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Description

[0001] The present invention relates to a printer that can print data on both sides of a paper.

[0002] As disclosed in, for example, Jpn. Pat. Appln. KOKAI Publication No. 11-286147, double-side printing mechanisms that can print data on both sides of a paper at the same time are known. Of these mechanisms, one that uses thermal head to print data on both sides of a thermal paper is known in particular. In this double-side printing mechanism, a first printing unit having a first thermal head and a first platen roller and a second printing unit having a second thermal head and a second platen roller are arranged symmetrical with respect to the paper-feeding path.

[0003] In this double-side printing mechanism, the first thermal head prints data on a thermal paper and then the second thermal head prints data on the thermal paper, thereby printing data on both sides of the thermal paper.

[0004] The configuration of the double-side printing mechanism described above can be applied to a thermal printer having a cover that can be opened and closed. The main unit of this thermal printer incorporates, for example, only the first platen roller and the second thermal head. The first thermal head and the second platen roller are arranged in the cover.

[0005] In order to ensure a predetermined pressure, the thermal printer is so configured that the first thermal head and the second thermal head are pushed onto the platen rollers by compression springs. Further, the thermal printer is so designed that the first thermal head and the second thermal head are rotated by predetermined strokes.

[0006] In the thermal printer so configured as described above, the cover may be closed while the first thermal head and the second thermal head remain displaced by the predetermined strokes. In this case, the first thermal head and the second thermal head may interfere with any other components, possibly damaging the components.

[0007] Of single-sided thermal papers, one is known on which timing marks such as black dots are printed, indicating the position where the paper should be cut. The timing marks are printed beforehand on the reverse side (i.e., the side that has no thermosensible layers). The conventional double-side thermal printer cannot utilize the timing marks when this single-sided thermal paper is used. The conventional double-side thermal printer should therefore be improved to enhance its versatility.

[0008] U.S. Patent No. 6,784,906 discloses a printer of this type. In this printer, the first printing unit and the second printing unit are provided in the paper-feeding path, positioned downstream and upstream, respectively, with respect to the direction in which a paper is being transported, and print data on both sides of a paper at the same time while the paper.

[0009] US-A-5,868,069 discloses an apparatus for

generating proofs of print signatures composed of first and second flats printed on opposite sides of a sheet which comprises first and second digital printing units. EP-A-0 947 340 on the other side discloses a both faces print station which prints both faces of thermal paper using a line thermal head simultaneously.

[0010] An object of the present invention is to provide a thermal printer that can use not only double-sided thermal papers and single-sided thermal papers, but also thermal papers having timing marks.

[0011] To attain the object described above, a thermal printer according to this invention is designed to print data on a thermal paper having a thermosensible layer on at least one side. This printer comprises:

a first thermal head which is arranged to contact said one side of the thermal paper and to print data on said one side of the thermal paper;

a first platen which is opposed to the first thermal head across the thermal paper;

a cutter mechanism which is arranged downstream with respect to the first thermal head, in a direction of feeding the thermal paper, and which is configured to cut the thermal paper;

a second thermal head which is arranged upstream with respect to the first thermal head, in the direction of feeding the thermal paper, to contact the other side of the thermal paper;

a second platen which is opposed to the second thermal head across the thermal paper;

a motor;

a drive-force transmitting mechanism which is configured to transmit a rotation of the motor to the first platen and the second platen ;

a first paper sensor which is arranged upstream with respect to the second thermal head, in the direction of feeding the thermal paper and which is configured to detect the thermal paper; and

a second paper sensor which is arranged between the first thermal head and the second thermal head and which is configured to detect the thermal paper and to read optically marks printed on the thermal paper,

wherein the marks are timing marks indicating a position where the thermal paper is to be cut.

