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(71) Applicant: **Seiko Epson Corporation**
Shinjuku-ku
Tokyo (JP)

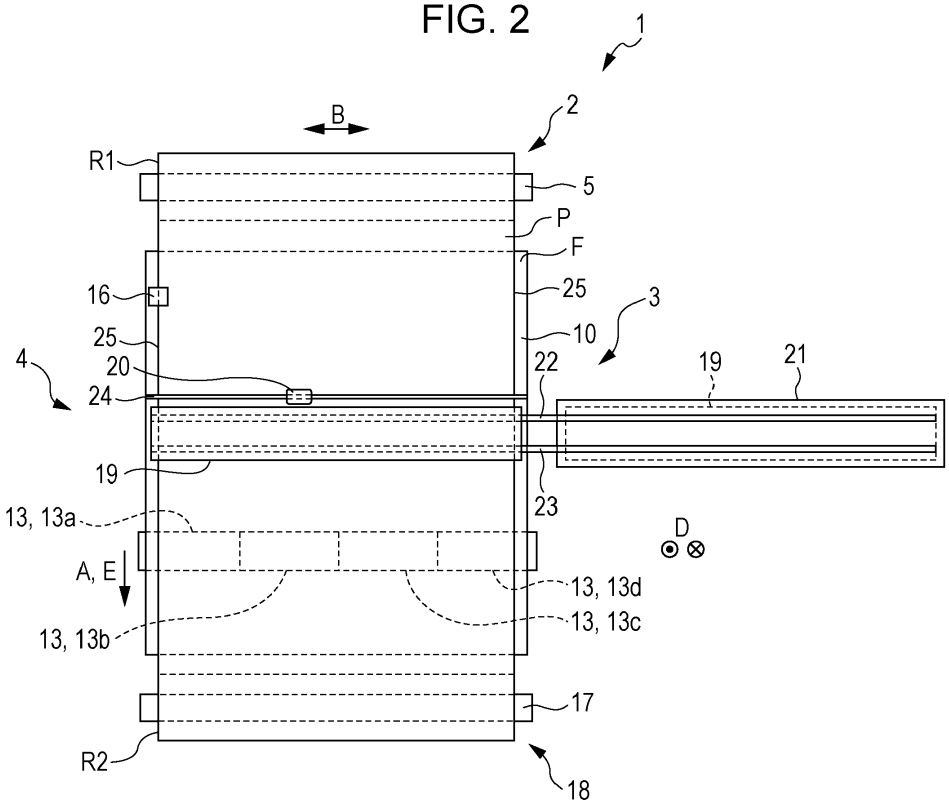
(72) Inventor: **KOJIMA, Kenji**
Suwa-shi, Nagano 392-8502 (JP)

(74) Representative: **Miller Sturt Kenyon**
9 John Street
London WC1N 2ES (GB)

(54) LIQUID DISCHARGING APPARATUS

(57) A liquid discharging apparatus (1) includes a transport section (10) for a medium (P), a line head (19) in which nozzles discharging liquid in an intersecting direction (B) that intersects a direction of transporting the medium are arrayed, a scan sensor (20) that is capable of detecting an end portion (25) of the medium (P) in the intersecting direction (B) by being moved in the intersecting direction (B), and a controller that controls movement in the intersecting direction (B) of the scan sensor (20) and controls discharging of the liquid, in which the line head (19) is movable in the intersecting direction (B), and the controller sets a position of the line head in the intersecting direction (B) based on a detection result of the scan sensor (20).

FIG. 2



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Description

1. Technical Field

[0001] The present invention relates to a liquid discharging apparatus.

2. Related Art

[0002] In the related art, a liquid discharging apparatus, which includes a transport section for a medium, and a line head extending in a direction intersecting a direction of transporting the medium, is used. In such a liquid discharging apparatus, in a case in which a position of a transported medium is deviated from an original position where the medium is intended to be transported, an image may not be capable of being formed on a desired position of the medium. Therefore, for example, JP-A-2011-126204 discloses, an edge sensor, which is capable of detecting an end portion of a medium in a direction intersecting the direction of transporting the medium, and a recording apparatus (liquid discharging apparatus), which is capable of moving a head unit based on a detection result of the edge sensor.

[0003] The recording apparatus, which is disclosed in JP-A-2011-126204, is capable of controlling formation of an image on a desired position of the medium. However, there is a concern that an image may not be formed on a desired position of the medium, in a case in which the medium is transported while being so deviated from the original position as greatly as being deviated from a position detectable by the edge sensor.

SUMMARY

[0004] An advantage of some aspects of the invention is that a discharging position of liquid with respect to a position of a medium by a line head can be accurately arranged.

