individually. In addition, it has been found to be very difficult to attach a plastic sheet thereto. Thus, this method does not lend itself to mass production.

In another method of making endless tapes or ribbons, a portion of a ribbon is unrolled from a roller and cut to the specific length required, and then the ends are sewn or pasted together. This method requires the tapes to be individually inked so that the joint will have ink thereon. This method has the drawback that each tape must be individually inked and the joint have a greater thickness than the remainder of the tape. When a group of keys are hit at the same time or closely adjacent in time, the imprint from the key or keys that hit the joint is not as dark as the imprints of other keys which hit the tape or ribbon on either side of the joint. Thus, this method does not lend itself to mass production of endless tapes or ribbons.

In addition to the above disadvantages, the prior tapes were made from silk or cotton. The length of the tape or ribbon lifetime would be greatly increased if it were made from nylon. Heretofore it has been extremely difficult to make an endless tape from nylon because of the many problems presented in joining the adjacent edges of the nylon fabric.

It is an object of this invention to overcome the foregoing disadvantages of the prior endless tapes or ribbons.

It is a further object of this invention to provide an endless tape or ribbon which is made from a roll of the tape or ribbon.

It is still a further object of this invention to provide a tape or ribbon which gives a uniform imprint when hit by a key.

Other objects will appear hereinafter.

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

FIGURE 1 is a plan view of the apparatus on which applicant's endless tapes or ribbons are made.

FIGURE 2 is a cross sectional view taken along the lines 2-2 of the apparatus in FIGURE 1.

FIGURE 3 is an end view taken along the lines 3-3 of the apparatus in FIGURE 1.

2

FIGURE 4 is an elevational view of the cutting knife shown in FIGURE 1.

FIGURE 5 is a perspective view of an endless tape produced by the apparatus of FIGURE 1.

FIGURE 6 is a cross sectional view of the tape shown in FIGURE 1.

Referring now to the drawings in detail, where like numerals indicate like elements, there is shown in FIGURE 1 a plan view of the apparatus on which the endless tapes of this invention are made.

As shown in FIGURE 1 the apparatus on which the endless tapes are made is a jig plate designated in general by the numeral 10. The jig plate 10 is generally rectangular in shape and is defined by the parallel end walls 12 and 13 and the parallel side walls 14 and 15. A slot 17 is provided on the edge 13 for a purpose to be described hereinafter. Above slot 17, there is provided a slot 16 which extends inwardly from edge 13 of the jig plate 10 for a substantial distance. Slot 16 is provided with a groove 18 which extends throughout the length of slot 16.

Integral with the jig plate 10, there is provided a truncated cone 20 which extends from the edge 14. It will be seen that truncated cone 20 has an edge 21 which is co-extensive with edge 13. The truncated cone 20 is provided with converging edges 22 and 24 for a purpose to be described hereinafter. Along edge 21 and edge 13, there is provided an arrow-shaped positioner 26. The arrow-shaped positioner 26 is provided with a mating edge 28 and converging edges 30 and 32. A stem 34 on the arrow-shaped positioner 26 is provided with outwardly directed keys 36. The keys 36 on each side of the stem 34 ride in the grooves 18 of the slot 16. The arrow-shaped positioner 26 is adjustable from the solid line position of FIGURE 1 to the position shown in phantom in FIGURE 1. The means providing for adjustment of the arrow-shaped positioner 26 may be of conventional construction such as a setscrew (not shown). It will be noted that adjustment of the arrow-shaped positioner enables endless tapes of different lengths to be made on the same jig plate.

At strategic locations on the jig plate, there are provided a plurality of pivotable gates 38, 40, 42 and 44. Each of these gates are identical, therefore only the gate 38 will be described in detail. A standard 46 is attached in the jig plate 10 by any convenient manner such as welding. The gate 38 is provided with a pair of ears 48 and a pin 50 extends through the ears 48 and the standard 46. Thus, the gate 38 can be pivoted with relation to the jig plate 10. As seen more clearly in FIGURE 3, the gate 38 is provided with a passageway 52 which extends across the full width of the gate 38 and is located along its lowermost surface. The gate 38 is provided with a magnet 56 which is received in a blind hole 54. The jig plate 10 is made of metal which is responsive to the magnet 56 and cooperates therewith in holding the gate 38 in its closed position as shown in FIGURE 3.

A pivotable knife 62 is mounted on the jig plate 10 between and spaced from the gates 38 and 42. A pair of standards 58 and 60 are fixedly secured to the jig plate 10 by any convenient method such as welding. A pin 63 extends through the standards 58 and 60 and the knife 62 so that the knife may have a pivotable range of approximately one hundred and eighty degrees. As shown more clearly in FIGURE 4, the knife 62 is provided with a handle 64 at the end opposite to the pin 63. A resistance heater 66 having lead wire 68 is mounted in the knife 62 for heating the knife blade edge 70.

As shown in FIGURE 6, the endless tape is laminar in structure. The layer of fabric 72 is preferably made of nylon. The layer of plastic 74 is attached to the layer of fabric 72 along their edges. The method of joining

the fabric 72 to the plastic 74 is explained in detail in U.S. Patent 3,010,559 issued to me on November 28, 1961. The illustration in FIGURE 6 wherein the fabric 72 and the plastic 74 are disclosed as being of approximately the same thickness is solely for illustration purposes only. As mentioned in the above-identified patent, the fabric has a thickness of between .004 and .005 inch whereas the plastic 74 has a thickness of between .001 and .002 inch. While the tape disclosed in the drawings is of laminar structure, it will be appreciated that applicant's invention may be practiced on a single ply of nylon ribbon.