[0012] Further, in this invention, the second paper sensor can detect the distal end of the thermal paper and timing marks such as black dots. The timing marks may be beforehand printed on a single-sided thermal paper. They may be printed a double-sided thermal paper, by using the second thermal head. The thermal printer according to this invention can use both a double-sided thermal paper and a single-sided thermal paper. In addition, the thermal printer can use thermal papers having timing marks. Thus, the thermal print has high versatility

[0013] The invention can be more fully understood from the following detailed description when taken in con-

junction with the accompanying drawings, in which:

FIG. 1 is a side view of a thermal printer, schematically showing the internal structure of the thermal printer;

FIG. 2 is a sectional view of a double-sided thermal paper;

FIG. 3 is a perspective view showing a part of a thermal paper having timing marks;

[0014] FIG. 1 schematically shows the internal structure of a thermal printer 201. This thermal printer 201 can simultaneously print data on both sides of a double-sided thermal paper 202. The printer 201 can be used in, for example, cash registers for use in retail shops.

[0015] As shown in FIG. 2, the double-sided thermal paper 202 (hereinafter called "thermal paper") has a base paper 203 and two thermosensible layers 204 and 205. The layers 204 and 205 are formed on the obverse and reverse sides of the base paper 203, respectively. More precisely, the first thermosensible layer 204 is formed on one side (e.g., obverse side) of the base paper 203, and the second thermosensible layer 205 is formed on other side (e.g., reverse side) of the base paper 203. These layers 204 and 205 are made of material that attains a desired color, such as black or red, when it is heated to a temperature equal to or higher than a predetermined value. As FIG. 1 shows, the thermal paper 202 is rolled, forming a roll, with the first thermosensible layer 204 turned inwards.

[0016] The thermal printer 201 has a printer main unit 211 and a cover 212. The cover 212 can be opened and closed. The printer main unit 211 has a paper receptacle 213, in which the rolled thermal paper 202 is placed. The cover 212 can be rotated up and down, around the shaft 215 of a hinge unit 214 provided on the printer main unit 211. When the cover 212 opened, the printer main unit 211 is opened at the top. FIG. 1 shows the cover 212 in the closed state.

[0017] A first thermal head 221 is provided in the printer main unit 211. The first thermal head 221 is arranged in the printer main unit 211 and can contact one side of the thermal paper 202, more precisely the first thermosensible layer 204. The first thermal head 221 is secured to a heat sink 222 that is a heat-radiating member. The first thermal head 221 and the heat sink 222 can rotate around a shaft 223.

[0018] In the cover 212, a first platen roller 231 is arranged and opposed to the first thermal head 221. The first platen roller 231 faces the first thermal head 221, clamping the thermal paper 202 jointly with the first thermal head 221, while the cover 212 remains closed as shown in FIG. 1.

[0019] The first platen roller 231 is made of elastic material having a coefficient of friction greater than that of metal, such as nitrilebutadiene rubber (NBR). The first platen roller 231 is shaped like a circular column and can rotate together with a first platen shaft 232 that extend in

horizontal direction. A cutter mechanism 233 is located downstream with respect to the first thermal head 221 in the direction of feeding the thermal paper. The cutter mechanism 233 is used to cut the thermal paper 202.

The cutter mechanism 233 is provided in, for example, the cover 212.

[0020] As FIG. 1 shows, the first thermal head 221 is set in a horizontal position, below the first platen roller 231. The distal-end part of the thermal paper 202 rolled and contained in the paper receptacle 213 passes through the nip between the first thermal head 221 and the first platen roller 231 and then through the cutter mechanism 233 and is ejected in the direction of arrow C shown in FIG. 1.

[0021] At the back of the first thermal head 221, a first biasing means 234 is provided. An example of the first biasing means 234 is a spring member such as a compression spring or a torsion spring. The first biasing means 234 is arranged between the heat sink 222 and a spring seat 235 that is provided in the printer main unit 211. The first biasing means 234 pushes the first thermal head 221 toward the first platen roller 231 in the direction of arrow A shown in FIG. 1.

[0022] A first platen gear 241 is mounted on the first platen shaft 232. The first platen gear 241 rotates together with the first platen roller 231. The first platen shaft 232 is supported by a bearing (not shown) provided in the cover 212 and can rotate.

[0023] A second thermal head 242 is provided in the cover 212. The second thermal head 242 is arranged upstream with respect to the first thermal head 221, in the direction of feeding the thermal paper 202. The second thermal head 242 is arranged in the cover 212 to contact the other side of the thermal paper 202, i.e., the second thermosensible layer 205. The second thermal head 242 is secured to a heat sink 243 that is a heat-radiating member. The second thermal head 242 can rotate around a shaft 244.