[0005] According to a first aspect of the invention, a liquid discharging apparatus includes a transport section for a medium, a line head in which nozzles discharging liquid in an intersecting direction that intersects a direction of transporting the medium are arrayed, a scan sensor that is capable of detecting an end portion of the medium in the intersecting direction by being moved in the intersecting direction, and a controller that controls movement in the intersecting direction of the scan sensor and controls discharging of the liquid, in which the line head is movable in the intersecting direction, and the controller sets a position of the line head in the intersecting direction based on a detection result of the scan sensor.

[0006] In the liquid discharging apparatus of a second aspect of the invention according to the first aspect, at the time of discharging operation of the liquid, when the scan sensor is reciprocated in the intersecting direction and the detection result of the scan sensor is input, the controller may change the position of the line head based on the detection result.

[0007] In the liquid discharging apparatus of a third aspect of the invention according to the first aspect, the controller may output an error, in a case in which a length in the intersecting direction of the medium based on discharging data of the liquid is different from a length in the intersecting direction of the medium based on the detection result of the scan sensor.

[0008] In the liquid discharging apparatus of a fourth aspect of the invention according to the first aspect, the controller may calculate a discharging width in the intersecting direction based on discharging data of the liquid and, in a case in which the calculated discharging width is longer than a length in the intersecting direction of the medium based on the detection result of the scan sensor, the controller may output an error.

[0009] In the liquid discharging apparatus of a fifth aspect of the invention according to the first aspect, one end side in the intersecting direction may become a reference position for matching a position in the intersecting direction of the medium, and the controller may set a movement range in the intersecting direction of the scan sensor corresponding to a length of the medium in the intersecting direction based on discharging data of the liquid.

[0010] The liquid discharging apparatus of a sixth aspect of the invention according to the first aspect may further include a meandering detection sensor that, when being disposed at a predetermined position, is capable of detecting whether or not the medium is transported in a meandering manner, by detecting the end portion at the predetermined position, and the controller may set the movement range in the intersecting direction of the scan sensor, based on the position of the meandering detection sensor.

[0011] In the liquid discharging apparatus of a seventh aspect of the invention according to the first aspect, the scan sensor may be disposed at an upstream side further than the line head in the transport direction.

[0012] In the liquid discharging apparatus of an eighth aspect of the invention according to the first aspect, the transport section may be a transporting belt causing the medium to be attached to and transported by the transporting belt.

[0013] The liquid discharging apparatus of a ninth aspect of the invention according to the eighth aspect may further include a cleaning section that is capable of cleaning the transporting belt and changing a cleaning region of the transporting belt in the intersecting direction, and the controller may set the cleaning region based on the detection result of the scan sensor.

[0014] In the liquid discharging apparatus of a tenth aspect of the invention according to the first aspect, the controller may be capable of setting the position of the line head of the intersecting direction to any one of a plurality of positions, in a case in which a length in the intersecting direction of the medium based on the detection result of the scan sensor is shorter than a length in

which the nozzles are arrayed in the intersecting direction.

[0015] In the liquid discharging apparatus of an eleventh aspect of the invention according to the tenth aspect, in a case in which a length in the intersecting direction of the medium based on the detection result of the scan sensor is shorter than a length in which the nozzles are arrayed in the intersecting direction, the controller may be capable of setting the position of the line head in the intersecting direction in accordance with a use frequency of the nozzles.

[0016] In the liquid discharging apparatus of a twelfth aspect of the invention according to the first aspect, in a case in which a length in the intersecting direction of the medium based on the detection result of the scan sensor is shorter than a length in which the nozzles are arrayed in the intersecting direction, the controller may be capable of setting the position of the line head in the intersecting direction to a position where the nozzles of an end portion side of the line head in the intersecting direction do not face the medium.

[0017] According to the invention, the discharging position of the liquid using the line head with respect to the position of the medium can be accurately arranged.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] Embodiments of the invention will now be described by way of example only with reference to the accompanying drawings, wherein like numbers reference like elements.

Fig. 1 is a schematic side view illustrating a recording apparatus according to a first embodiment of the invention.

Fig. 2 is a schematic plan view illustrating the recording apparatus according to the first embodiment of the invention.

Fig. 3 is a block diagram illustrating the recording apparatus according to the first embodiment of the invention.

Fig. 4 is a schematic plan view illustrating the recording apparatus according to the first embodiment of the invention.

Figs. 5A and 5B are schematic views illustrating an arrangement of a head unit and nozzles of a line head in the recording apparatus according to the first embodiment of the invention.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0019] Hereinafter, a recording apparatus according to a first embodiment as a liquid discharging apparatus of the invention will be described with reference to attached drawings in detail.

[0020] First, an outline of a recording apparatus 1 according to the first embodiment of the invention will be described.

[0021] Fig. 1 is a schematic side view of the recording apparatus 1 of the embodiment. In addition, Fig. 2 is a schematic plan view of the recording apparatus 1 of the embodiment. In order to easily describe main parts of the recording apparatus 1 of the embodiment, a part of configuration members are omitted in Fig. 2.

