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Description

This invention relates to printers.

Our UK Patent Application Publication No. GB—A—2 106 148 discloses a sublimation transfer type printer in which an ink ribbon containing a sublimation dye is positioned adjacent a sheet of printing paper and heated with a heating pattern corresponding to picture image information so as to transfer the sublimation dye on to the printing paper whereby the picture image is printed on the printing paper. Such printers can, for example, be used for printing out, as a hard copy, a still picture image of various picture images such as a picture image taken by a video camera, a television picture image and so on.

A known sublimation transfer type printer shown in Figure 1 of the accompanying drawings comprises a platen 2, which has a sheet of printing paper 1 wound around it and which rotates in the direction shown by an arrow *a*, and a thermal print head 4 which contacts the platen, gripping therebetween an ink ribbon 3 for use in thermal transfer printing. The thermal print head 4 is provided at a tip end thereof with a plurality of heat generating elements (head elements) 4a, the number of which corresponds to a number of picture elements in one scanning line of, for example, a television (video) picture image.

The ink ribbon 3 for use in thermal transfer printing, which is closely held between the thermal print head 4 and the printing paper 1, is formed of a sheet-like carrier base material 9 on which ink portions of configuration or shape corresponding to that of a picture screen of the television picture image and containing sublimation dyes of respective colours, for example yellow, magenta, cyan and black, namely yellow ink portions Y, magenta ink portions M, cyan ink portions C and black ink portions B, are repeatedly arranged in turn. Ink portion position detecting marks 5Y, 5M, 5C and 5B are formed on one side edge of the ink ribbon 3 at the positions of the ink portions of corresponding colours so as to enable the positions of the ink portions to be detected, and block position detecting marks 6 are formed on the other side edge of the ink ribbon 3 so as to enable detection of each of a plurality of groups of the ink portions, each group being a block formed by the combination of adjacent ink portions Y, M, C and B of the four different colours.

In the state in which the yellow ink portion Y, for example, is in close contact with the printing paper 1 as described above, the elements 4a of the thermal print head 4 are heated in a pattern corresponding to the picture elements of one scanning line, in accordance with information corresponding to the colour yellow, for example a yellow colour signal of a television video signal, so as to thermally transfer a line of the yellow sublimation dye of the yellow ink portion Y on to the printing paper 1 in accordance with the pattern. At every one of a plurality of lines each corresponding to a scanning line, the platen 2 is intermittently rotated (stepped) in the direction of the arrow *a* and information for that line is thermally transferred to the printing paper 1, whereby the yellow colour of a whole picture is transferred to the printing paper, line by line, during one revolution of the platen 2. Then, similar transfer processes are carried out for a magenta ink portion M, a cyan ink portion C a black ink portion B, the transferred picture images of the yellow magenta, cyan and black sublimation dyes being superposed on one another so as to print a colour picture image on the printing paper 1. Detecting means is provided for detecting the marks 5 (5Y, 5M, 5C and 5B) and 6 in order that, for the respective ink portions Y, M, C and B, signals corresponding to the respective colour signals are supplied to the head elements 4a of the head 4. The detecting means may comprise, for example, a light source 7 for emitting a light ray for use in detection, for example an infra-red ray emitting diode, and a detecting element 8 for detecting the infra-red ray, the source 7 and detecting element 8 being disposed in opposing relationship to each other on opposite sides of the thermal transfer recording ink ribbon where the marks 5 and 6 are provided. The detecting means detects whether the marks 5 and 6 are or are not present and produces at the detecting element 8 a signal which indicates the position of the ink ribbon 3 relative to the thermal print head 4.

A cover film, which can prevent the transferring picture image from becoming faded in colour and which can obtain a heating effect for raising the colouring by minutely diffusing the dye, is hot pressed on the printing paper 1.

The cover film is hot pressed on the printing paper 1 by a laminator that is usually provided independently of the printer. The laminator comprises a pair of metal heating rolls 10 and 11 as shown, for example, in Figure 2 of the accompanying drawings, and the printing paper 1 and a cover film 12, which are superposed on each other, are transported between the rolls 10 and 11 while in close contact therewith. The laminator of such construction has a large heat capacity so that it requires a very long time and much energy to heat and cool it, and also requires cooling means for lowering the ambient temperature, whereby the laminator is of large size. Further, there is a problem of matching position between the printing paper 1 and the cover film 12. Furthermore, the position matching between the printed printing paper 1 and the cover film 12 is difficult, and if the front surface and the back surface of the cover film 12 are mis-selected, the cover film is wound around the rolls 10 and 11, making the printing paper dirty and so on. In addition, since the rolls 10 and 11 tend to come into surface contact with each other, a large pressure is required and bubbles are easily formed between the printing paper 1 and the cover film 12.