[0024] A second platen roller 251 is provided in the printer main unit 211 and is opposed to the second thermal head 242. The second platen roller 251 faces the second thermal head 242, clamping the thermal paper 202 jointly with the second thermal head 242, while the cover 212 remains closed as is illustrated in FIG. 1.

[0025] As FIG. 1 shows, the second thermal head 242 is arranged above the second platen roller 251 and inclined downward. The distal end part of the thermal paper 202, which is rolled and contained in the paper receptacle 213, passes through the nip between the second thermal head 242 and the second platen roller 251 and is fed toward the first thermal head 221.

[0026] The second platen roller 251 is made of elastic material having a coefficient of friction greater than that of metal, such as NBR. The second platen roller 251 is shaped like a circular column and is mounted on a second platen shaft 252 that extend in horizontal direction. A second platen gear 253 is mounted on the second platen shaft 252. The second platen gear 253 rotates together

with the second platen roller 251. The second platen shaft 252 is supported by a pair of bearings (not shown), i.e., left and right bearings provided in the printer main unit 211. The second platen shaft 252 can therefore rotate.

[0027] At the back of the second thermal head 242, a second biasing means 254 is provided. An example of the second biasing means 254 is a spring member such as a compression spring or a torsion spring. The second biasing means 254 is arranged between the heat sink 243 and a spring seat 255 that is provided in the cover 212. The second biasing means 254 pushes the second thermal head 242 toward the second platen roller 251 in the direction of arrow B shown in FIG. 1.

[0028] The printer main unit 211 incorporates a motor 261. An example of the motor 261 is a pulse motor that can rotate in both the forward direction and reverse direction. The angle through which it rotates (i.e., rotation angle) can be accurately controlled in accordance with the number of pulses output from a controller 272, which will be described later.

[0029] An output gear 263 is mounted on the shaft 262 of the motor 261. The rotation of the shaft 262 of the motor 261 (hence, the rotation of the output gear 263) is transmitted via a drive-force transmitting mechanism 264 to the first platen roller 231 and the second platen roller 251. The drive-force transmitting mechanism 264 includes a reduction gear 265, a drive gear 266, the above-mentioned second platen gear 253, a pair of idler gears 267 and 268, and the above-mentioned first platen gear 241. The reduction gear 265 is set in mesh with the output gear 263. The drive gear 266 rotates together with the reduction gear 265. The second platen gear 253 is set in mesh with the drive gear 266. The first platen gear 241 is set in mesh with the idler gear 267.

[0030] One idler gear 267 is arranged in the cover 212, and the other idler gear 268 is arranged in the printer main unit 211. The idler gears 267 and 268 mesh with each other as long as the cover 212 remains closed. When the cover 212 is opened, the idler gears 267 and 268 are disengaged from each other. One idler gears 267 meshes with the first platen gear 241 at all times. The other gear 268 meshes with the second platen gear 253 at all times.

[0031] A first paper sensor 271 is arranged upstream with respect to the second thermal head 242, in the direction of feeding the thermal paper 202, in order to detect the thermal paper 202. The first paper sensor 271 is electrically connected to the controller 272. The controller 272 is an example of a control unit that uses a microprocessor or the like.

[0032] While the thermal paper 202 remains between the paper receptacle 213 and the second thermal head 242, the sensing unit 271a of the first paper sensor 271 may contact the thermal paper 202 from below. In this case, the first paper sensor 271 detects the thermal paper 202. When the first paper sensor 271 detects the thermal paper 202, it outputs a signal indicating that the thermal paper 202 has been detected. The signal is supplied to

the controller 272.

[0033] A second paper sensor 273 is arranged between the first thermal head 221 and the second thermal head 242. The second paper sensor 273 is a reflection-type sensor that can optically detect the distal end of the thermal paper 202 and comprises a light-emitting element and a light-receiving element. The second paper sensor 273 can detect timing marks 274 (see FIG. 3) that are printed on the thermal paper 202. When the second paper sensor 273 detects the distal end of the thermal paper 202, it generates a signal indicating that the distal end has been detected. This signal is supplied to the controller 272.

[0034] The timing marks 274 are marks that can be optically read. An example of a timing mark 274 is a black mark (e.g., black dot) that indicates the position where the thermal paper 202 should be cut.

