

Description

BACKGROUND OF THE INVENTION:

The present invention relates to an image communication apparatus for ejecting a liquid droplet onto a recording member to perform image recording.

In general, a so-called ink-jet recording system for ejecting a droplet of a liquid such as an ink onto a record sheet according to recording information to perform image recording is known.

The ink-jet recording system has the following drawbacks.

(1) The ink-jet recording system often causes a printing error due to evaporation or drying of an ink or clogging of nozzles with dust, and in a non-recording state, a preservation operation of a head such as capping is necessary.

(2) In order to suppress such a printing error, head recovery operations such as idle ejection of all the nozzles, an ink supply operation, and the like must be performed before printing, and a considerable time is required until recording is ready.

(3) When a head has a large number of nozzles, in particular, in a line head, a probability of omission of printing dots is increased.

Such drawbacks become more serious as the number of nozzles of the head is increased, and pose serious problems particularly when the ink-jet recording system is applied to an apparatus which has a relatively long standby time without recording, e.g. an image communication apparatus such as a facsimile.

Therefore, an ink-jet image communication apparatus comprising a recording head having a plurality of nozzles has not been realised yet.

Reference is made to US Patent No. 4 333 088 which discloses a facsimile transceiver apparatus having an ink-jet printer in which ink is supplied to the jet for priming and purging prior to printing.

Reference is also made to US Patent No. 4 558 332 which discloses a multi-nozzle ink-jet printer in which if an ink-jet nozzle which has been in a non-print mode for more than the predetermined time period is to be used for printing, a printing controller causes the ink-jet nozzle to be scavenged prior to printing.

The present invention has been made in consideration of the above situation, and has as its object to improve an image communication apparatus for ejecting a liquid droplet onto a recording member to record an image.

It is another object of the present invention to provide an image communication apparatus which can prevent a printing error.

It is still another object of the present invention to provide an image communication apparatus which can efficiently perform a reception operation.

It is still another object of the present invention to provide an image communication apparatus which can shorten a time until a recording operation is started when reception is performed after completion of transmission.

It is still another object of the present invention to provide an image communication apparatus which can quickly perform recovery processing of a recording head when reception is performed after completion of transmission.

It is still another object of the present invention to provide an image communication apparatus which performs standby operations including recovery processing of a recording head in response to transmission of a predetermined procedure signal, thereby shortening a time until reception is started when reception is performed immediately after completion of transmission.

The invention aims at achieving one or more of the above objects.

According to the invention there is provided an image communicating apparatus for recording on a recording medium an image corresponding to received data by using a recording head having a plurality of recording elements for ejecting ink droplets, comprising communication means for communicating with a partner station to send/receive predetermined procedure signals associated with communication and image data, first control means for controlling a communication operation of said communication means, said first control means causing a communication mode to shift to a reception mode upon reception of a procedure signal indicating the presence of an original to be transmitted from the partner station after calling the partner station, recovery means for performing a recovery process for recovering an ink ejection condition of said recording head, and second control means for controlling an operation of said recovery means, characterised in that said second control means includes means for detecting transmission of a predetermined procedure signal in the form of a transmission command signal or for reception of said procedure signal and to initiate operation of said recovery means to execute the recovery process before said communication means receives the image data after reception of said procedure signal.

The invention will now be described by way of example with reference to the accompanying drawings in which:-

Fig. 1 is a block diagram showing an electrical arrangement of a facsimile apparatus according to an embodiment of the present invention;

Fig. 2-1 is a sectional view of an ink-jet recording apparatus of this embodiment;
 Fig. 2-2 is a sectional view showing a preservation position of a recording head;
 Fig. 3 is a view showing an ink-jet recording head used in this embodiment;
 Fig. 4 is a flow chart of a main controller of this embodiment; and
 Fig. 5 is a flow chart of a record controller of this embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT:

An embodiment of the present invention will be described in detail hereinafter.

A facsimile apparatus exemplified as an embodiment of the present invention has an ink-jet full-line type line head having a length corresponding to a width of a maximum record sheet which can be used in recording, a head preservation means which can prevent evaporation and clogging of an ink by, e.g., capping, a head recovery means for performing idle ejection of all the nozzles of the line head or ink supply to prevent a printing error, and means for shifting a head to one of a preservation position, a recovery position, and a print position for performing recording, so that the recording head is moved from the preservation position to the print position via a predetermined standby operation simultaneously with transmission of a DTC (digital transmission command signal) when reception is successively performed immediately after completion of transmission.

