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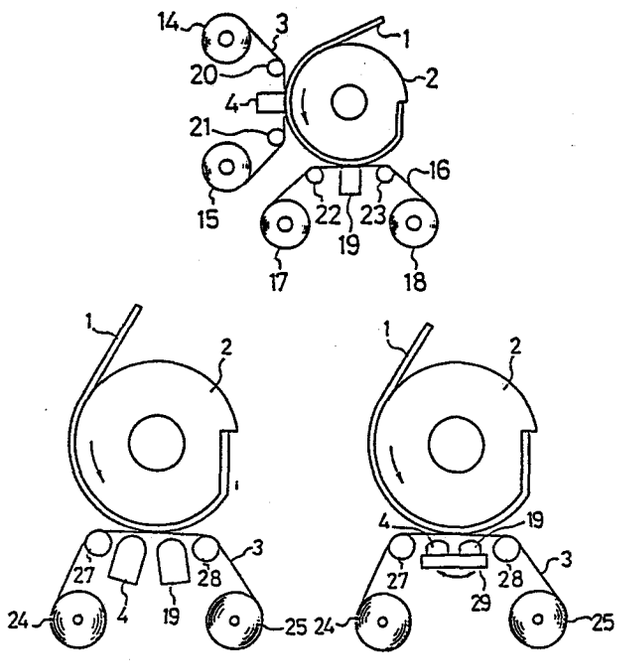
(71) Applicant: **SONY CORPORATION,**
7-35 Kitashinagawa 6-Chome Shinagawa-ku,
Tokyo 141 (JP)

(72) Inventor: **KOBAYASHI, Naotake Sony Chemicals Corporation,, Kanuma Plant 18, Satsuki-cho Kanuma-shi, Tochigi 322 (JP)**
Inventor: **OCHIAI, Yasuyuki Sony Chemicals Corporation,, Kanuma Plant 18, Satsuki-cho Kanuma-shi, Tochigi 322 (JP)**
Inventor: **SHINOHARA, Satoru Sony Chemicals Corporation,, Kanuma Plant 18, Satsuki-cho Kanuma-shi, Tochigi 322 (JP)**
Inventor: **ABE, Tetsuya Sony Chemicals Corporation,, Kanuma Plant 18, Satsuki-cho Kanuma-shi, Tochigi 322 (JP)**
Inventor: **FUJIWARA, Yoshio Sony Chemicals Corporation,, Kanuma Plant 18, Satsuki-cho Kanuma-shi, Tochigi 322 (JP)**

(74) Representative: **Cotter, Ivan John et al, D. YOUNG & CO. 10 Staple Inn, London WC1V 7RD (GB)**

(54) PRINTER.

(57) Printer which prints, as a hard copy, various static images such as an image picked up by a video camera or a television picture image, and, more particularly, a printer which is arranged such that an ink ribbon including a subliming dye is laid over a sheet of a photographic paper, and a pattern of the subliming dye according to data on an image is transferred to the photographic paper by heating, thereby printing the image. The printer includes a platen (2) which holds the photographic paper (1); a ribbon (3) which has a predetermined subliming dye portion and a cover film (13) which are formed according to a predetermined arrangement; a multi-element heat-sensitive head (4) which is adapted to heat the subliming dye portion of the ribbon (3) pressed against the photographic paper (1) on the platen (2) according to image data, in order to transfer the subliming dye portion to the photographic paper (1), thereby effecting printing; and a heat-sensitive head (19) with a single heating portion which extends over the entire width thereof and thermocompression-bonds the cover film (13) to the photographic paper (1) when the photographic paper (1) and the cover film (13) are pressed against each other on the platen (2). Thus it is possible to easily and reliably lay the cover film (13) over the photographic paper (1), reduce the size of the apparatus as a whole, and simplify the construction thereof.



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DESCRIPTION

TITLE OF THE INVENTION

PRINTER

TECHNICAL FIELD

The present invention relates to printers 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. More particularly, this invention relates to a sublimation transfer type printer in which an ink ribbon containing a sublimation dye is superposed on a printing paper and heated with a heating pattern corresponding to a picture image information so as to transfer the sublimation dye on the printing paper, thus the picture image being printed on the printing paper.