[0035] As described above, the thermal paper 202 is a double-sided thermal paper and has two thermosensible layers 204 and 205 on the obverse and reverse sides, respectively. Therefore, the first thermal head 221 can print the timing marks 274 on the first thermosensible layer 204, or the second thermal head 242 can print the marks 274 on the second thermosensible layer 205. To enable the second paper sensor 273 to detect the timing marks 274, however, the second thermal head 242 prints the timing marks 274. This is because the second thermal head 242 is arranged upstream with respect to the sensor 273 in the direction of feeding the thermal paper 202.

[0036] The thermal paper 202 may be replaced by a single-sided thermal paper having only one thermosensible layer. If this is the case, the timing marks 274 are printed on the reverse side of the thermal paper (i.e., the side on which no thermosensible layers are provided). That is, the second paper sensor 273 of this embodiment can detect the timing marks 274 printed on the double-sided thermal paper 202 and the timing marks printed on a single-sided thermal paper.

[0037] To control the position where to cut the thermal paper 202, by using the timing marks 274, the controller 272 outputs pulses to the motor 261 when the timing marks 274, in number that corresponds to the distance for which the paper 202 has been fed. On the bases of the number of pulses received, the motor 261 is driven by a prescribed angle. That part of the thermal paper 202, which is to be cut, therefore reaches the cutter mechanism 233.

[0038] How the thermal printer 201 according to this embodiment operates will be explained below.

[0039] When the cover 212 is opened to replenish the thermal paper 202, the first platen roller 231 moves away from the first thermal head 221. At the same time, the second thermal head 242 moves away from the second platen roller 251. Further, the one idler gear 267 is disengaged from the other idler gear 268. The top of the printer main unit 211 is therefore opened. As a result, the first thermal head 221 and the second platen roller 251 are fully exposed to the outside.

[0040] While the cover 212 remains closed as shown in FIG. 1, the first biasing means 234 keeps pushing the first thermal head 221 toward the first platen roller 231, and the second biasing means 254 keeps pushing the second thermal head 243 toward the second platen roller 251. Moreover, the idler gears 267 and 268 come into mesh with each other.

[0041] The thermal paper 202 is set in the paper receptacle 213, and the distal end of the paper 202 is led to the second thermal head 242. Then, the first paper sensor 271 detects the thermal paper 202, and the controller 272 outputs pulses. These pulses drive the motor 261 by the prescribed angle in the direction of arrow R shown in FIG. 1. The second platen roller 251 is thereby rotated in the direction of arrow R2. The thermal paper 202 is therefore fed toward the first thermal head 221.

[0042] The rotation of the shaft 262 of the motor 261 is transmitted via the drive-force transmitting mechanism 264 to the first platen roller 231 and the second platen roller 251. The first platen roller 231 and the second platen roller 251 therefore rotate in the direction of arrow R1 and the direction of arrow R2, respectively. While the thermal paper 202 nipped between the second thermal head 242 and the second platen roller 251 is moving toward the first thermal head 221, the second paper sensor 273 detects the thermal paper 202.

[0043] When the second paper sensor 273 detects the distal end of the thermal paper 202, the controller 272 outputs pulses. The pulses drive the motor 261 further, by the prescribed angle. Then, the thermal paper 202 is stopped at a preset printing position, with its distal end clamped between the first thermal head 221 and the first platen roller 231.

[0044] When the controller 272 outputs a signal to the motor 261, instructing that data be printed, the motor 261 rotates the first platen roller 231 and the second platen roller 251 in the directions of arrows R1 and R2, respectively. At this time, the first thermal head 221 prints data on the first thermosensible layer 204 of the thermal paper 202. At the same time, the second thermal head 242 can print data on the second thermosensible layer 205 of the thermal paper 202. If necessary, the second thermal head 242 can print, on the desired parts of the second thermosensible layer 205, timing marks 274 that indicate the position where the paper 202 should be cut.

[0045] After the printing is thus performed, the thermal paper 202 is fed toward the cutter mechanism 233. While the thermal paper 202 is being fed so, the second paper sensor 273 detects the timing marks 274. Thereafter, the paper 202 is further fed in accordance with the number of pulses output from controller 272, until that part of the thermal paper 202, at which the paper 202 is to be cut, reaches the cutter mechanism 233. Then, the cutter mechanism 233 operates, cutting the thermal paper 202.