[0022] The recording apparatus 1 of the embodiment includes a feeding section 2 which is capable of feeding a roll R1 of a recording medium (medium) P for recording. Also, a transport mechanism 3 is included, which transports the recording medium P in the transport direction A by an adhesive belt 10 (endless belt) supporting the recording medium P on a supporting surface F to which an adhesive is attached. In addition, a recording mechanism 4 is included, which performs recording by discharging ink, which is an example of liquid, onto the recording medium P from nozzles N (refer to Figs. 5A and 5B) of the line head 19 including the head unit 7 as a discharging section. Moreover, a cleaning mechanism 15 for the adhesive belt 10 is also included. Further, a winding mechanism 18 is included, which includes a winding shaft 17 winding the recording medium P.

[0023] The feeding section 2 includes a rotating shaft 5, which serves as a setting position of the roll R1 of the recording medium P for recording, and is capable of feeding the recording medium P to the transport mechanism 3 through a driven roller 6 from the roll R1, which is set on the rotating shaft 5. When the recording medium P is fed to the transport mechanism 3, the rotating shaft 5 is rotated in a rotating direction C.

[0024] The transport mechanism 3 includes an adhesive belt 10 which mounts and transports the recording medium P fed from the feeding section 2, a driving roller 8 which drives the adhesive belt 10 in a direction E, and a driven roller 9. The recording medium P is pressed and attached onto the supporting surface F of the adhesive belt 10 by a pressing roller 12 so as to be mounted on the supporting surface. Moreover, when the recording medium P is transported, the driving roller 8 is rotated in the rotating direction C.

[0025] However, the endless belt as a transporting belt is not limited to the adhesive belt. For example, an electrostatic chuck endless belt may be used.

[0026] In addition, a configuration in which the recording medium P is supported and transported by a moving support tray, or the like may be adopted, or a configuration in which the recording medium P is transported by a pair of rollers may be adopted. Further, a so-called flatbed type recording apparatus may be used, which performs recording by fixing the recording medium P to a supporting section and moving the line head 19 with respect to the fixed recording medium.

[0027] The recording mechanism 4 includes the line head 19 in which the nozzles N, which discharge liquid in the intersecting direction B intersecting with the transport direction A of the recording medium P, are arranged (refer to Figs. 5A and 5B). The line head 19 includes multiple head units 7 arranged in the intersecting direc-

tion B, in each of which the nozzles N are arranged in the intersecting direction B (refer to Figs. 5A and 5B). Moreover, details are described later; however, during the recording operation (discharging operation of ink), the line head 19 of the embodiment changes a position in the intersecting direction B by a control of the controller 34 (refer to Fig. 3).

[0028] Here, the "line head" is a recording head, which is used to the recording apparatus in which a region of the nozzles N formed in the intersecting direction B intersecting with the transport direction A of the recording medium P is provided to be capable of covering the entirety in the intersecting direction B of the recording medium P so that an image is formed by relatively moving the recording head or the recording medium P. A region of the nozzles N in the intersecting direction B of the line head 19 may not be capable of covering the entirety in the intersecting direction B of the entirety of the recording medium P supported by the recording apparatus 1.

[0029] In addition, as illustrated in Fig. 2, the line head 19 can be moved in the intersecting direction B along guide rails 22 and 23 between a recording position (position illustrated by solid line in Fig. 2) and a maintenance position (position illustrated by broken line in Fig. 2). In addition, as illustrated in Fig. 2, a maintenance section 21 corresponding to the maintenance position of the line head 19 is provided, and the maintenance section 21 is capable of performing capping of the head unit 7, suctioning ink from the nozzles N of the head unit 7, wiping of the head unit 7 by a cap, a suctioning mechanism, a wiper, and the like (not illustrated) in a state in which the line head 19 is in the maintenance position.

[0030] In addition, a meandering detection sensor 16 which is capable of detecting whether or not the recording medium P is meandered is provided at an upstream side of the line head 19 in the transport direction A. The meandering detection sensor 16 of the embodiment is configured so as to be capable of being moved to any position in the intersecting direction B manually by a user. When the user disposes the meandering detection sensor 16 at a position where an end portion 25 in the intersecting direction B of the recording medium P can be detected, the meandering detection sensor 16 detects whether or not the recording medium P is meandered and transported according to an absence/presence of the end portion 25 in a detection range of the meandering detection sensor 16 while transporting the recording medium P. A meandering control is capable of being executed by moving the roll R1 of the feeding section 2 in a direction of the rotating shaft 5, for example, based on a detection result using the meandering detection sensor 16.

[0031] In addition, downstream of the line head 19 in the transport direction A, a scan sensor 20, which is capable of reciprocating (reciprocate-scanning) in the intersecting direction B along the guide rail 24 extending the intersecting direction B, is provided. The scan sensor 20 detects the end portion 25 in the intersecting direction B of the recording medium P by performing reciprocate-scanning in the intersecting direction B.