BACKGROUND ART

A prior art sublimation transfer type printer, as, for example, shown in Fig. 1, comprises a platen 2 having wound therearound a printing paper 1 and rotating in the direction shown by an arrow a and a thermal print head 4 which contacts with the platen, gripping therebetween an ink ribbon 3 for use in thermal transfer printing. The thermal print head 4 has at its tip end heat generating elements 4a the number of which corresponds to that of picture elements in one scanning line of, for example, a television 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 shape corresponding to that of the picture screen of the television picture image and containing sublimation dyes of respective colors, for example, yellow, magenta, cyan and black, namely, the ink portions of yellow Y, magenta M, cyan C and black 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 at the positions of the corresponding color ink portions so as to detect the positions of the ink portions and a block position detecting mark 6 is formed on the other side edge of the ink ribbon so as to detect each group of the ink portions, namely, a block formed by the combination of the adjacent ink portions Y, M, C and B.

Under the state that the ink portion Y, for example, is made in close contact with the printing paper 1 as described above, each head element 4a of the thermal print head 4 is heated with a pattern corresponding to the picture elements of one scanning line by an information corresponding to a yellow color, for example, a yellow color signal of a television video signal so as to thermally transfer the yellow sublimation dye of the ink portion Y on the printing paper 1 in accordance with the pattern. At every line corresponding to each scanning line, the platen 2 is intermittently rotated in the direction along the arrow a

to thereby thermally transfer an information of each line on the printing paper, thus the yellow color of one picture amount being transferred on the printing paper by one revolution of the platen 2. Then, a similar transfer treatment is carried out for the magenta M, the transfer for the cyan C and the black B is sequentially carried out over and over and the transferred picture images of the sublimation dyes of the yellow Y, the magenta M, the cyan C and the black B are superposed on one another so as to print a color picture image on the printing paper. In this case, there is provided detecting means for detecting the marks 5(5Y, 5M, 5C and 5B) and 6 in order that in the respective ink portions Y, M, C and B, the signals corresponding to the respective color signals are supplied to the head element 4a of the head 4. The detecting means consists of, for example, a light source 7 for emitting a light ray for use in detection, for example, an infrared ray emitting diode and a detecting element 8 for detecting the infrared ray which are disposed in opposing relation to each other at both sides of the thermal transfer recording ink ribbon 3 at which the marks 5 and 6 are provided. The detecting means detects whether the marks 5 and 6 exist or not and produces at the detecting element 8 a detected signal by which the position of the thermal transfer recording ink ribbon 3 relative to the thermal print head 4 is detected.

On the resultant printing paper is hot pressed a cover film which can prevent the transferred picture image

from being faded in color and which can obtain a heating effect for raising the coloring by minutely diffusing the dye.

The cover film is hot pressed on the printing paper by a laminator that is usually provided independently of the printer. The laminator comprises a pair of metal heating rolls 10 and 11 as, for example, shown in Fig. 2 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 thus arranged is large in heat capacity so that it requires a very long time and much energy to heat and cool and also requires cooling means for lowering the ambient temperature, thus the apparatus being made large in size. Further, there is a problem of matching a position between the printing paper and the cover film. Furthermore, there occurs such a problem that the position matching between the printed printing paper and the cover film is difficult and that if the front surface and the back surface of the cover film 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 both rolls tend to come in surface contact with each other, a large pressure is required and a bubble is easily formed between the printing paper and the cover film.

As other method for superposing or laminating the cover film on the printing paper, the following one is known.

As illustrated in Fig. 3, a cover film 13 made of a transparent resinous layer which can be released from the base material 9 is located behind the ink portions containing the sublimation dyes formed on the base material 9 of, for example the ink ribbon 3, namely, the yellow Y, the magenta M, the cyan C and the black B. This cover film layer 13 is transferred and coated on the printing paper after each sublimation dye was transferred by the thermal print head 4. The respective ink portions Y, M, C, B and the cover film 13 are each printed by the gravure printing. However, since the cover film layer 13 must be coated with a thickness very larger than those of the ink portions Y, M, C and B, this film layer 13 is printed after the ink portions Y, M, C and B were 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 this cover film layer is formed, the other ink portions Y, M, C and B are affected resulting in various problems of function as the cover film and production standpoint.

In accordance with the present invention, the printer for carrying out the above-mentioned sublimation transfer type printing is provided with a mechanism for laminating the cover film on the printing paper to thereby laminate the cover film on the printing paper easily and positively and also the overall arrangement of the apparatus can be made small in size and simple in construction.