[0046] The thermal printer 201 according to the present embodiment has a paper-reversing function of driving the motor 261 in the reverse direction in order to move the distal end of the thermal paper 202 cut by the

cutter mechanism 233, back to a position near the first thermal head 221. Since the paper-reversing function can return the distal end of the paper 202 to a position near the first thermal head 221, the paper 202 can be prevented from having an unprintable region, i.e., blank region. Thus, the thermal paper 202 will not be wasted.

[0047] In the thermal printer 201 according to this embodiment, the thermal paper 202 can be cut, without using timing marks 274. If no timing marks 274 are used, the pulses output from the controller 272 drive the motor 261 by the prescribed angle, thereby feeding the paper 202 until the part of the paper 202, which is to be cut, reaches the cutter mechanism 233. Then, the cutter mechanism 233 operates, cutting the thermal paper 202.

[0048] Timing marks may be already printed on the reverse side of a single-sided thermal paper (i.e., the side on which no thermosensible layers are provided). In this case, the position at which to cut the paper can be designated if the second paper sensor 273 detects the timing marks printed on the single-sided thermal paper. Thus, the thermal printer 201 according to this embodiment can use not only double-sided thermal papers, but also single-sided thermal papers.

[0049] In reducing this invention to practice, the components of the invention, such as the first and second thermal heads, first and second platen rollers, cutter mechanism, drive-force transmitting mechanism, first paper sensor and second paper sensor, can of course be modified as needed. Moreover, the marks printed on the thermal paper are not limited to timing marks. Any other optically readable marks may be printed, instead.

Claims

1. A printer comprising a thermal paper (202) having a thermosensible layer (204) on at least one side, said printer comprising:

a first thermal head (221) which is arranged to contact said one side of the thermal paper (202) and to print data on said one side of the thermal paper (202);

a first platen (231) which is opposed to the first thermal head (221) across the thermal paper (202);

a second thermal head (242) which is arranged upstream with respect to the first thermal head (221), in the direction of feeding the thermal paper (202), to contact the other side of the thermal paper (202);

a second platen (251) which is opposed to the second thermal head (242) across the thermal paper (202);

a first paper sensor (271) which is arranged upstream with respect to the second thermal head (242), in the direction of feeding the thermal paper (202) and which is configured to detect the

- thermal paper (202); and **characterised by**
 a cutter mechanism (233) which is arranged
 downstream with respect to the first thermal
 head (221), in a direction of feeding the thermal
 paper (202), and which is configured to cut the
 thermal paper (202);
 a motor (261);
 a drive-force transmitting mechanism which is
 configured to transmit a rotation of the motor
 (261) to the first platen (231) and the second
 platen (251);
 a second paper sensor (273) which is arranged
 between the first thermal head (221) and the
 second thermal head (242) and which is config-
 ured to detect the distal end of the thermal paper
 (202) and to read optically marks printed on the
 thermal paper (202),
 wherein the marks are timing marks (274) indi-
 cating a position where the thermal paper (202)
 is to be cut, and
 the motor (261) has a reversing function to move
 the distal end of the thermal paper (202) cut by
 the cutter mechanism (233) back to a position
 near the first thermal head (221).
2. The printer according to claim 1, wherein the second
 paper sensor (273) is a reflection-type sensor that
 is able to detect optically the timing marks (274).
 3. The printer according to claim 2, wherein the thermal
 paper (202) is a double-sided thermal paper having
 thermosensible layers (204, 205) on both sides, and
 the second paper sensor (273) is configured to de-
 tect the timing marks (274) that the second thermal
 head (242) has printed on the other side of the ther-
 mal paper (202).
 4. The printer according to claim 2, wherein the thermal
 paper is a single-sided thermal paper having a ther-
 mosensible layer on one side only, and the second
 paper sensor (273) is configured to detect timing
 marks (274) already printed on the other side of the
 single-sided thermal paper