[0032] The cleaning mechanism 15 for the adhesive belt 10 includes a cleaning brush 13 (refer to Fig. 2) in which a plurality of cleaning rollers 13a, 13b, 13c, and 13d are arranged in a rotating shaft direction (intersecting direction B), and a tray 14 containing detergent for cleaning the cleaning brush 13.

[0033] As described above, the cleaning brush 13 of the embodiment is configured to have the cleaning rollers 13a, 13b, 13c, and 13d which are capable of being rotated in the rotating direction C and a reverse direction of the rotating direction C and arranged in the intersecting direction B. In addition, the cleaning rollers 13a, 13b, 13c, and 13d are individually moved in a direction D, and the cleaning rollers 13a, 13b, 13c, and 13d can be individually brought into contact with and separated from the adhesive belt 10.

[0034] The winding mechanism 18 is a mechanism winding the recording medium P on which recording is performed, which is transported from the transport mechanism 3 through the driven roller 11, and is capable of winding as the roll R2 of the recording medium P by setting a paper tube, or the like for winding over the winding shaft 17 and winding the recording medium P.

[0035] Next, an electric configuration of the recording apparatus 1 of the embodiment will be described.

[0036] Fig. 3 is a block diagram of the recording apparatus 1 of the embodiment.

[0037] The controller 34 is provided with a CPU 35 which has in charge of controlling the entirety of the recording apparatus 1. The CPU 35 is connected to a ROM 26 in which various control programs, and the like executed by the CPU 35 are stored, and a RAM 27 which is capable of temporarily storing data, through a system bus 36.

[0038] Also, the CPU 35 is connected to the head driving section 28 for driving the line head 19, through the system bus 36.

[0039] In addition, the CPU 35 is connected to a motor driving section 29 for driving a scan sensor motor 30, a transport motor 31, a feeding motor 32, a winding motor 33, a cleaning brush rotating motor 39, a cleaning brush moving motor 40, and a head moving motor 41, through the system bus 36.

[0040] Here, the scan sensor motor 30 is a motor for reciprocating the scan sensor 20 in the intersecting direction B. In addition, the transport motor 31 is a motor for driving the driving roller 8. In addition, the feeding motor 32 is a rotation mechanism of the rotating shaft 5 and is a motor driving the rotating shaft 5 for feeding out the recording medium P to the transport mechanism 3. In addition, the winding motor 33 is a driving motor for rotating the winding shaft 17. In addition, the cleaning brush rotating motor 39 is a motor for rotating the cleaning brush 13 (cleaning rollers 13a, 13b, 13c, and 13d). In addition, the cleaning brush moving motor 40 is a motor which is a driving source for individually moving the cleaning rollers 13a, 13b, 13c, and 13d in the direction D. Also,

the head moving motor 41 is a motor for moving the line head 19 in the intersecting direction B.

[0041] The CPU 35 is connected to the input/output section 37 through the system bus 36, and the input/output section 37 is connected to the meandering detection sensor 16, the scan sensor 20, and a PC 38 for receiving and transmitting data such as recording data and signals.

[0042] Because of such a configuration, the controller 23 controls movement of the scan sensor 20 in the intersecting direction B, and is capable of controlling movement of the line head 19 in the intersecting direction B based on a detection result of the scan sensor 20.

[0043] The recording apparatus 1 of the embodiment includes the adhesive belt 10 which is a transport section of the recording medium P, the line head 19 which is movable in the intersecting direction B and in which the nozzles N discharging the ink in the intersecting direction B intersecting with the transport direction A of the recording medium P, and the scan sensor 20 which is capable of detecting the end portion 25 of the recording medium P in the intersecting direction B by being moved in the intersecting direction B.

[0044] In addition, the controller 34 controls a movement in the intersecting direction B of the scan sensor 20, and controls discharging of the ink from the line head 19. Also, based on the detection result of the scan sensor 20, the position of the line head 19 in the intersecting direction B is set.

[0045] As described above, since the scan sensor 20, which is capable of detecting the end portion 25 of the recording medium P in the intersecting direction B by being moved in the intersecting direction B, the recording apparatus 1 of the embodiment is capable of suppressing deviation from the detectable position for detecting transporting of the recording medium P by widening a scanning region, even when the recording medium P is transported by being greatly deviated from the original position where the medium is intended to be transported. In addition, the line head 19 is movable in the intersecting direction B, and the controller 34 sets the position of the line head 19 in the intersecting direction B based on the detection result of the scan sensor 20, and thus the discharging position of the liquid with respect to the position of the medium using the line head 19 can be accurately focused by appropriately setting the position of the line head 19 in the intersecting direction B based on the detection result of the scan sensor 20.

[0046] Next, the position of the line head 19 used when recording is performed in the recording apparatus 1 of the embodiment (at the time of discharging operation of ink) will be described with reference to Fig. 2, Fig. 4, and Figs. 5A and 5B.