A printing and laminating arrangement similar to that described with reference to Figures 1 and 2 of the accompanying drawings is disclosed in our

above-cited UK Patent Application Publication No. GB—A—2 106 148.

Another method of superposing or laminating the cover film on to the printing paper is proposed in Japanese Patent Application Publication No. JP—A—58/148 778, which was published on 3rd September 1983, namely after the earlier priority date of the present application.

According to this previously proposed method, as illustrated in Figure 3 of the accompanying drawings, a cover film 13 comprising a transparent resinous layer which can be released from the base material 9 is located behind (after) the ink portions containing the sublimation dyes formed on the base material 9 of, for example, the ink ribbon 3, namely, the yellow ink portions Y, the magenta ink portions M, the cyan ink portions C and the black ink portions B. The cover film layer 13 is transferred to and coated on the printing paper 1 after each sublimation dye has been transferred by the thermal print head 4. The respective ink portions Y, M, C, B and the cover film 13 are each printed by gravure printing. However, since the cover film layer 13 must be coated to have a thickness much larger than those of the ink portions Y, M, C and B, the cover film layer 13 is printed after the ink portions Y, M, C and B have been printed. It is, however, difficult to form the cover film layer 13 as a layer having a sufficient thickness and a uniform and smooth surface by one printing process and, when the cover film layer is formed, the other ink portions Y, M, C and B are affected, resulting in various problems as regards the function as a cover film and from the production standpoint.

According to the present invention there is provided a printer comprising:

a platen around which printing paper can be held;

a thermal print head for heating an ink ribbon while the ribbon is in contact with printing paper held on the platen so that sublimation dye is transferred from the ribbon to the paper to print on the paper an iamge determined by image information supplied to the print head; and

means for hot pressing a cover film on to the printing paper having thereon the printed image;

characterised in that the means for hot pressing the cover film comprises a thermal head operative to hot press the cover film, on to the printing paper having thereon the printed image while the paper remains held on the platen.

With such an arrangement, the cover film can be laminated on the printing paper easily and positively (that is with certainty or reliably) and, also, the overall arrangement of the apparatus can be made of small size and of simple construction.

According to one embodiment of the invention, the ink ribbon and cover film are separate. According to another embodiment, the ribbon has a predetermined sublimation dye portion or portions and a cover film formed in a predetermined alignment, and the thermal print head is formed of a number of heat generating elements for heating the sublimation dye portion of the ribbon in accordance with picture image information with the sublimation dye portion of the ribbon and the printing paper on the platen in close contact with each other and for transferring sublimation dyes on to the printing paper so as to print a picture image on the printing paper. The thermal head for hot pressing the cover film may comprise a single heat generating portion of a width at least equal to the full width of the sublimation dye portions (ink portions).

The invention will now be further described, by way of illustrative and non-limiting example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a known printer;

Figure 2 is a diagram showing the construction of a laminator for use with the printer of Figure 1;

Figure 3 is a diagram showing a pattern of a previously proposed ink ribbon which includes thereon a cover film layer;

Figure 4 is a diagram showing the construction of a printer embodying this invention;

Figures 5 and 6 are pattern diagrams showing examples of respective cover films;

Figures 7 and 8 are perspective views of respective examples of a thermal head for hot pressing the cover film; and

Figures 9 and 10 are diagrams showing the construction of respective further embodiments of this invention.

A printer embodying this invention will now be described with reference to Figure 4, in which parts corresponding to parts shown in Figure 1 are designated by the same references. In similar manner to that described in connection with Figure 1, the ink ribbon 3 used with the printer of Figure 4 is of such a structure that the respective ink portions, for example the ink portions Y, M, C and B coated with the sublimation dyes of yellow, magenta, cyan and black, respectively, are sequentially arranged. The ink ribbon 3 is moved from a supply roll 14 to a take-up roll 15 and, in the midst of its movement, the ink ribbon 3 moves along the platen 2 around which the printing paper 1 set on the platen 2. In the place at which the ink ribbon 3 is in contact with the printing paper 1, the thermal transfer head 4, which is heated in accordance with the picture image information, contacts the ink ribbon 3 from the back surface thereof so as sequentially to transfer the sublimation dyes of respective colours on to the printing paper, whereby a colour picture image is obtained. In this case, the thermal transfer head 4, the ink ribbon 3, the platen 2 and the like can be constructed similarly to those described in connection with Figure 1.