The operation is as follows:

The arrow-shaped positioner 26 is adjusted relative to the jig plate 10 so that the desired length of endless tape will be provided. If desired, the stem 34 of arrow-shaped positioner may be provided with indicia which can be compared with indicia located on the jig plate 10 adjacent the slot 16.

The operation of the apparatus will be discussed first with a single ply of nylon tape. The single ply of nylon tape is provided in bulk rolls and inked by high speed machinery. The leading edge of the nylon tape is fed over the jig plate 10 and under the gates 40 and 42 in the direction of arrow 80 in FIGURE 1. The leading edge is fed down over the edge 13 in slot 17 in the jig plate 10, and under the leading edge of the arrow-shaped positioner 26. The leading edge is then fed over the edges 30 and 32 of the arrow-shaped positioner 26 and down underneath the truncated cone 20. The leading edge is then returned to the top surface of the jig plate 10 by passing over the edge 24 of the truncated cone 20 and then under the gates 38 and 44. That portion of the tape which passes between the gates 38 and 44 will overlap a portion of the tape which extends between gates 40 and 42. The handle 64 on the knife 62 is pivoted to the position shown in phantom in FIGURE 1. When the knife 62 is in the position shown in phantom in FIGURE 1, the knife blade edge 70 will extend across the overlapped portion of the tapes at an angle approximately forty-five degrees with each tape. A small amount of pressure on the handle 64 will enable the knife cutting edge 70 to cut the tape and provide a thermo-fused joint. The knife will then be pivoted in the direction of arrow 71 in FIGURE 4 to its full line position in FIGURE 1. The leading edge of the tape which is now located under gate 40 will be thrown away. The gates 38 and 40 will be pivoted upward and the endless tape will be removed from the jig plate 10 and arrow-shaped positioner 26. The leading edge of the tape will now be located underneath the gate 42. The above-mentioned process will be repeated in the making of additional endless tapes.

The method of using the apparatus in FIGURE 1 will now be described in connection with a laminar tape having a nylon fabric on one side and a sheet of plastic on the other side. The laminated tape is fed under the gates and around the arrow-shaped positioner 26 in the same manner as recited above. When using a laminated tape, it is preferred that the plastic side be face up so that in the overlapped portion of the tape the plastic sides will be adjacent to one another. When the knife 62 is pivoted to the position shown in phantom in FIGURE 1, the hot knife blade edge 70 will sever the endless tape from the roll and provide a thermo-fused joint 78. As shown in FIGURE 5, the endless tape 76 will have a thermo-fused joint 78 which extends across the full width of the tape and makes an acute angle with the edges of the tape. The thickness of the endless tapes 76 at the joint 78 will be substantially the same as the thickness throughout the remainder of the endless tape 76. Thus, the bulkiness presented by sewn or pasted joints has been eliminated. Since the layers 72 and 74 of the laminated tape are both synthetics, the hot knife blade edge 70 severs the tape and provides a thermo-fused joint between the fabric layers and the plastic layers. Since the

thermo-fused joint 78 is at an acute angle with the edges of the tape 76, the typing keys of a piece of office machinery will only hit a portion of the joint.

It will be appreciated that the jig may be modified so that the thermo-fused joint extends across the width of the tape and substantially perpendicular to the edges of the tape. Such structure is within the scope of this invention. Although, it is preferred to provide a thermo-fused joint which extends across the width of the tape at an acute angle with the edges of the tape. Since the fabric layer of the tape has been pre-inked, the thermo-fused joint 78 will also contain ink. Thus, the applicant's endless tape may be impregnated with ink by conventional machinery while it is still on the roll in bulk prior to being made into endless tapes. Thus, the necessity for inking individual endless tapes has been eliminated.

While the applicant's invention may be practiced with a single ply of nylon fabric, the laminated tape is preferred. The provision of an impervious sheet of plastic enables the tape to have a long useful operating life and prevents the keys on the office equipment from coming in contact with the printing ink impregnated in the fabric. It will be appreciated that all printing inks are provided with chemicals which corrode the typing keys. Also, since the keys cannot come directly in contact with the ink impregnated fabric, the keys need not be cleaned as is done in conventional office equipment.

This application is a division of my copending application Serial No. 17,391 filed on March 24, 1960, now U.S. Patent No. 3,086,901, issued April 23, 1963, and entitled Apparatus for Making Endless Printing Tapes and Method of Making Same.

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 tape comprising a laminated endless ribbon, one layer of said ribbon being an ink carrying nylon ribbon of uniform width, a second layer of said laminated endless ribbon being a thin ribbon of ink-impervious thermoplastic material having the same width as said nylon ribbon and joined to said nylon ribbon along its edges only, and a thermo-fused butt joint across the width and through the thickness of said laminated ribbon, the thickness of said joint being substantially equal to the thickness of said laminated ribbon.

2. A tape in accordance with claim 1 wherein said thermo-fused joint includes ink therein.

3. A tape in accordance with claim 1 wherein said material and ribbon are joined along their extreme edges with a thermo-fused joint.

4. A tape as set forth in claim 1 wherein said thermo-fused joint forms an acute angle with the edges of said laminated ribbon.

5. A tape in accordance with claim 4 wherein said joint is a straight-line joint forming an angle of approximately forty-five degrees with the edges of said laminated ribbon.

References Cited by the Examiner

UNITED STATES PATENTS

2,044,630	6/36	Phelps	197—172
2,379,500	7/45	Steffens	156—267
2,614,676	10/52	Pessoa	197—168
2,711,780	6/55	Hakomaki	156—304
2,728,439	12/55	Murphy et al.	197—172
2,793,153	5/57	Grundel	197—172

FOREIGN PATENTS

806,771 12/58 Great Britain.

EUGENE R. CAPOZIO, *Primary Examiner*.

ROBERT E. PULFREY, *Examiner*.