DISCLOSURE OF INVENTION

The present invention relates to a printer which comprises a platen for holding therearound a printing paper, a ribbon having formed a predetermined sublimation dye portion and a cover film in the predetermined alignment, a thermal print head formed of a number of head elements for heating the sublimation dye portion of the ribbon in accordance with a picture image information under the condition that the sublimation dye portion of the ribbon and the printing paper on the platen are made in close contact with each other and for transferring the sublimation dyes on the printing paper so as to print a picture image on the printing paper and a thermal head having a single heat generating portion of a width at least equal to the full width of the ink portions and for hot pressing the cover film on the printing paper under the condition that the printing paper and the cover film are made in close contact with each other on the platen. According to this invention, the cover film can be laminated on the printing paper easily and positively and also the overall arrangement of the apparatus can be made small in size and simple in construction.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a perspective view of a prior art printer, Fig. 2 is a diagram showing the construction of its laminator, Fig. 3 is a diagram showing a pattern of an ink ribbon which includes thereon a cover film layer, Fig. 4 is a diagram showing the construction of an embodiment of a

printer according to this invention, Figs. 5 and 6 are pattern diagrams showing examples of a cover film, Figs. 7 and 8 are respectively perspective views of examples of a thermal head for hot pressing the cover film and Figs. 9 and 10 are respectively diagrams showing the construction of other embodiments of this invention.

BEST MODE FOR CARRYING OUT THE INVENTION

To describe the present invention more fully, an embodiment of the printer according to this invention will be described with reference to Fig. 4. In the figure, like parts corresponding to those in Fig. 1 are marked with the same references. Similarly as described in connection with Fig. 1, the ink ribbon 3 is of such a structure that the respective ink portions, for example, the ink portions coated with the sublimation dyes of the yellow Y, the magenta M, the cyan C and the black B 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, this ink ribbon 3 moves along the platen 2 around which the printing paper 1 is wound, or comes in contact with the printing paper 1 set on the platen 2. In the place in which the ink ribbon is in contact with the printing paper, the thermal transfer head 4 which is heated in accordance with the picture image information contacts with the ink ribbon 3 from the back surface thereof so as to sequentially transfer the sublimation dyes of respective colors on the printing paper, thus a color picture image being obtained. Here, 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 Fig. 1.

A supply roll 17 and a take-up roll 18 for a cover film 16 are provided so as to move the cover film 16 while in contact with the printing paper 1 placed on the platen 2. A thermal head 19 is formed of a single heat generating element over the full width of the cover film so as to hot press the cover film 16 on the printing paper 1 set on the platen 2 from the back surface of the film 16. Reference numerals 20 and 21 designate guide members for the ink ribbon 3 and reference numerals 22 and 23 designate guide members for the cover film.

The cover film 16 can be formed such that, for example, as shown in Fig. 5 a cover film layer 16b made of 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 or that as shown in Fig. 6, the similar cover film layer 16b is continuously coated on the film base material. The film base material 16a of the cover film 16 is made by coating a resinous composition for use in a smoothing treatment on a condenser paper in order that the resinous layer as the cover film layer 16b can be transferred positively. As the resin for use in lamination such one may be used which has high transparency and improves

the coloring property of the sublimation dye. The resinous materials must be selected so as to avoid 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 coloring property, it is preferred that the resin may have benzene nucleus or cyclic structure in a molecular structure and may be, for example, polyester resins (saturated linear-shape polyester resin), epoxy resins, cellulose resins, acetal resins and so on.

As the resin for use in smoothing treatment, such one is sufficient which is not molten together with the resin for use in lamination and, for example, silicone resins, polyolefins (polyethylene, polypropylene and copolymers of various kinds) and acrylic resins.

Practical examples will be enumerated. In the first example, as the resin for use in smoothing treatment, 100 parts by weight of polybutadiene-system oligomer having terminal acrylic groops and 2 parts by weight of benzyl dimethyl ketal as a photosensitizer were mixed and the mixed product was coated on the condenser paper so as to have an area weight of $10g/m^2$. Thereafter, the product was cured under irradiation of high voltage mercury lamp of 80W/cm provided with 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.

As the resin for use in lamination, namely, the

cover film layer 16b, a saturated linear polyester resin was used. For example, the mixture of VYLON #20 (60 parts by weight) and VYLON #30 (40 parts by weight) each manufactured by TOYOBO CO., LTD. was dissolved so as to have solid content of 30 weight % by 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 amount was $20g/m^2$.