A supply roll 17 and a take-up roll 18 for a cover film 16 are operative to move the cover film 16 while it is in contact with the printing paper 1 disposed on the platen 2. A thermal head 19 is formed of a single heat generating element extending over the full width of the cover film 16 so as to hot press the cover film onto the printing

paper 1, disposed on the platen 2, from the back surface of the cover film. Guide members 20 and 21 are provided for ink ribbon 3 and guide members 22 and 23 are provided for the cover film 16.

The cover film 16 can be formed such that, for example, as shown in Figure 5, a cover film layer 16b comprising a transparent resinous layer releasable from a film base material 16a is intermittently coated on the film base material so as to have a pattern of the same shape and size as those of the respective ink portions Y, M, C and B of, for example, the ink ribbon 3. Alternatively, as shown in Figure 6, a similar cover film layer 16b can be continuously coated on the film base material 16a. The film base material 16a of the cover film 16 is made by coating a resinous composition for use in a smoothing treatment on condenser paper in order that the resinous layer serving as the cover film layer 16b can be transferred positively, that is with certainty. The resin for use in lamination may be one which has high transparency and improves the colouring property of the sublimation dye. The resinous materials must be selected so as to avoid the possibility that, upon transferring, the resin for use in lamination and the resin for use in smoothing treatment will be dissolved into each other and then made integral. In order to improve the colouring poroperty, it is preferable for the resin to have a benzene nucleus or a cyclic structure in the molecular structure: for example, polyester resins (saturated linear polyester resin), epoxy resins, cellulose resins, and acetal resins may be employed.

It is sufficient for the resin for use in smoothing treatment to be one which will not melt together with the resin for use in lamination; for example, silicone resins, polyolefins (polyethylene, polypropylene and copolymers of various kinds) and acrylic resins may be employed.

Practical examples will now be described. In a first example, the resin for use in smoothing treatment was formed by mixing 100 parts by weight of a polybutadiene-system oligomer having terminal acrylic groups and 2 parts by weight of benzil dimethyl ketal (benzoyl-phenyl-dimethoxy-methane) as a photosensitiser and coating the mixed product on condenser paper so that it has a weight per unit area of 10 g/m^2. Thereafter, the product was cured under irradiation from a high voltage mercury lamp of 80 W/cm disposed at a distance of 10 cm from the coating for 10 seconds. As a result, the film base material 16a having the smooth coated surface was obtained.

For the resin for use in lamination, namely the cover film layer 16b, a saturated linear polyester resin was used. For example, a mixture of VYLON No. 20 (60 parts by weight) and VYLON No. 30 (40 parts by weight), each manufactured by TOYOBO CO., LTD., was dissolved, so as to have a solid content of 30 weight %, in methyl ethyl ketone. This solution was coated on the film base material 16a so as to form the cover film layer 16b. In this case, the coating weight per unit area was 20 g/m^2.

In a second example, a mixture of 100 parts by weight of silicone rubber, 10 parts by weight of a catalyser and 30 parts by weight of toluene was used to form the resin for use in smoothing treatment. This mixture was coated on condenser paper (10 g/m^2) and then cured at 150°C for one hour. The resin for the cover film layer was formed by coating and then drying a 30% solution of VYLON No. 20, manufactured by TOYOBO CO., LTD., in methyl ethyl ketone.

In a third example, polyethylene (SUMIKATHENE L—402 manufactured by SUMITOMO CHEMICAL CO., LTD.) was employed as the resin for sue in smoothing treatment. Specifically, this polyethylene was press-moulded to form a film having a thickness of 10 micrometers by a unaxial injection moulding machine at a screw temperature ranging from 200 to 220°C and a die temperature of 220°C. The resultant polyethylene film was roll-laminated on condenser paper under a linear pressure of 3 kg/cm, at a temperature of 140°C and at a speed of 3 m/min.

The cover film layer 16b was formed on the film base material 16a with the surface smoothed in similar manner to the first example. In the third example, HI—MILAN No. 1855 manufactured by MITSUI POLYCHEMICALS CO., LTD. can be used in place of the SUMIKATHENE L—402 manufactured by SUMITOMO CHEMICAL CO., LTD.

In this case, since no other ink portion is formed on the film base material 16, the cover film layer 16b can be formed as a layer of desired thickness and having a sufficiently uniform and smooth surface, without considering how to avoid the influence exerted on these ink portions.

The thermal head 19 for use in hot pressing the cover film 16 is provided at its tip end, as for example, shown in Figures 7 and 8, with a contact portion 19a of a thin plate shape which has a width covering the full width of the ink portions Y, M, C and B of the ink ribbon 3 and comes into line contact with the platen 2, with the ink ribbon 3 and the cover film 16 therebetween. A resistive material layer 19b is deposited on the contact portion 19a by, for example, vacuum evaporation, plating or the like so as to generate heat when it is supplied with a current. The resistive material layer 19b may, as shown in Figure 7, be formed continuously with a width corresponding to that of the ink portions of the ink ribbon 3, or, as shown in Figure 8, may be formed intermittently at portions corresponding to each head element 4a of the thermal transfer head 4 as shown in Figure 1.