Patentansprüche

1. Drucker, umfassend
 ein Thermopapier (202) mit einer thermosensitiven
 Schicht (204) auf mindestens einer Seite,
 einen ersten Thermokopf (221), der so angeordnet
 ist, um die eine Seite des Thermopapiers (202) zu
 kontaktieren und die eine Seite des Thermopapiers
 (202) zu bedrucken;
 eine erste Walze (321), die gegenüber dem ersten
 Thermokopf (221) über dem Thermopapier (202) an-
 geordnet ist;
 einen zweiten Thermokopf (242) zum Kontaktieren

der zweiten Seite des Thermopapiers (202), der in
 Bezug auf den ersten Thermokopf (221) in Richtung
 der Aufgabe des Thermopapiers (202) stromauf-
 wärts angeordnet ist;
 eine zweite Walze (251), die gegenüber dem zweiten
 Thermokopf (242) und über dem Thermopapier
 (202) angeordnet ist;
 einen ersten Papiersensor (271), der in Bezug auf
 den zweiten Thermokopf (242) in Richtung der Auf-
 gabe des Thermopapiers (202) stromaufwärts an-
 geordnet und dazu ausgebildet ist, das Thermopa-
 pier zu erfassen;
gekennzeichnet durch
 einen Schneidmechanismus (233), der in Bezug auf
 den ersten Thermokopf (221) in Richtung der Auf-
 gabe des Thermopapiers (202) stromabwärts ange-
 ordnet und dazu ausgebildet ist, das Thermopapier
 zu schneiden;
 einen Motor (261);
 einen Antriebskraft-Übertragungsmechanismus,
 der dazu ausgebildet ist, eine Rotation des Motors
 (261) auf die erste Walze (231) und die zweite Walze
 (251) zu übertragen;
 einen zweiten Papiersensor (273), der zwischen
 dem ersten Thermokopf (221) und dem zweiten
 Thermokopf (242) angeordnet und dazu ausgebildet
 ist, das distale Ende des Thermopapiers (202) zu
 erfassen und auf optische Weise Markierungen zu
 lesen, die auf das Thermopapier (202) gedruckt sind,
 wobei die Markierungen Taktungsmarkierungen
 (274) sind, die eine Position anzeigen, wo das Ther-
 mopapier (202) zu schneiden ist, und der Motor (261)
 eine rückwärts gerichtete Funktion aufweist, um das
 distale Ende des Thermopapiers (202), welches mit-
 tels des Schneidmechanismus (233) geschnitten
 wurde, wieder zurück zu einer Position in, der Nähe
 des ersten Thermokopfs (221) zu bewegen.

2. Drucker nach Anspruch 1, wobei der zweite Papier-
 sensor (273) ein Sensor des Reflexionstyps ist, der
 in der Lage ist, die Taktungsmarkierungen (274) auf
 optische Weise zu erfassen.
3. Drucker nach Anspruch 2, wobei das Thermopapier
 (202) ein doppelseitiges Thermopapier ist, das ther-
 mosensitive Schichten (204, 205) auf beiden Seiten
 aufweist und der zweite Papiersensor (273) so aus-
 gebildet ist, die Taktungsmarkierungen (274) zu er-
 fassen, die der zweite Thermokopf (242) auf die an-
 dere Seite des Thermopapiers (202) gedruckt hat.
4. Drucker nach Anspruch 2, wobei das Thermopapier
 (202) ein einseitiges Thermopapier ist, das nur auf
 einer Seite eine thermosensitive Schicht aufweist
 und der zweite Papiersensor (273) so ausgebildet
 ist, Taktungsmarkierungen (274) zu erfassen, die
 bereits auf die andere Seite des einseitigen Thermo-
 papiers gedruckt sind.