In the second example, as the resin for use in smoothing treatment, a mixture of 100 parts by weight of silicone rubber, 10 parts by weight of catalyzer and 30 parts by weight of toluene was used. This mixture was coated on the condenser paper ($10g/m^2$) and then cured at 150°C for one hour. As the resin for the cover film layer, such one that 30 % solution of VYLON #20 manufactured by TOYOBO CO., LTD. in methyl ethyl ketone was coated and then dried.

In the third practical example, as the resin for use in smoothing treatment, polyethylene (SUMIKATHENE manufactured by SUMITOMO CHEMICAL CO., LTD.) was employed. Namely, this polyethylene was press-molded to be a film having a thickness of 10 μm by an uniaxial injection molding machine at screw temperature ranging from 200 to 220°C and a die temperature of 220°C. The resultant polyethylene film was roll-laminated on the condenser paper under linear pressure of 3kg/cm, at temperature of 140°C and at speed of 3m/min.

The cover film layer 16b was formed on the film base material 16a with the surface smoothed similarly to the first practical example. In the third practical example, in place of the SUMIKATHENE L-402 manufactured by SUMITOMO CHEMICAL CO., LTD. HI-MILAN #1855 manufactured by MITSUI POLYCHEMICALS CO., LTD. can be used.

In this case, since no other ink portion is formed on the film base material 16a, the cover film layer 16b can be formed as a layer of desired thickness and 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 is provided, as, for example, shown in Figs. 7 and 8, at its tip end 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 in line contact with the platen 2, getting the ink ribbon 3 and the cover film 16 therebetween. The contact portion 19a is provided with a resistive material layer 19b deposited on the contact portion by, for example, vacuum evaporation, plating and the like so as to generate heat when it is supplied with a current. This resistive material layer 19b may continuously be formed with a width corresponding to that of the ink portions of the ink ribbon 3 as shown in Fig. 7 or formed intermittently at the portion corresponding to each head element 4a of the thermal transfer head 4 seen in Fig. 1 as illustrated in Fig. 8.

The cover film layer 16b of the cover film 16 is transferred and pressed on the printing paper 1 by the thermal head 19 as mentioned before. In this case, when the cover film layer 16b is formed to be the intermittent pattern as shown in Fig. 5, a mark 16c is disposed in association with each intermittent pattern just like the detection mark 5 formed on the ink ribbon 3 described in connection with Fig. 1 and this mark 16c is detected by detecting means not shown so as to determine the relative position of the cover film 16b to the printing paper thereby enabling the cover film layer 16b to be laminated on the printing paper exactly at the printed portion.

As described above, since in the printer of this invention the thermal head for use in printing and the thermal head for use in hot pressing the cover film are disposed at different positions for the common platen around which the printing paper is wound, it is possible to avoid the apparatus from being made large in size due to the provision of press rolls, the heat capacity from being increased and much energy from being consumed thereby and so on as described in the beginning.

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 preamble can be avoided and the cover film layer can be formed so as to have the desired thickness and coating condition, thus this cover film layer being printed on the

printing paper positively.

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

Unlike the prior art printer using the heating rolls as mentioned in the beginning, 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 the bubble can be prevented from being taken in, resulting in great practical advantages.

Figs. 9 and 10 respectively illustrate other embodiments of the present invention. In Figs. 9 and 10, like parts corresponding to those in Fig. 1 are marked with the same references and will not be described. In the case, similarly to Fig. 3, the ink ribbon 3 comprises the ink portions, for example, the ink portions coated with the sublimation dyes of, for example, the yellow Y, the magenta M, the cyan C and the black B which are in turn arranged and

the cover film 13 made of the transparent resinous layer releasable from the base material 9 and located thereafter. This 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, or comes in contact with the printing paper 1 set on the platen 2. Then, in the contact portion, the thermal transfer head 4 having a number of head elements which is heated in accordance with the picture information comes in close contact with the ink ribbon 3 from its back surface so as to sequentially transfer the sublimation dyes of respective colors on the printing paper, thereby obtaining the color picture image. Here, the thermal transfer head 4, the ink ribbon 3, the platen 2 and so on can be constructed similarly to those in Fig. 1.

As to the hot-pressing of the cover film 13, for 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 the printing paper 1 set on the platen 2 from the back surface of the cover film 13 by using the thermal head 19 for use in hot pressing the cover film having the single heat generating portion having the width over its full width as shown in Fig. 7. Reference numerals 27 and 28 designate guide members for the ink ribbon 3.

Other portions are constructed similarly as in the prior art printer.