Fig. 1 is a block diagram showing an embodiment of a facsimile apparatus to which the present invention is applied. In Fig. 1, a main controller 1 of the facsimile apparatus controls facsimile operations such as reading, recording, communication, and the like. modem controller 2 is connected to a line through an NCU 3. A console/display unit 4 comprises LCDs or LEDs and key switches. A read controller 5 has CCDs or a contact sensor. A record controller 6 performs recording of an image read by the read controller 5 or an image received by the modem controller 2. The record controller 6 performs printing of data transferred to a head 6-a by energizing a head driver 6-b. A head shift motor 6-c shifts the head to one of the preservation, recovery, and print positions, and a head position sensor 6-d detects the position of the head. An ink supply circuit 6-e supplies an ink to the line head. The ink supply circuit 6-e performs an ink supply operation after an ink cartridge is exchanged or during a head recovery operation. A recording sheet feed motor 6-f feeds a record sheet for each one line printing operation.

Fig. 2-1 is a cross-sectional view of an ink-jet recording apparatus mounted on the facsimile apparatus shown in Fig. 1. The recording apparatus shown in Fig. 2-1 includes a record sheet 10, a platen roller 20 for feeding the record sheet, an ink-jet head preservation cap 30, and an exhaust ink tray 40. The apparatus also includes a head print position sensor 6d-1, a recovery position sensor 6d-2, and a preservation position sensor 6d-3.

Fig. 2-2 is a view showing a state wherein the head is located at the preservation position. In this state, the nozzle surface is capped by the preservation cap 30.

Fig. 3 shows the full-multi ink-jet head used in this embodiment. In this head, nozzles of one line corresponding to the width of a maximum record size are aligned. In this case, head piping paths behind the nozzle array are not shown. The head shown in Fig. 3 has an ink supply pipe 6a-1. An ink is supplied from an ink tank by driving a gear pump.

The ink-jet head of this embodiment is of a bubble-jet type. In this head, an electric-thermo conversion element such as a heater is driven according to recording information to generate bubbles, thereby ejecting an ink.

Stop positions and operations of the head will be described below.

When the sensor 6d-1 shown in Fig. 2-1 is turned on, the head is located at the print position, and the head driver 6-b is turned on to perform recording. When the sensor 6d-2 is turned on, the head is located at the recovery position, and causes the ink supply circuit 6-e to perform an ink supply operation to recover a printing error caused by clogging of nozzles or evaporation of an ink or causes the head driver 6-b to perform an idle ejection operation with all black image information. Thus, an ink is forcibly ejected from ejection ports to remove an ink having increased viscosity in the nozzles. The removed ink is received by the exhaust ink tray 40. Furthermore, when the sensor 6d-3 is turned on, the head is located at the preservation position, and capping for preventing evaporation and clogging of an ink in a head non-use state is performed.

A gear pump 6a-2 shown in Fig. 3 supplies an ink from an ink cartridge 6a-3 to the head. The ink supply circuit 6-e shown in Fig. 1 is operated to drive this pump, thereby supplying an ink.

The recovery operation includes two kinds of operations, i.e., (1) a method of driving the pump to supply an ink, and (2) an idle ejection method of transferring all black data corresponding to one line of the head to the head, and turning on the head driver 6-b (Fig. 1) to perform a normal all black printing operation at the recovery position.

Fig. 4 is a flow chart showing an operation of the main controller 1, and Fig. 5 is a flow chart showing an operation of the record controller 6.

The overall operation of the facsimile apparatus of this embodiment will be described below with reference to the flow charts of Figs. 4 and 5.

Fig. 4 is a flow chart of the main controller when polling is successively started immediately after completion of transmission. In step S1, a DTC (digital transmission command signal) is sent to a transmitting station. The DTC is a signal for instructing a station on the other end of a line to transmit image data when the own apparatus receives a signal DIS (digital identification signal) for informing functions of the station on the other end of a line and detects the presence of an original after completion of transmission. Thereafter, since the own apparatus becomes a receiving station, the DTC has the same information as the DIS. Upon reception of the DTC, the station on the other end of the line sends a signal DCS for instructing a reception mode, and a signal TCF for checking if there is a transmission error before image data is transmitted.