The cover film layer 16b of the cover film 16 is transferred and pressed on to the printing paper 1 by the thermal head 19 as mentioned above. In this case, when the cover film layer 16b is formed to have the intermittent pattern as shown in Figure 5, a mark 16c is disposed in association with each intermittent pattern, just like the detection marks 5 formed on the ink ribbon 3 described

in connection with Figure 1, and each mark 16c is detected by detecting means (not shown) so as to determine the position of the cover film 16b relative to the printing paper, thereby enabling the cover film layer 16b to be laminated on the printing paper 1 exactly at the printed portion.

Since, in the above-described printer embodying this invention, the thermal head 4 for use in printing and the thermal head 19 for use in hot pressing the cover film 16 are disposed at different positions with respect to the common platen 2 around which the printing paper 1 is wound, it is possible to avoid the apparatus having to be of large size due to the provision of press rolls, and to avoid the heat capacity from being increased and much energy thereby being consumed, and so on, as described in the introduction to this description.

Further, since the cover film 16 having the cover film layer 16b is formed independently of the ink ribbon 3, the constraint due to the ink portion, as mentioned in the introduction to this specification, can be avoided, and the cover film layer can be formed so as to have a desired thickness and coating condition, whereby the cover film layer can be printed on the printing paper positively, that is with certainty or reliably.

As described above, since the sublimation-transfer and the hot-pressing of the cover film 16 are carried out using the common platen 2, the laminator driving mechanism becomes unnecessary, making the apparatus relatively small in size and simple in construction and reducing the power consumption remarkably. Furthermore, since the cover film 16 is hot-pressed by the thermal head 19, the heat capacity becomes very small, making instantaneous heating and/or cooling possible. Thus, in addition to the above-mentioned advantage that the apparatus can be made to be of small size and manpower can be saved, the responsiveness thereof can be made high and the handling thereof becomes easy.

Unlike the known printer using the heating rolls as described in the introduction to this description, the cover film can be prevented from being wound around the rolls and also prevented from being dirtied, the large pressure can be made unnecessary, and bubbles can be prevented from being created, resulting in great practical advantages.

Figures 9 and 10 illustrate respective further embodiments of the present invention. In Figures 9 and 10, parts corresponding to parts shown in Figure 1 are designated by the same references and will not be described. In this case, in similar manner to Figure 3, the ink ribbon 3 comprises the ink portions, for example the ink portions Y, M, C and B coated with the sublimation dyes of, for example, yellow, magenta cyan and the black, respectively, which are arranged in turn, and the cover film 13 made of the transparent resinous layer releasable from the base material 9 and located thereafter. The ink ribbon 3 is transferred from a supply roll 24 to a take-up roll 25 and in the midst of its movement, the ribbon 3 lies along the platen 2 around which the printing paper 1 is wound, coming into contact with the printing paper 1 disposed on the platen 2. Then at the contact portion, the thermal transfer head 4, which has a number of heat generating elements heated in accordance with the picture information, comes into close contact with the ink ribbon 3 from its back surface so as sequentially to transfer the sublimation dyes of respective colours on to the printing paper, thereby obtaining the colour picture image. In this case, the thermal transfer head 4, the ink ribbon 3, the platen 2 and so on can be constructed similarly to those in Figure 1.

To effect hot-pressing of the cover film 13 on to the printing paper 1, on the platen 2, to which the sublimation dyes are sequentially transferred, the cover film 13 is moved in contact therewith and the cover film 13 is hot pressed on to the printing paper 1, which remains held on the platen 2, from the back surface of the cover film 13, by using the thermal head 19 having the single heat generating portion extending over its full width as shown in Figure 7. Guide members 27 and 28 are provided for the ink ribbon 3.

Other portions are constructed in similar manner to the known printer.