The operation of the printer seen in Fig. 9 will be described in concrete. After the front and back surfaces of a polyethylene telephthalate film was subjected to a treatment for giving a heat-resisting property by applying liquid containing silicone denatured epoxy resin and hardener, thereon formed are a thermal sublimation ink and a cover film made of methylmethacrylate polymer to thereby form the ribbon 3 shown in Fig. 3. The ink ribbon was heated from the back surface thereof by the thermal head 4 having a number of head elements for use in picture image in accordance with the video signal so as to sublimate the sublimation dyes on the surface of the printing paper 1 which was set on the platen 2, thus the picture image being formed. The sublimation dyes may be yellow, magenta, cyan and necessary black and used in turn repeatedly. Then, the thermal head 19 comes in 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 finished good to have a very smooth surface.

The embodiment shown in Fig. 10 will be described. In this embodiment, there is used an integral type head 29 in which the thermal head 4 for picture image and the thermal

head 19 having the single heat generating element for the cover film are disposed in parallel to each other on the surface of a ceramic plate. The picture image thermal head 4 of the head is inclined first to the surface of the printing paper 1 set 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 is reversely inclined a little at the side of the thermal head 19 having the single heat generating element to be in contact with the back surface of the ribbon sufficiently and to heat the cover film 13 on the back surface of the ribbon so as to melt bond and transfer the cover film 13 on the printing paper. The others are formed similar to those of Fig. 1.

It will easily be understood that the embodiments in Figs. 9 and 10 can achieve the same action and effect as those of the embodiment in Fig. 4.

Further, according to the embodiments of the invention, 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 made in close contact with the printing paper set on the platen to transfer the sublimation dye on the printing paper thereby printing the picture image by the thermal head having the single heat generating element over its full width for hot pressing the cover film on the

printing paper under the condition that the printing paper and the cover film are made in close contact with each other on the platen and the ink ribbon coated with the sublimation dye portions and by using the cover film in the predetermined alignment. Thus, the lamination of the cover film can be carried out stably and positively and the overall arrangement of the apparatus can be made smaller in size and more simple in construction.

CLAIMS

1. A printer characterized by a platen for holding therearound a printing paper, a thermal print head having a number of heat generating elements for heating a sublimation dye portion of an ink ribbon in accordance with a picture image information under the condition that said ink ribbon containing the sublimation dye is made in close contact with said printing paper set on said platen and for transferring said sublimation dye of said ink ribbon on said printing paper, and a thermal head having a single heat generating element over its full width and for hot pressing a cover film on said printing paper under the condition that said cover film is made in close contact with said printing paper printed and set on said platen.

2. A printer characterized by a platen for holding therearound a printing paper, an ink ribbon having formed thereon a sublimation dye portion and a cover film in a predetermined alignment, a multi-element thermal print head for heating said sublimation dye portion of said ink ribbon in accordance with a picture image information under the condition that said printing paper on said platen is made in contact with said sublimation dye portions of said ink ribbon and for transferring said sublimation dye on said printing paper so as to print a picture image thereon, and a thermal head having a single heat generating portion over

its full width and for hot pressing said cover film on said printing paper under the condition that said printing paper printed is made in close contact with said cover film.

3. A printer characterized by a platen for holding therearound a printing paper, a supply roll for supplying an ink ribbon coated with a predetermined sublimation dye, a supply roll for supplying a cover film, a thermal head for heating said ink ribbon in accordance with a picture image information under the condition that said ink ribbon is made in close contact with said printing paper set on said platen and for transferring said sublimation dye of said ink ribbon on said printing paper, and a thermal head for hot pressing said cover film on said printing paper at different position on said platen.

4. A printer according to claim 3, characterized in that said thermal head for hot pressing said cover film on said printing paper is formed of a single heat generating element.