In step S2, a head standby command is given to the own record controller 6, and training for reception is performed in step S3. In step S4, head standby end information from the record controller 6 is waited. In step S5, a CFR (check for reception ready signal) is sent, and an image data reception operation is then started. Note that the CFR is a signal for informing that the receiving station is ready to receive the image data.

Fig. 5 is a flow chart of the record controller 6 which has received the head standby command output from the main controller 1 in step S2. In step S10, the head is shifted from the preservation position to the recovery position. After the position of the head is checked by the sensor, an ink supply or ink idle ejection operation is performed in step S20.

In step S30, the head is shifted from the recovery position to the print position. In some cases, a wiping operation for removing an ink attached to nozzle ports is required. When the print position sensor of the head is turned on, completion of a standby operation is informed to the main controller in step S40.

In the above embodiment, the head standby operation is performed by the record controller 6. However, these control operations may be performed by the main controller.

In the above embodiment, the head standby operation is performed simultaneously with transmission of the DTC after completion of transmission thereof. However as soon as it is confirmed upon reception of a DIS (digital identification signal) from a station on the other end of the line after

completion of transmission that the station on the other end of the line has a transmission original, the standby operation may be started. Furthermore, when it is detected in response to a DIS after calling that a station on the other end of the line has a transmission original, the standby operation can be similarly performed.

As described above, when reception is successively performed immediately after completion of transmission, the head standby operation is started in response to transmission of a digital transmission command signal. Thus, reception can be efficiently performed even when a preservation or recovery operation is required like in an ink-jet system.

In this embodiment, a recording operation is performed by a bubble-jet system. Any other systems may be employed, as a matter of course.

The recording head is not limited to a full-multi type recording head. For example, a head which serially scans a recording member to perform image recording may be employed.

In this embodiment, the standby operation including the recovery operation is performed in synchronism with transmission of the DTC. However, the present invention is not limited to this. For example, the standby operation may be started in synchronism with reception of a DCS or TCF or transmission of a CFR.

Claims

1. An image communicating apparatus for recording on a recording medium an image corresponding to received data by using a recording head (6-a) having a plurality of recording elements for ejecting ink droplets, comprising communication means (2,3) for communicating with a partner station to send/receive predetermined procedure signals (DIS, DTC, DCS, TCF, CFR) associated with communication and image data, first control means (1) for controlling a communication operation of said communication means, said first control means (1) causing a communication mode to shift to a reception mode upon reception of a procedure signal (DCS) indicating the presence of an original to be transmitted from the partner station after calling the partner station, recovery means (6-e) for performing a recovery process for recovering an ink ejection condition of said recording head, and second control means (6) for controlling an operation of said recovery means, characterised in that said second control means (6) includes means for detecting transmission of a predetermined procedure signal in the form of a transmission command signal (DTC) or for reception of said procedure



Fig. 4 is a flow chart showing an operation of the main controller 1, and Fig. 5 is a flow chart showing an operation of the record controller 6.

The overall operation of the facsimile apparatus of this embodiment will be described below with reference to the flow charts of Figs. 4 and 5.

Fig. 4 is a flow chart of the main controller when polling is successively started immediately after completion of transmission. In step S1, a DTC (digital transmission command signal) is sent to a transmitting station. The DTC is a signal for instructing a station on the other end of a line to transmit image data when the own apparatus receives a signal DIS (digital identification signal) for informing functions of the station on the other end of a line and detects the presence of an original after completion of transmission. Thereafter, since the own apparatus becomes a receiving station, the DTC has the same information as the DIS. Upon reception of the DTC, the station on the other end of the line sends a signal DCS for instructing a reception mode, and a signal TCF for checking if there is a transmission error before image data is transmitted.

In step S2, a head standby command is given to the own record controller 6, and training for reception is performed in step S3. In step S4, head standby end information from the record controller 6 is waited. In step S5, a CFR (check for reception ready signal) is sent, and an image data reception operation is then started. Note that the CFR is a signal for informing that the receiving station is ready to receive the image data.

Fig. 5 is a flow chart of the record controller 6 which has received the head standby command output from the main controller 1 in step S2. In step S10, the head is shifted from the preservation position to the recovery position. After the position of the head is checked by the sensor, an ink supply or ink idle ejection operation is performed in step S20.