[0047] Fig. 4 is a view corresponding to Fig. 2, and is a schematic plan view of the recording apparatus 1 of the embodiment. Here, Fig. 2 illustrates a position of the line head 19 in a case in which the recording medium P having a long length L1 (refer to Figs. 5A and 5B) in the intersecting direction B (width thereof is wide) is used, and Fig. 4 illustrates a position of the line head 19 in a case in which the recording medium P having a narrow width is used.

[0048] Figs. 5A and 5B are schematic views illustrating an arrangement of the nozzles N and the head unit 7 of the line head 19 in the recording apparatus 1 of the embodiment. In these drawings, Fig. 5A illustrates an arrangement of the head units 7 in the line head 19, and an example of a positional relationship between the line head 19 and the recording medium P in a state of being transported. In addition, Fig. 5B is an enlarged view of a part region VB of Fig. 5A, and illustrates a positional relationship between the nozzles N of the head unit 7 and the end portion 25 of the recording medium P in a state of being transported.

[0049] As illustrated in Fig. 2 and Fig. 4, in the recording apparatus 1 of the embodiment, a position of the line head 19 is set with a side of the line head reverse 19 of the maintenance section 21 in the intersecting direction B as a reference based on a detection result of the end portion 25 of the recording medium P using the scan sensor 20, when the controller 34 controls the recording operation (discharging operation of ink). In detail, as illustrated in Fig. 5A, a position of the head units 7 at an end portion of the line head 19 reverse of the maintenance section 21 in the intersecting direction B (in more detail, nozzles N of head units 7 at reverse side end portion) is set so as to correspond to a position of the end portion 25 of the recording medium P.

[0050] Moreover, a position of the head units 7 at the end portion of the line head 19 reverse of the maintenance section 21 in the intersecting direction B is set to correspond to a position of the end portion 25 of the recording medium P, and the position of the head units 7 becomes a state illustrated in Fig. 5B (a position of the end portion of the head units 7 in the intersecting direction B does not correspond to a position of the end portion 25 of the recording medium P), at the maintenance section 21 side of the line head 19 in the intersecting direction B. Accordingly, the controller 34 of the embodiment is capable of selecting nozzles N1 to be used in the nozzles N. Specifically, based on the detection result of the scan sensor 20, the controller 34 determines where the end portion 25 is positioned in the line head 19 in the intersecting direction B. In addition, as illustrated in Fig. 5B, the controller 34 sets the nozzles N in a position facing the recording medium P at an arrow R1 side further than the end portion 25 to nozzles N1 to be used, and sets the nozzles N in a position not facing the recording medium P at an arrow R2 side further than the end portion 25 to nozzles N2 not to be used. Accordingly, by selecting such a control method, that is, selecting the nozzles N1 to be used from the nozzles N, the recording apparatus 1 of the embodiment is capable of accurately and simply arranging a discharging position of the ink using the line head 19 with respect to the position of the medium. Moreover, in addition to a control method in which the controller 34 is used to select the nozzles N1 to be used from

the nozzles N, a control method in which the controller 34 is used to select head units to be used from a plurality of the head units 7 may be used.

[0051] As described above, in the recording apparatus 1 of the embodiment, based on the detection result of the end portion 25 of the recording medium P using the scan sensor 20, the position of the head unit 7s at the end portion of the line head 19 reverse of the maintenance section 21 in the intersecting direction B is set to correspond to a position of the end portion 25 of the recording medium P. However, it is not limited to the above described configuration. For example, based on the detection result of the end portion 25 of the recording medium P using the scan sensor 20, the position of the head units 7 at the end portion of the line head 19 at the maintenance section 21 side in the intersecting direction B may be set to correspond to a position of the end portion 25 of the recording medium P.

[0052] In addition, the controller 34 of the embodiment is capable of outputting an error, in a case in which a length in the intersecting direction B of the recording medium P based on recording data (ink discharging data) is different from the length L1 (refer to Fig. 5A) in the intersecting direction B of the recording medium P based on the detection result of the scan sensor 20. Accordingly, in a case in which a width of the medium in the intersecting direction B of the recording medium P, which is input to the controller 34, set when a user selects the recording medium P to be used by using the PC 38, or the like, is different from the length L1, that is, in a case in which the recording medium P to be assumed is different from the recording medium P set in the recording apparatus 1, it is possible to urge the user to change the recording medium to an appropriate recording medium P. Therefore, the recording apparatus 1 of the embodiment is capable of suppressing recording on the recording medium P different from the recording medium P to be assumed.

[0053] In addition, in a case in which a discharging width in the intersecting direction B is calculated based on the recording data (ink discharging data) and the calculated discharging width is longer than the length L1 (refer to Fig. 5A) in the intersecting direction B of the recording medium P based on the detection result of the scan sensor 20, the controller 34 of the embodiment is capable of outputting an error to the PC 38 serving as an alarm section. Accordingly, in a case in which the discharging width is longer than the length L1, it is possible to urge the user to modify the recording data so as to reduce the discharging width, or to change the recording medium into the recording medium P having a wide width. Accordingly, the recording apparatus 1 of the embodiment is capable of suppressing the fact that an image formed using the ink discharged from the line head 19 is not fit into the recording medium P.