Revendications

1. Imprimante comprenant un papier thermique (202) comportant une couche thermosensible (204) sur au moins un premier côté, ladite imprimante comprenant :
 - une première tête thermique (221) qui est agencée pour entrer en contact avec ledit premier côté du papier thermique (202) et pour imprimer des données sur ledit premier côté du papier thermique (202) ;
 - une première platine (231) qui est opposée à la première tête thermique (221) de l'autre côté du papier thermique (202) ;
 - une seconde tête thermique (242) qui est agencée en amont par rapport à la première tête thermique (221), dans la direction d'acheminement du papier thermique (202), pour entrer en contact avec l'autre côté du papier thermique (202) ;
 - une seconde platine (251) qui est opposée à la seconde tête thermique (242) de l'autre côté du papier thermique (202) ;
 - un premier capteur de papier (271) qui est agencé en amont par rapport à la seconde tête thermique (242), dans la direction d'acheminement du papier thermique (202) et qui est configuré pour détecter le papier thermique (202) ;

et caractérisée par

 - un mécanisme de découpe (233) qui est agencé en aval par rapport à la première tête thermique (221), dans une direction d'acheminement du papier thermique (202), et qui est configuré pour découper le papier thermique (202) ;
 - un moteur (261) ;
 - un mécanisme de transmission de force d'entraînement qui est configuré pour transmettre une rotation du moteur (261) à la première platine (231) et à la seconde platine (251) ;
 - un second capteur de papier (273) qui est agencé entre la première tête thermique (221) et la seconde tête thermique (242) et qui est configuré pour détecter l'extrémité distale du papier thermique (202) et pour lire optiquement des repères imprimés sur le papier thermique (202), dans laquelle les repères sont des repères temporels (274) indiquant une position où le papier thermique (202) est à découper, et le moteur (261) a une fonction marche arrière pour ramener l'extrémité distale du papier thermique (202) découpé par le mécanisme de découpe (233) à une position proche de la première tête thermique (221).
2. Imprimante selon la revendication 1, dans laquelle le second capteur de papier (273) est un capteur du type à réflexion pouvant détecter optiquement les repères temporels (274).
3. Imprimante selon la revendication 2, dans laquelle le papier thermique (202) est un papier thermique double face comportant des couches thermosensibles (204, 205) des deux côtés, et le second capteur de papier (273) est configuré pour détecter les repères temporels (274) que la seconde tête thermique (242) a imprimés sur l'autre côté du papier thermique (202).
4. Imprimante selon la revendication 2, dans laquelle le papier thermique est un papier thermique simple face comportant une couche thermosensible sur un seul côté, et le second capteur de papier (273) est configuré pour détecter les repères temporels (274) déjà imprimés sur l'autre côté du papier thermique simple face.