In step S30, the head is shifted from the recovery position to the print position. In some cases, a wiping operation for removing an ink attached to nozzle ports is required. When the print position sensor of the head is turned on, completion of a standby operation is informed to the main controller in Step S40.

In the above embodiment, the head standby operation is performed by the record controller 6. However, these control operations may be performed by the main controller.

In the above embodiment, the head standby operation is performed simultaneously with transmission of the DTC after completion of transmission thereof. However as soon as it is confirmed upon reception of a DIS (digital identification signal) from a station on the other end of the line after

completion of transmission that the station on the other end of the line has a transmission original, the standby operation may be started. Furthermore, when it is detected in response to a DIS after calling that a station on the other end of the line has a transmission original, the standby operation can be similarly performed.

As described above, when reception is successively performed immediately after completion of transmission, the head standby operation is started in response to transmission of a digital transmission command signal. Thus, reception can be efficiently performed even when a preservation or recovery operation is required like in an ink-jet system.

In this embodiment, a recording operation is performed by a bubble-jet system. Any other systems may be employed, as a matter of course.

The recording head is not limited to a full-multi type recording head. For example, a head which serially scans a recording member to perform image recording may be employed.

In this embodiment, the standby operation including the recovery operation is performed in synchronism with transmission of the DTC. However, the present invention is not limited to this. For example, the standby operation may be started in synchronism with reception of a DCS or TCF or transmission of a CFR.

Claims

1. An image communicating apparatus for recording on a recording medium an image corresponding to received data by using a recording head (6-a) having a plurality of recording elements for ejecting ink droplets, comprising communication means (2,3) for communicating with a partner station to send/receive predetermined procedure signals (DIS, DTC, DCS, TCF, CFR) associated with communication and image data, first control means (1) for controlling a communication operation of said communication means, said first control means (1) causing a communication mode to shift to a reception mode upon reception of a procedure signal (DCS) indicating the presence of an original to be transmitted from the partner station after calling the partner station, recovery means (6-e) for performing a recovery process for recovering an ink ejection condition of said recording head, and second control means (6) for controlling an operation of said recovery means, characterised in that said second control means (6) includes means for detecting transmission of a predetermined procedure signal in the form of a transmission command signal (DTC) or for reception of said procedure



signal and to initiate operation of said recovery means to execute the recovery process before said communication means receives the image data after reception of said procedure signal (DTC, DCS).

2. An apparatus as claimed in claim 1, characterised in that said first control means (1) outputs a predetermined signal to said second control means (6) upon transmission of said procedure signal (DTC) and said second control means causes said recovery means to execute the recovery process in accordance with said predetermined signal. 5
3. An apparatus as claimed in claim 2, characterised in that said first control means sends said predetermined procedure signal (DTC) to the partner station after reception of another procedure signal (DIS) indicating the presence of an original. 10
4. An apparatus as claimed in claim 3, characterised in that said predetermined procedure signal (DTC) is a signal for instructing the partner station to transmit data. 15
5. An apparatus as claimed in any one of claims 1 to 4, characterised in that said first control means sends to the partner station a procedure signal (CFR) indicating the ready for reception after completion of the recovery process. 20
6. An apparatus as claimed in any one of claims 1 to 5, characterised in that said recovery means performs the recovery process by supplying ink to said recording head. 25
7. An apparatus as claimed in any one of claims 1 to 5, characterised in that recovery means performs the recovery process by causing said recording head to execute idle ejection of ink droplets being of no use for recording. 30
8. An apparatus as claimed in any one of claims 1 to 7, characterised in that said recording head is equipped with the recording elements of one line corresponding to a recording section of the recording medium. 35
9. An apparatus as claimed in any one of claims 1 to 8, characterised in that said recording head ejects ink droplets by causing a change in condition of ink by using thermal energy emitted from the recording elements. 40