FIG. 1

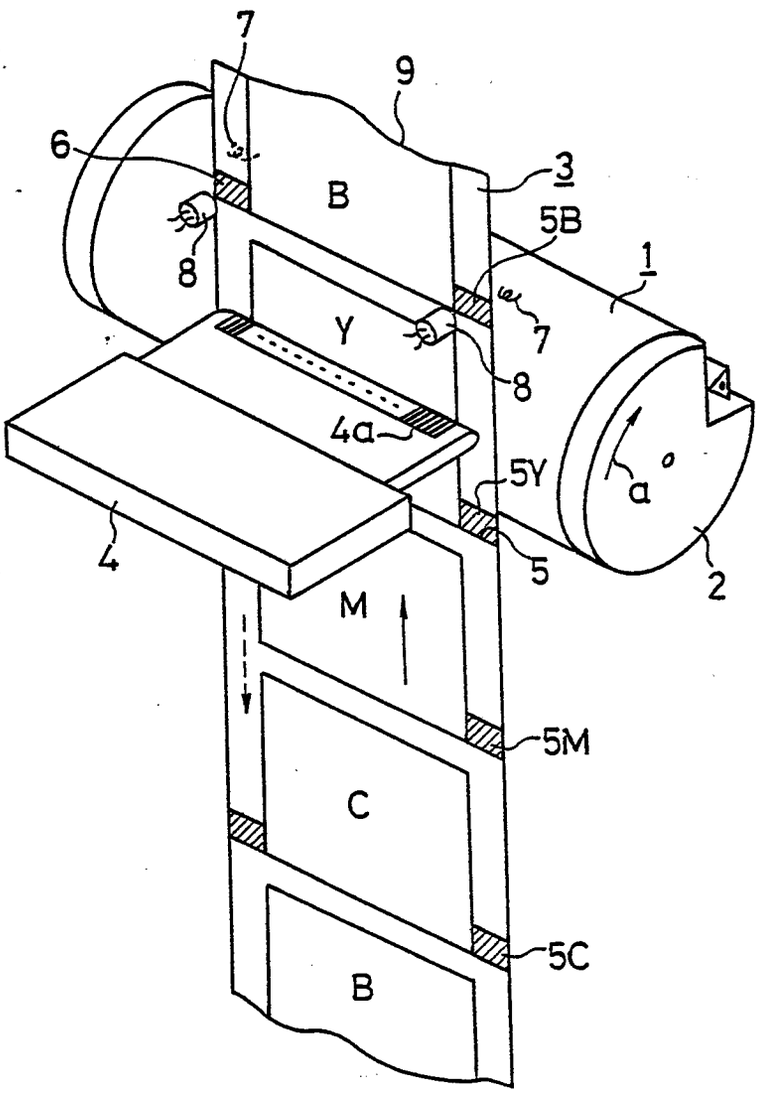


FIG. 2

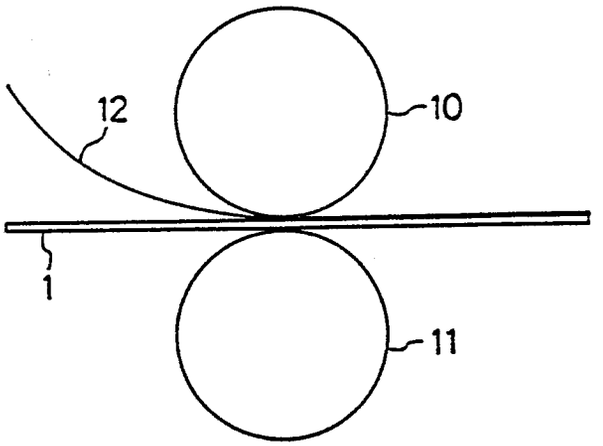


FIG. 3

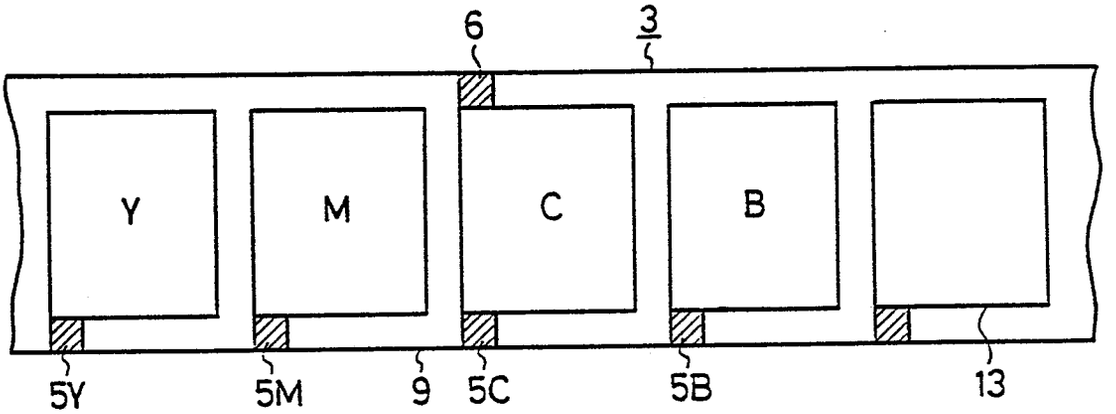


FIG. 4

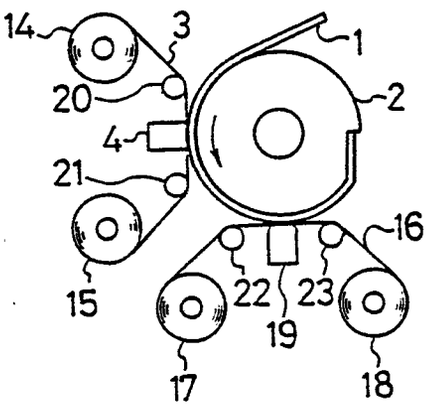


FIG. 5

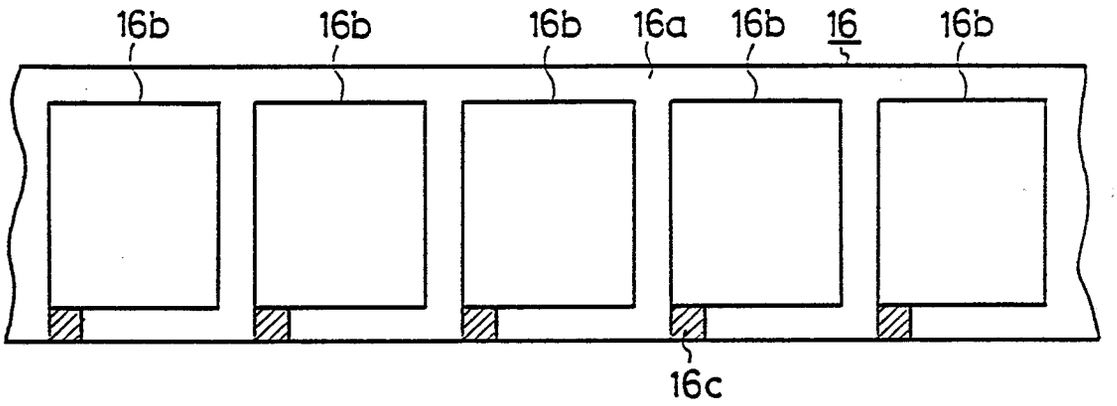


FIG. 6

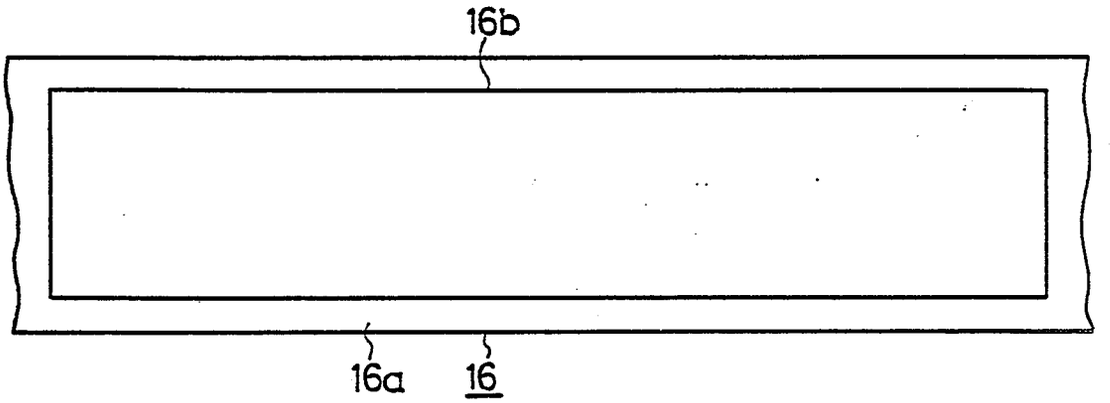


FIG. 7

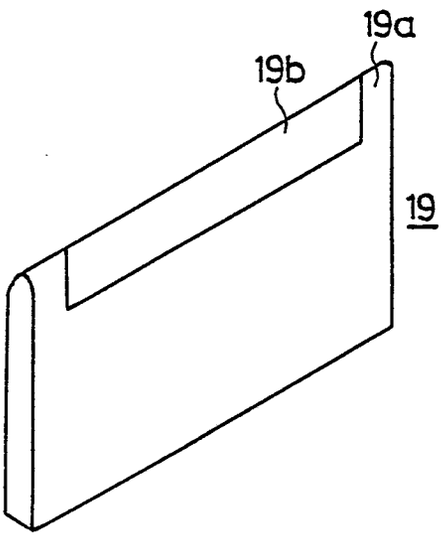


FIG. 8

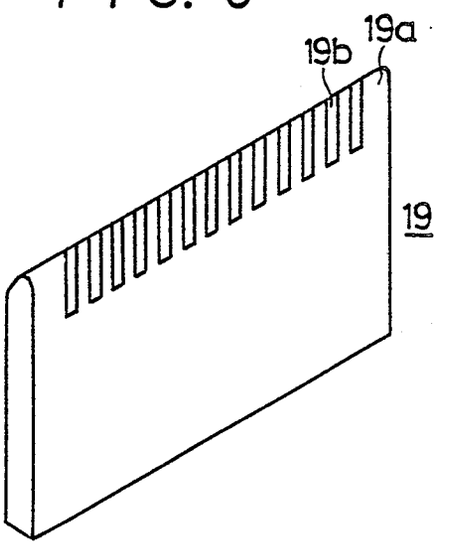


FIG. 9

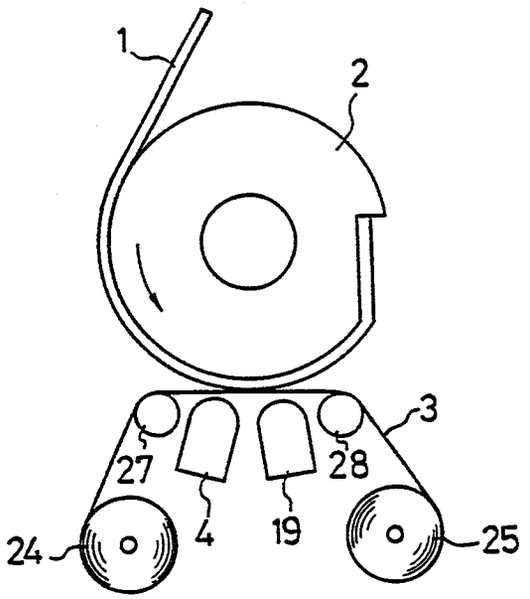
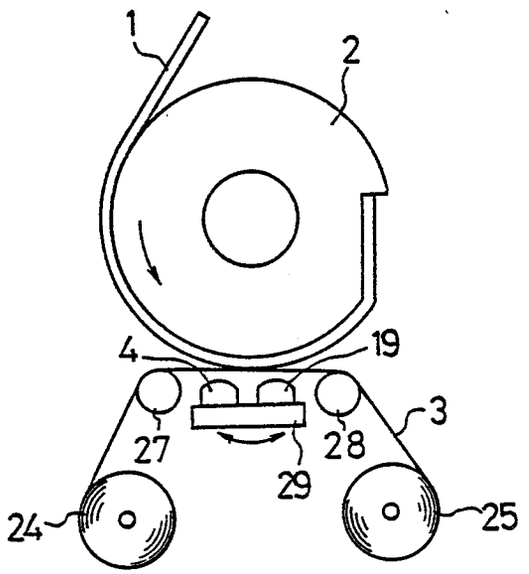


FIG. 10



EXPLANATION FOR REFERENCE NUMERALS

Reference numeral (1) represents the printing paper, (2) the platen, (3) the ink ribbon, (4) the thermal