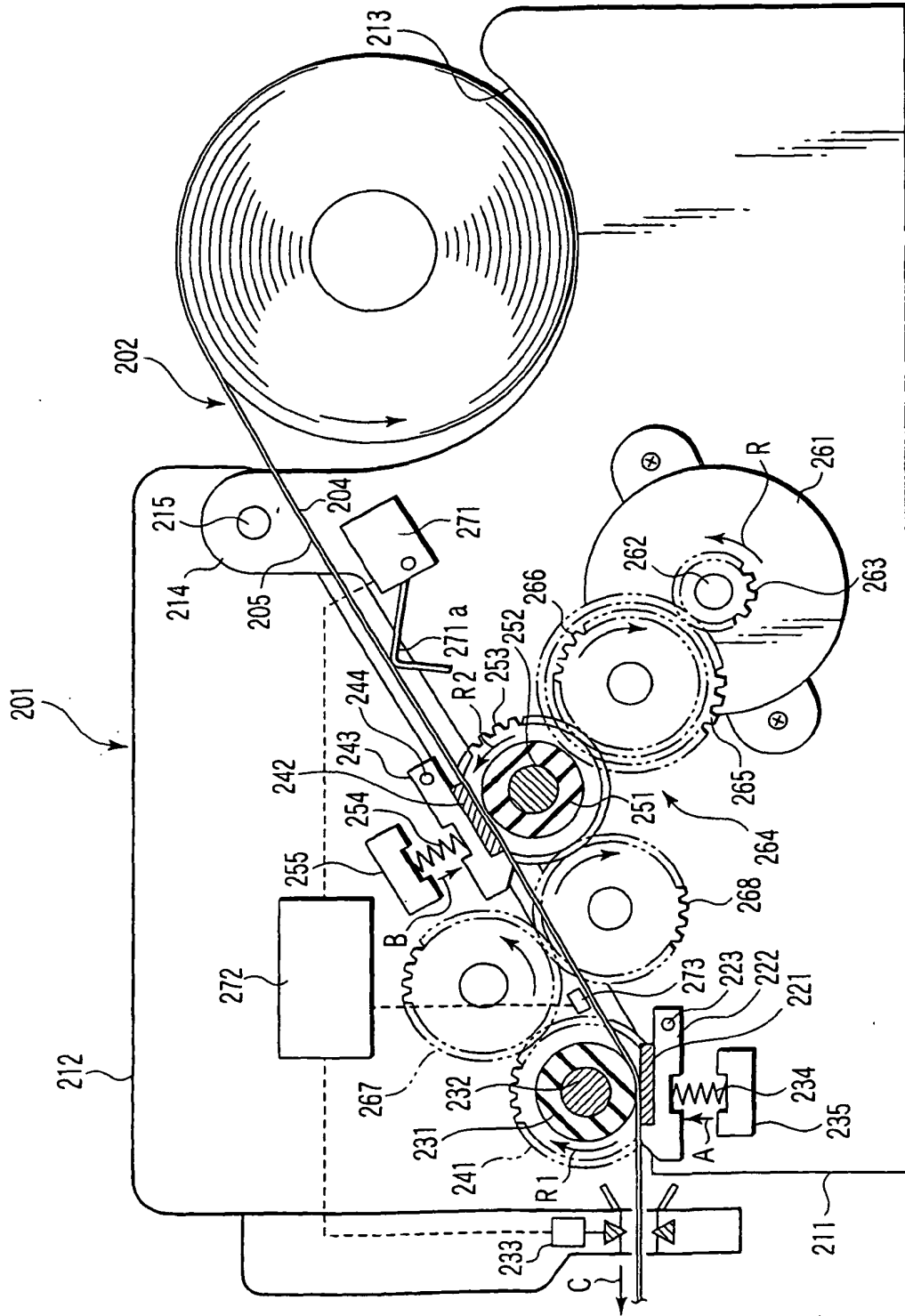


FIG. 1

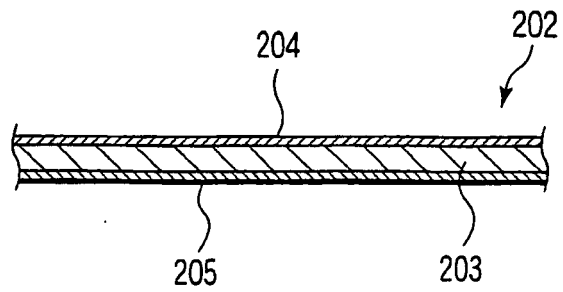


FIG. 2

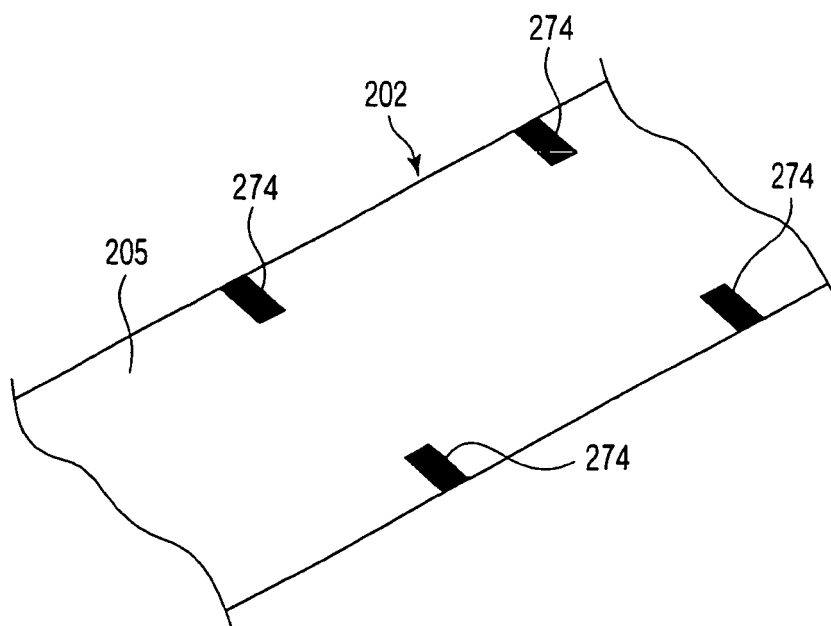


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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