The operation of the printer shown in Figure 9 will now be described in more detail. After the front and back surfaces of a polyethylene terephthalate film were subjected to a treatment for imparting a heat-resisting property by applying a liquid containing a silicone-denatured epoxy resin and a hardener, a thermal sublimation ink and a cover film made of methylmethacrylate polymer are formed therein so as thereby to form the ribbon 3 shown in Figure 3. The ink ribbon was heated from the back surface thereof by the thermal head 4 (having a number of heat generating elements for use in picture image formation in accordance with the video signal) so as to sublimate the sublimation dyes on to the surface of the printing paper 1, which was disposed on the platen 2, whereby the picture image was formed. The sublimation dyes may be yellow, magenta, cyan and necessary black and used in turn repeatedly. Then, the thermal head 19 comes into contact with the cover film 13 formed on the ribbon 3 from the back surface thereof and is heated so as to hot melt and transfer the cover film 13. In this case, the position of the cover film 13 upon starting the lamination with respect to the position of the picture image was automatically determined. As a result, the cover film 13 was automatically released from the ribbon base material and a print was obtained that had a good finish and a very smooth surface.

The embodiment shown in Figure 10 will now be described. This embodiment uses an integral type head 29 in which the thermal head 4 for the picture image and the thermal head 19 having the single heat generating element for the cover film are disposed parallel to each other on a surface of a ceramic plate. The picture image thermal head 4

of the head 29 is inclined first to the surface of the printing paper 1 disposed on the platen 2 and is heated to heat the ink ribbon from the back surface side of the portion printed with the sublimation ink so as to sublimate the sublimation dye in accordance with the picture image information, thereby forming the picture image. Then, the head 29 is oppositely inclined a little at the side of the thermal head 19 having the single heat generating element so that the element is in contact with the back surface of the ribbon sufficiently and heats the cover film 13 on the back surface of the ribbon so as to melt bond and transfer the cover film 13 on to the printing paper 1. The other parts of the printer of Figure 9 are formed similarly to those of Figure 1.

It will easily be understood that the embodiments of Figures 9 and 10 can achieve the same action and effect as the embodiment of Figure 4.

According to the embodiments described above, the picture is printed by the multi-element thermal head which is heated in accordance with the picture image information under the condition that the sublimation dye portion of the ribbon is in close contact with the printing paper disposed on the platen to transfer the sublimation dye on to the printing paper thereby printing the picture image, and the thermal head having the single heat generating element over its full width is used for hot pressing the cover film on to the printing paper under the condition that the printing paper and the cover film are in close contact with each other on the platen and the ink ribbon coated with sublimation dye portions, the cover film being in a predetermined alignment. Thus, the lamination of the cover film can be carried out stably and positively (that is, with certainty or reliably) and the overall arrangement of the apparatus can be amde smaller in size and simpler in construction.

Claims

1. A printer comprising:

a platen (2) around which printing paper (1) can be held;

a thermal print head (4) for heating an ink ribbon (3) while the ribbon (3) is in contact with printing paper (1) held on the platen (2) so that sublimation dye is transferred from the ribbon (3) to the paper (1) to print on the paper an image determined by image information supplied to the print head (4); and

means for hot pressing a cover film (16, 13) on to the printing paper (1) having thereon the printed image;

characterised in that the means for hot pressing the cover film (16, 13) comprises a thermal head (19) operative to hot press the cover film on to the printing paper (1) having thereon the printed image while the paper remains held on the platen (2).

2. A printer according to claim 1, wherein the thermal head (19) operative to hot press the cover film on to the printing paper (1) has a single heat generating element of a width at least equal to the width of ink portions of the ink ribbon (3).

3. A printer according to claim 1 or claim 2, comprising means (14, 15, 20, 21) for directing an ink ribbon (3) past a position at which it is heated by thermal print head (4) and means (17, 18, 22, 23) for directing a cover film (16), which is separate from the ink ribbon (3), past a position at which it is hot pressed by the thermal head (19).

4. A printer according to claim 1 or claim 2, comprising means (24, 25, 27, 28) for directing an ink ribbon (3) which comprises a cover film (13) past respective positions in which the ink ribbon is heated by the thermal print head (4) and the cover film is hot pressed by the thermal head (19).

5. A printer according to claim 4, wherein the thermal print head (4) and the thermal head (11) are mounted on a common mounting (29) whose orientation with respect to the platen (2) can be altered.

Patentansprüche

1. Druckvorrichtung mit

einer Druckwalze (2), um die herum ein Druckpapier (1) gehalten werden kann,

einem thermischen Druckkopf (4) zum Aufheizen eines Farbbandes (3), während sich das Farband (3) in Berührung mit dem Druckpapier (1) befindet, das auf der Druckwalze (2) gehalten wird, so daß Sublimationsfarbstoff von dem Farbband (3) auf das Druckpapier (1) übertragen wird, um auf das Druckpapier ein Bild zu drukken, das durch Bildinformation bestimmt ist, die dem Druckkopf (4) zugeführt wird, und

einem Mittel zum Warmpressen eines Schutzfilms (16, 13) auf das Druckpapier (1), das auf sich das gedruckte Bild aufweist,

dadurch gekennzeichnet, daß das Mittel zum Warmpressen des Schutzfilms (16, 13) aus einem thermischen Kopf (19) besteht, der betreibbar ist, um den Schutzfilm warm auf das Druckpapier (1) zu pressen, das auf sich das gedruckte Bild aufweist, während das Papier noch auf der Druckwalze (2) gehalten wird.