[0054] In addition, when the detection result of the scan sensor 20 is input while reciprocating the scan sensor 20 in the intersecting direction B at the time of recording operation (ink discharging operation), the controller 34 of the embodiment is capable of adjusting the position of the line head 19 based on the detection result. Specifically, for example, the line head 19 is moved (adjusted) at a degree of 10 μm in the intersecting direction B while transporting the recording medium P by 100 mm, and thus the recording operation can be performed. Accordingly, at the time of the recording operation, the recording apparatus 1 of the embodiment is capable of accurately efficiently arranging the discharging position of the liquid using the line head 19 with respect to the position of the medium by adjusting the position of the line head 19 in real time based on the detection result of the scan sensor 20.

[0055] Also, when the scan sensor 20 is reciprocated in the intersecting direction B before the recording operation, the controller 34 of the embodiment is capable of recognizing the position of the end portion 25 based on the detection result detected before the recording operation, without detecting the end portion 25 in real time at the time of recording operation. However, in such a case described above, the position of the line head 19 at the time of the recording operation is not adjusted.

[0056] In addition, the recording apparatus 1 of the embodiment has a configuration in which one end side (left side in Fig. 2) in the intersecting direction B becomes a reference position for arranging the position in the intersecting direction B of the recording medium P. Also, the controller 34 is capable of setting a movement range in the intersecting direction B of the scan sensor 20, according to a length in the intersecting direction B of the recording medium P based on the recording data (ink discharging data). Accordingly, the recording apparatus 1 of the embodiment is capable of suppressing a movement in which the scan sensor 20 is moved to an unnecessary range (a range where the recording medium P is not present) according to the length in the intersecting direction B of the recording medium P based on the recording data.

[0057] In addition, as described above, the recording apparatus 1 of the embodiment includes the meandering detection sensor 16. Here, when the user moves the meandering detection sensor in manual and disposes it at a predetermined position, the meandering detection sensor 16 of the embodiment is capable of detecting whether or not the recording medium P is meandered and transported by detecting the end portion 25 at the predetermined position.

[0058] The controller 34 is capable of setting a movement range in the intersecting direction B of the scan sensor 20, based on a position of the meandering detection sensor 16 which is disposed by the user. Specifically, the controller 34 is capable of setting a movement range in the intersecting direction B of the scan sensor 20, so as not to include a range of the outside in the intersecting direction B further than the position of the meandering detection sensor 16 where the recording medium P is not exist. Accordingly, the recording apparatus 1 of the embodiment is capable of suppressing the fact that the

scan sensor 20 is moved to an unnecessary range, based on the position of the meandering detection sensor 16.

[0059] Also, as illustrated in Fig. 1 and Fig. 2, the scan sensor 20 of the embodiment is disposed at an upstream side further than the line head 19 in the transport direction A. Accordingly, the recording apparatus 1 of the embodiment is capable of detecting a position of the recording medium P before the ink is discharged from the line head 19.

[0060] In addition, as illustrated in Fig. 1 and Fig. 2, the adhesive belt 10, which is the transport section of the embodiment, is a transporting belt which transports the recording medium P while being attached thereto.

[0061] In the transporting belt which transports the recording medium P while being attached thereto, once the recording medium P is attached thereto (supporting recording medium P), deviation of the recording medium P from the transporting belt is suppressed. After detecting a transporting deviation of the recording medium P from the original position where the medium is intended to be transported, it is possible to suppress the recording medium P being further deviated therefrom.

[0062] Here, after detecting a transporting deviation of the recording medium P from the original position where the medium is intended to be transported, and if there is a concern that the recording medium P is further deviated, for example, it is preferable that the scan sensor 20 is provided at a plurality of positions, such as at a upstream side and at a downstream side further than the line head 19.

[0063] However, the recording apparatus 1 of the embodiment includes the transporting belt which transports the recording medium P while being attached thereto, and thus the recording apparatus is capable of sufficiently accurately detecting the transporting deviation of the recording medium P from the original position where the medium is intended to be transported with only one scan sensor 20.

[0064] In addition, as described above, the recording apparatus 1 of the embodiment includes the cleaning brush 13 as a cleaning section for the adhesive belt 10. The cleaning brush 13 changes a cleaning region of the adhesive belt 10 in the intersecting direction B.