transfer head, (13) and (16) the cover films, and (19) the hot pressing thermal head for the cover film.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/JP84/00330

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl[3] B41J3/20 // B41J29/00, 31/00

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC	B41J3/00-3/22, 29/00, 31/00 B41M5/26

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

Jitsuyo Shinan Koho 1964-1984
Kokai Jitsuyo Shinan Koho 1971-1984

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category*	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
P	JP, A, 58-148778 (Sony Corp.), 3 September 1983 (03. 09. 83)	1 - 4
P	JP, A, 58-148779 (Sony Corp.), 3 September 1983 (03. 09. 83)	1 - 4
P	DE, A, 3315139 (Canon K. K.), 3 November 1983 (03. 11. 83)	1 - 4
A	GB, A, 2106148 (Sony Corporation) 7 April 1983 (07. 04. 83) & DE, A, 3227831 & FR, A, 2510042 & NL, A, 8202999 & AU, A, 8640782 & JP, A, 58-015064 & JP, A, 58-147390	1 - 4

* Special categories of cited documents: [15]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search [1]	Date of Mailing of this International Search Report [2]
August 31, 1984 (31. 08. 84)	September 10, 1984 (10. 09. 84)
International Searching Authority [1]	**Signature of Authorized Officer [20]**
Japanese Patent Office	