2. Druckvorrichtung nach Anspruch 1, bei der der thermische Kopf (19), der betreibbar ist, um den Schutzfilm warm auf das Druckpapier (1) zu pressen, ein einziges wärmeerzeugendes Element einer Breite hat, die zumindest gleich der Breite der Farbbereiche des Farbbandes (3) ist.

3. Druckvorrichtung nach Anspruch 1 oder 2, oder Mitteln (14, 15, 20, 21) zum Vorbeiführen eines Farbbandes (3) an einer Position, in der es durch den thermischen Druckkopf (4) aufgeheizt wird, und Mitteln (17, 18, 22, 23) zum Vorbeiführen eines Schutzfilms (16), der separat von dem Farbband vorgesehen ist, an einer Position, in der er durch den thermischen Kopf (19) warmepreßt wird.

4. Druckvorrichtung nach Anspruch 1 oder 2, mit Mitteln (24, 25, 27, 28) zum Vorbeiführen

eines Farbbandes (3), das eine Schutzschicht (13) enthält, an betreffenden Positionen, in denen das Farbband durch den thermischen Druckkopf (4) aufgeheizt wird und die Schutzschicht durch den thermischen Kopf (19) warmegepreßt wird.

5. Druckvorrichtung nach Anspruch 4, bei der der thermische Druckkopf (4) und der thermische Kopf (11) auf einer gemeinsamen Halterung (29) montiert sind, deren Orientierung in bezug auf die Druckwalze (2) verändert werden kann.

Revendications

1. Imprimante comportant:

un rouleau (2) autour duquel un papier d'impression (1) peut être maintenu,

une tête d'impression thermique (4) destinée à chauffer un ruban encré (3) pendant que le ruban (3) est en contact avec le papier d'impression (1) maintenu sur le rouleau (2) de manière qu'un colorant à sublimation soit transféré du ruban (3) au papier (1) afin d'imprimer sur ce papier une image déterminée par des informations d'image fournies à la tête d'impresion (4), et

un dispositif de pressage à chaud d'une pellicule de recouvrement (16, 13) sur le papier d'impression (1) sur lequel l'image est imprimée,

caractérisé en ce que le dispositif de pressage à chaud de la pellicule de recouvrement (16, 13) comporte une tête thermique (19) ayant pour fonction de presser à chaud la pellicule de recouvrement sur le papier d'impression (1) portant l'image imprimée pendant que la papier reste maintenu sur le rouleau (2).

2. Imprimante selon la revendication 1, dans laquelle la tête thermique (19) ayant pour fonction de presser à chaud la pellicule de recouvrement sur le papier d'impression (1) comporte un seul élément générateur de chaleur d'une largeur au moins égale à la largeur de parties encrées du ruban encré (3).

3. Imprimante selon la revendication 1 ou 2, comportant un dispositif (14, 15, 20, 21) destiné à diriger un ruban encré (3) devant une position à laquelle il est chauffé par la tête d'impression thermique (4) et un dispositif (17, 18, 22, 23) destiné à diriger une pellicule de recouvrement (16) qui séparée de la partie encrée (3) devant une position à laquelle elle est pressée à chaud par la tête thermique (19).

4. Imprimante selon la revendication 1 ou 2, caractérisée en ce qu'elle comporte un dispositif (24, 25, 27, 28) destiné à diriger un ruban encré (3) qui comporte une pellicule de recouvrement (13) devant des positions respectives dans lesquelles le ruban encré est chauffé par une tête d'impression thermique (4) et la pellicule de recouvrement est pressée à chaud par la tête thermique (19).

5. Imprimante selon la revendication 4, dans laquelle la tête d'impression thermique (4) et la tête thermique (11) sont montées sur un montage commun (29) dont l'orientation par rapport au rouleau (2) peut être modifiée.