[0065] Also, the controller 34 of the embodiment is capable of setting the cleaning region based on the detection result of the scan sensor 20. Specifically, based on the detection result of the scan sensor 20, the controller determines a region (a region is to be concerned of being contaminated due to the ink), where the ink is discharged, on the supporting surface F of the adhesive belt 10, and is capable of setting cleaning regions (selecting the cleaning rollers to be in contact with the adhesive belt 10 among the cleaning rollers 13a, 13b, 13c, and 13d) based on the determined result. In more detail, the controller 34 allows the cleaning rollers, which are disposed at a position including a region in the inside further than the end portion 25 in the intersecting direction B, to be in contact with the adhesive belt 10, and allows the cleaning rollers, which are not disposed at a position including a region in the inside further than the end portion 25 in the intersecting direction B, not to be in contact with the adhesive belt 10. For example, in a case in which the transporting position of the recording medium P with respect to the adhesive belt 10 and the cleaning brush 13 is in the positional relationship illustrated in Fig. 2, all of the cleaning rollers 13a, 13b, 13c, and 13d are disposed at the position including the region in the inside further than the end portion 25 in the intersecting direction B, and thus all of them are in contact with the adhesive belt 10. Meanwhile, as a case of the positional relationship illustrated in Fig. 4, that is, in a case in which the recording medium P having a width narrower than the recording medium P illustrated in Fig. 2 is used, and for example, the cleaning rollers 13b, 13c, and 13d correspond to the cleaning rollers disposed at a position including a region of the inside further than the end portion 25, and the cleaning roller 13a corresponds to the cleaning roller not disposed at a position including a region of the inside further than the end portion 25, the cleaning rollers 13b, 13c, and 13d are in contacted with the adhesive belt 10 and the cleaning rollers 13a is not in contact with the adhesive belt 10.

[0066] Accordingly, the recording apparatus 1 of the embodiment is capable of suppressing inefficiency of cleaning the unnecessary region (region not contaminated with ink) on the adhesive belt 10.

[0067] In addition, as described above, the controller 34 of the embodiment is capable of setting a position of the line head 19 in the intersecting direction B so as to be any one of a plurality of positions, in a case in which the length L1 in the intersecting direction B of the recording medium P is shorter than a length of which the nozzles N in the intersecting direction B are arranged, based on the detection result of the scan sensor 20. In detail, the position of the line head 19 with respect to the recording medium P can be set based on one end side (left side in Fig. 2) in the intersecting direction B as a reference, and the position of the line head 19 with respect to the recording medium P can be set with a positional relationship different from such a positional relationship. Accordingly, for example, even when a defect (such as clogging) is generated on one end side of the nozzles N in the intersecting direction B of the line head 19, deterioration of a recording quality can be suppressed by disposing the line head 19 at a position where those nozzles N do not facing the recording medium P.

[0068] In addition, for example, in a case in which the length L1 in the intersecting direction B of the recording medium P is shorter than a length of which the nozzles N in the intersecting direction B are arranged, based on the detection result of the scan sensor 20, the controller 34 of the embodiment is capable of setting the position of the line head 19 in the intersecting direction B according to a frequency of using the nozzles N. Specifically, when recording is performed several times in a state like the case described above, the position of the line head 19 in the intersecting direction B can be set so that a

deviation of a use frequency of each of the nozzles N of the line head 19 decreases, for example, so that an arrangement with respect to the recording medium P of the line head 19 is changed each time recording is performed. Accordingly, rapid deterioration of the line head 19 due to the use deviation of each of the nozzles N in the line head 19 can be suppressed.

[0069] In addition, for example, in a case in which the length L1 in the intersecting direction B of the recording medium P is shorter than a length of which the nozzles N in the intersecting direction B are arranged, based on the detection result of the scan sensor 20, the controller 34 of the embodiment is capable of setting the position of the line head 19 in the intersecting direction B to a position where the nozzles N of the end portion side of the line head 19 in the intersecting direction B do not face the recording medium P. Instability of discharging (instability in discharging direction or deviation of discharging amount becomes great) is easily generated on the nozzles N at the end portion side of the line head 19, more than the nozzles N at the center portion of the line head 19. Therefore, when the position of the line head 19 is set at the position where the nozzles N at the end portion of the line head 19 in the intersecting direction B do not face the recording medium P, recording can be performed only by using the nozzles N at the center portion, and thus, deterioration of the recording quality can be suppressed.

[0070] Also, the invention is not limited to the embodiment described above, and can be variously changed within a range of the invention disclosed in Claims, further, it is needless to say that resultants thereof are also included in the range of the invention.

[0071] For example, after detecting the position of the end portion of the recording medium P while moving the scan sensor 20 like the above described embodiment, the scan sensor 20 is stopped at the position of the end portion, and the recording medium P can be detected at the position where the sensor is stopped.

[0072] In such a case, in a case in which the recording medium P is deviated from a detecting region of the scan sensor 20 stopped, or a case in which the position of the end portion is deviated from the position of the initially detected end portion further than a preset value, the recording medium P is determined to be meandered, and thus a predetermined meandering control can be performed or an error can be detected. When performing such a control, the meandering control can be performed with high accuracy, and the meandering control can be simply performed even when the meandering detection sensor 16 is not provided as described above embodiment.