Patentansprüche

1. Bildübertragungsvorrichtung zum Aufzeichnen eines Bildes entsprechend empfangenen Daten auf einem Aufzeichnungsmedium unter Verwendung eines Aufzeichnungskopfes (6-a) mit einer Vielzahl von Aufzeichnungselementen zum Ausstoßen von Tintentropfchen, mit einer Übertragungseinrichtung (2, 3) zur Übertragung mit einer Partnerstation zum Senden bzw. Empfangen von vorbestimmten, mit der Übertragung verbundenen Verfahrenssignalen (DIS, DTC, DCS, TCF, CFR) und Bilddaten, 5
einer ersten Steuereinrichtung (1) zum Steuern eines Übertragungsvorgangs der Übertragungseinrichtung, wobei die erste Steuereinrichtung (1) veranlaßt, daß eine Übertragungsart nach Empfang eines Verfahrenssignals (DCS), das das Vorhandensein einer von der Partnerstation nach Anruf bei der Partnerstation zu übertragenden Vorlage anzeigt, zu einer Empfangsart wechselt, 10
einer Wiederherstellvorrichtung (6-e) zum Durchführen eines Wiederherstellvorgangs zum Wiederherstellen eines Tintenausstoßzustands des Aufzeichnungskopfes und 15
einer zweiten Steuereinrichtung (6) zum Steuern einer Arbeitsweise der Wiederherstellvorrichtung, 20
dadurch gekennzeichnet, daß
die zweite Steuereinrichtung (6) eine Einrichtung zum Erfassen der Übertragung eines vorbestimmten Verfahrenssignals in Form eines Übertragungs-Befehlssignals (DTC) oder zum Empfangen des Verfahrenssignals und zum Auslösen der Arbeitsweise der Wiederherstellvorrichtung zum Ausführen des Wiederherstellvorgangs enthält, bevor die Übertragungseinrichtung nach dem Empfang des Verfahrenssignals (DTC, DCS) die Bilddaten empfängt. 25
2. Bildübertragungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** die erste Steuereinrichtung (1) ein vorbestimmtes Signal (1) zu der zweiten Steuereinrichtung (6) nach Übertragung des Verfahrenssignals (DTC) ausgibt und die zweite Steuereinrichtung verursacht, daß die Wiederherstellvorrichtung den Wiederherstellvorgang entsprechend dem vorbestimmten Signal ausführt. 30
3. Bildübertragungsvorrichtung nach Anspruch 2, **dadurch gekennzeichnet, daß** die erste Steuereinrichtung das vorbestimmte Verfahrenssignal (DTC) nach Empfang eines anderen Verfahrenssignals (DIS), das das Vorhanden- 35



sein einer Vorlage anzeigt, zu der Partnerstation sendet.

4. Bildübertragungsvorrichtung nach Anspruch 3, **dadurch gekennzeichnet**, daß das vorbestimmte Verfahrenssignal (DTC) ein Signal zum Befehlen der Partnerstation ist, Daten zu übertragen. 5
5. Bildübertragungsvorrichtung nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet**, daß die erste Steuereinrichtung der Partnerstation ein Verfahrenssignal (CFR) sendet, das die Empfangsbereitschaft nach Abschluß des Wiederherstellvorgangs anzeigt. 10 15
6. Bildübertragungsvorrichtung nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet**, daß die Wiederherstellvorrichtung den Wiederherstellvorgang durch Zuführen von Tinte zu dem Aufzeichnungskopf durchführt. 20
7. Bildübertragungsvorrichtung nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet**, daß die Wiederherstellvorrichtung den Wiederherstellvorgang dadurch durchführt, daß sie den Aufzeichnungskopf veranlaßt, einen Leerlaufausstoß von Tintentröpfchen auszuführen, der nicht zur Aufzeichnung dient. 25
8. Bildübertragungsvorrichtung nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet**, daß der Aufzeichnungskopf mit den Aufzeichnungselementen einer Zeile ausgestattet ist, die einem Aufzeichnungsabschnitt des Aufzeichnungsmediums entspricht. 30 35
9. Bildübertragungsvorrichtung nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet**, daß der Aufzeichnungskopf durch Verursachen einer Veränderung des Zustands der Tinte unter Verwendung von von den Aufzeichnungselementen abgegebener Wärmeenergie Tintentröpfchen ausstößt. 40 45