FIG. 1

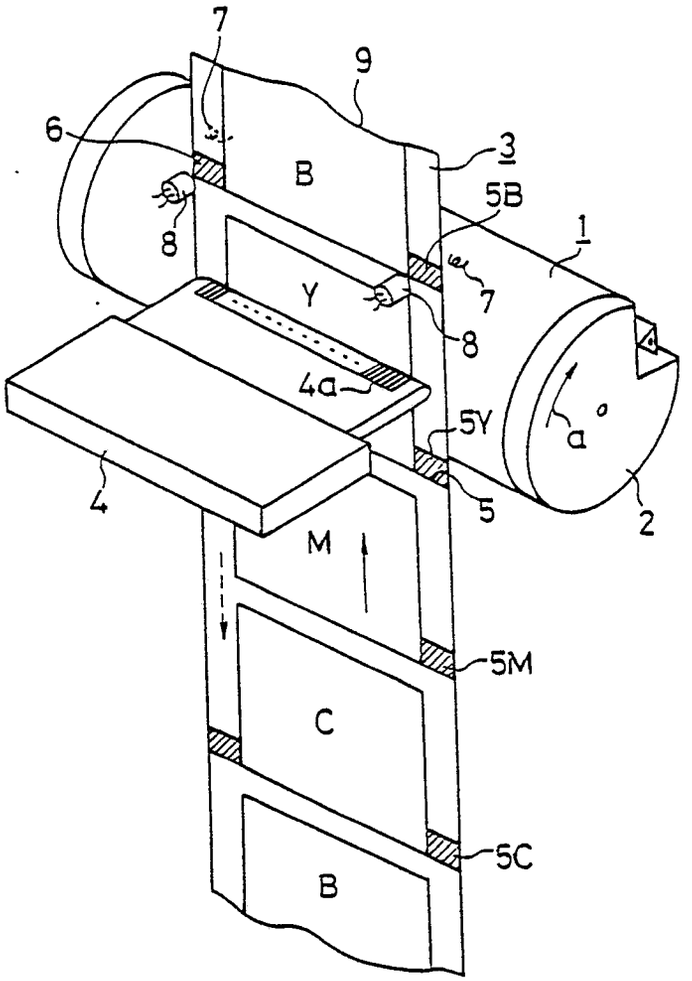

FIG. 2

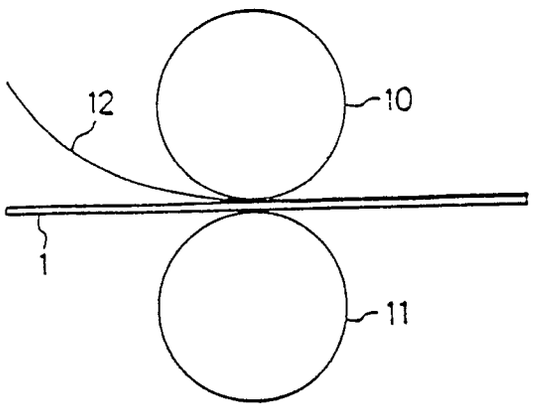

FIG. 3

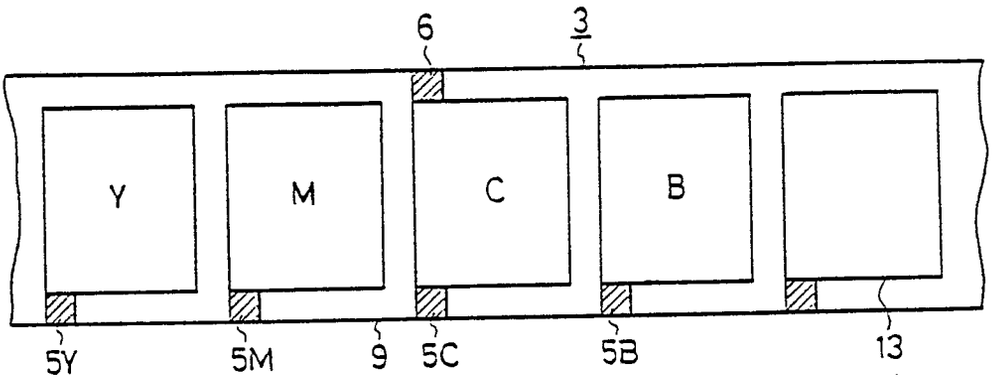

FIG. 4

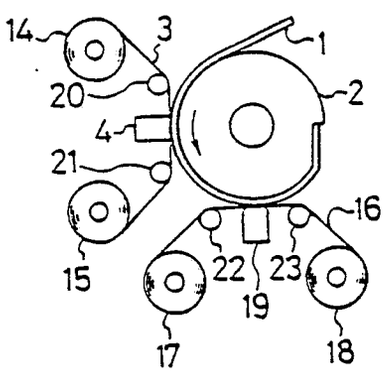

FIG. 5