Revendications

1. Un appareil de transmission d'images pour enregistrer sur un support d'enregistrement une image correspondant à des données reçues, par l'utilisation d'une tête d'enregistrement (6-a) ayant un ensemble d'éléments d'enregistrement destinés à éjecter des gouttelettes d'encre, comprenant des moyens de communication (2, 3) pour communiquer avec une station associée de façon à émettre/recevoir des signaux de procédure prédéterminés (DIS, DTC, DCS, TCF, CFR) qui sont associés à des données de communication et d'image, des premiers moyens de commande (1) pour commander une opération de communication des moyens de communication, les premiers moyens de commande (1) faisant passer un mode de communication à un mode de réception sous l'effet de la réception d'un signal de procédure (DCS) indiquant la présence d'un original à transmettre à partir de la station associée après l'appel de la station associée, des moyens de remise en fonction (6-e) pour accomplir un processus de remise en fonction de façon à rétablir une condition d'éjection d'encre de la tête d'enregistrement, et des seconds moyens de commande (6) pour commander une opération des moyens de remise en fonction, caractérisé en ce que les seconds moyens de commande (6) comprennent des moyens pour détecter la transmission d'un signal de procédure prédéterminé sous la forme d'un signal d'ordre de transmission (DTC) ou pour la réception du signal de procédure et le déclenchement du fonctionnement des moyens de remise en fonction, pour accomplir le processus de remise en fonction avant que les moyens de communication ne reçoivent les données d'image, après la réception du signal de procédure (DTC, DCS). 50 55

nées de communication et d'image, des premiers moyens de commande (1) pour commander une opération de communication des moyens de communication, les premiers moyens de commande (1) faisant passer un mode de communication à un mode de réception sous l'effet de la réception d'un signal de procédure (DCS) indiquant la présence d'un original à transmettre à partir de la station associée après l'appel de la station associée, des moyens de remise en fonction (6-e) pour accomplir un processus de remise en fonction de façon à rétablir une condition d'éjection d'encre de la tête d'enregistrement, et des seconds moyens de commande (6) pour commander une opération des moyens de remise en fonction, caractérisé en ce que les seconds moyens de commande (6) comprennent des moyens pour détecter la transmission d'un signal de procédure prédéterminé sous la forme d'un signal d'ordre de transmission (DTC) ou pour la réception du signal de procédure et le déclenchement du fonctionnement des moyens de remise en fonction, pour accomplir le processus de remise en fonction avant que les moyens de communication ne reçoivent les données d'image, après la réception du signal de procédure (DTC, DCS).

2. Un appareil selon la revendication 1, caractérisé en ce que les premiers moyens de commande (1) émettent un signal prédéterminé vers les seconds moyens de commande (6) sous l'effet de la transmission du signal de procédure (DTC), et les seconds moyens de commande commandent aux moyens de remise en fonction d'accomplir le processus de remise en fonction conformément au signal prédéterminé.
3. Un appareil selon la revendication 2, caractérisé en ce que les premiers moyens de commande émettent le signal de procédure prédéterminé (DTC) vers la station associée après la réception d'un autre signal de procédure (DIS) indiquant la présence d'un original.
4. Un appareil selon la revendication 3, caractérisé en ce que le signal de procédure prédéterminé (DTC) est un signal pour ordonner à la station associée d'émettre des données.
5. Un appareil selon l'une quelconque des revendications 1 à 4, caractérisé en ce que les premiers moyens de commande émettent vers la station associée un signal de procédure (CFR) qui indique l'état prêt pour la réception, après l'achèvement du processus de remise



en fonction.

6. Un appareil selon l'une quelconque des revendications 1 à 5, caractérisé en ce que les moyens de remise en fonction accomplissent le processus de remise en fonction en fournissant de l'encre à la tête d'enregistrement. 5
7. Un appareil selon l'une quelconque des revendications 1 à 5, caractérisé en ce que les moyens de remise en fonction accomplissent le processus de remise en fonction en commandant à la tête d'enregistrement d'exécuter une éjection "à blanc" de gouttelettes d'encre qui n'a aucune utilité pour l'enregistrement. 10 15
8. Un appareil selon l'une quelconque des revendications 1 à 7, caractérisé en ce que la tête d'enregistrement est équipée d'éléments d'enregistrement d'une ligne correspondant à une section d'enregistrement du support d'enregistrement. 20
9. Un appareil selon l'une quelconque des revendications 1 à 8, caractérisé en ce que la tête d'enregistrement éjecte des gouttelettes d'encre en provoquant un changement de condition de l'encre, par l'utilisation d'énergie thermique émise par les éléments d'enregistrement. 25 30

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