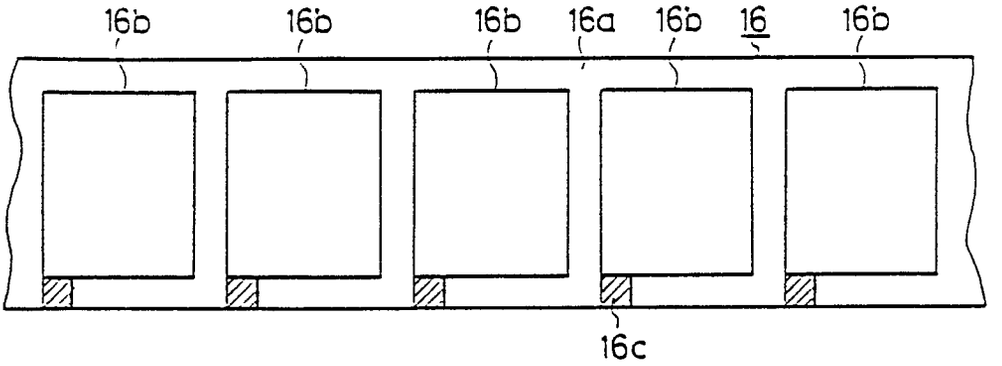

FIG. 6

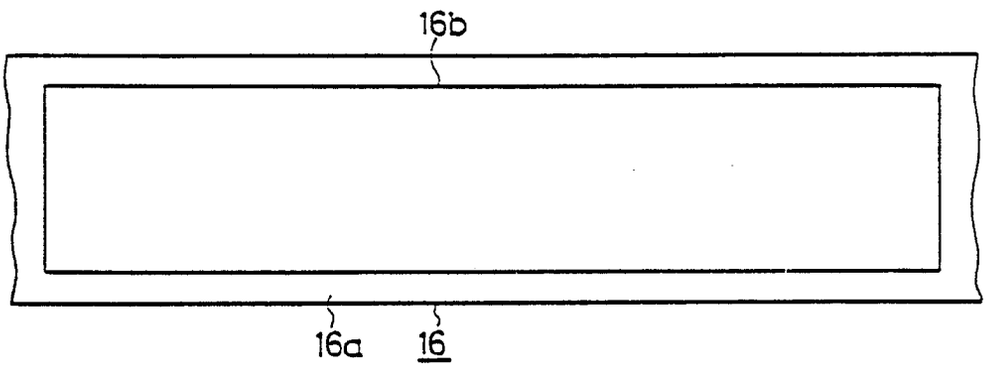

FIG. 7

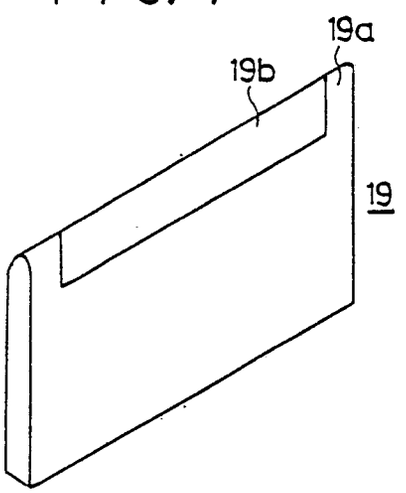

FIG. 8

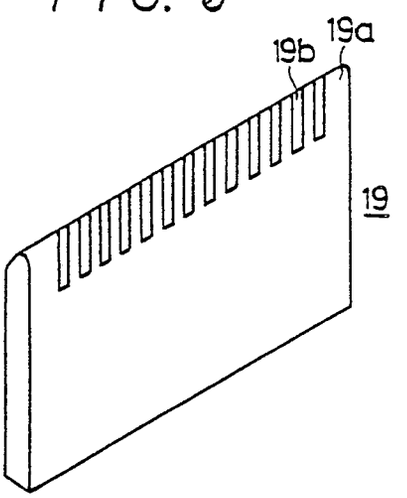

FIG. 9

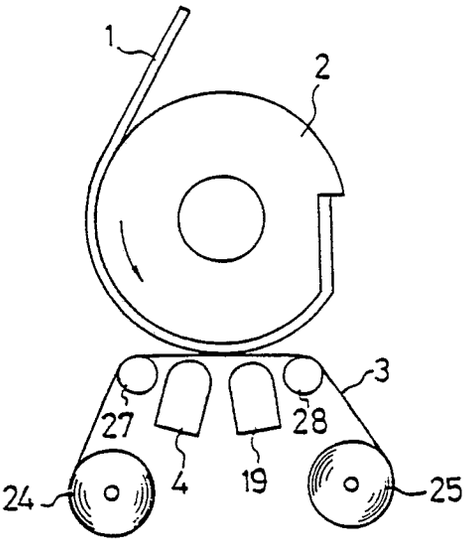

FIG. 10