[0073] Hitherto, the invention has been described based on specific examples. Here, the outline of the invention will be described once more.

[0074] The liquid discharging apparatus 1 of a first aspect of the invention includes the transport section 10 for the medium P, the line head 19 in which the nozzles N discharging liquid in the intersecting direction B that intersects the transport direction A of the medium P are arrayed, the scan sensor 20 capable of detecting the end portion 25 of the medium P in the intersecting direction B by being moved in the intersecting direction B, and the controller 34 which controls a movement in the intersecting direction B of the scan sensor 20 and controls discharging of the liquid. The line head 19 can be moved in the intersecting direction B, and the controller 34 is capable of setting the position of the line head 19 in the intersecting direction B based on the detection result of the scan sensor 20.

[0075] According to the aspect, the scan sensor 20 is included, which is capable of detecting the end portion 25 of the medium P in the intersecting direction B by being moved in the intersecting direction B. Accordingly, even when the recording medium P is transported by being greatly deviated from the original position where the medium is intended to be transported, the deviation from the detectable position can be suppressed. In addition, the line head 19 is movable in the intersecting direction B, and the controller 34 sets the position of the line head 19 in the intersecting direction B based on the detection result of the scan sensor 20. Accordingly, when the position of the line head 19 in the intersecting direction B is appropriately set based on the detection result of the scan sensor 20, the discharging position of the liquid using the line head 19 with respect to the position of the medium can be accurately arranged.

[0076] According to the liquid discharging apparatus 1 of a second aspect of the invention, in the first aspect described above, at the time of a discharging operation of the liquid, when the scan sensor 20 is reciprocated in the intersecting direction B and the detection result of the scan sensor 20 is input, the controller 34 changes the position of the line head 19 based on the detection result.

[0077] According to the aspect, at the time of the discharging operation of the liquid, when the scan sensor 20 is reciprocated in the intersecting direction B and the detection result of the scan sensor 20 is input, the controller 34 changes the position of the line head 19 based on the detection result. Accordingly, at the time of the discharging operation of the liquid, when the position of the line head 19 is adjusted in real time based on the detection result of the scan sensor 20, efficiently, the discharging position of the liquid with respect to the position of the medium using the line head 19 can be accurately arranged.

[0078] According to the liquid discharging apparatus 1 of a third aspect of the invention, in one of the first aspect and the second aspect described above, the controller 34 outputs an error, in a case in which a length in the intersecting direction B of the medium P based on discharging data of the liquid is different from the length L1 in the intersecting direction B of the medium P based on the detection result of the scan sensor 20.

[0079] According to the aspect, the controller 34 outputs an error in a case in which a length in the intersecting

direction B of the medium P based on discharging data of the liquid is different from the length L1 in the intersecting direction B of the medium P based on the detection result of the scan sensor 20. Accordingly, in a case in which the width in the intersecting direction B of the medium P which is input to the controller 34 is different from the length L1, that is, a case in which the medium P being assumed is different from the medium P set in the liquid discharging apparatus 1, the user is urged to change the medium into an appropriate medium P, or the like. Therefore, discharging of the liquid onto the medium P which is different from the medium P being assumed can be suppressed.

[0080] According to the liquid discharging apparatus 1 of a fourth aspect of the invention, in any one of the first aspect to the third aspect described above, the controller 34 calculates a discharging width in the intersecting direction B based on discharging data of the liquid and, in a case in which the calculated discharging width is longer than the length L1 in the intersecting direction B of the medium P based on the detection result of the scan sensor 20, the controller outputs an error.

[0081] According to the aspect, the controller 34 calculates the discharging width in the intersecting direction B based on discharging data of the liquid and, in a case in which the calculated discharging width is longer than the length L1 in the intersecting direction B of the medium P based on the detection result of the scan sensor 20, outputs an error. Accordingly, it is possible to suppress an image formed by the liquid being formed outside of the medium P.

[0082] According to the liquid discharging apparatus 1 of a fifth aspect of the invention, in any one of the first aspect to the fourth aspect described above, one end side in the intersecting direction B becomes a reference position for matching the position in the intersecting direction B of the medium P, and the controller 34 sets a movement range in the intersecting direction B of the scan sensor 20 corresponding to a length of the medium P in the intersecting direction B based on discharging data of the liquid.

[0083] According to the aspect, one end side in the intersecting direction B is a reference position for arranging the position in the intersecting direction B of the medium P, and the controller 34 sets the movement range in the intersecting direction B of the scan sensor 20 corresponding to the length of the medium P in the intersecting direction B based on the discharging data of the liquid. Accordingly, corresponding to the length in the intersecting direction B of the medium P based on the discharging data of the liquid, a movement of the scan sensor 20 to an unnecessary range can be suppressed.

[0084] According to the liquid discharging apparatus 1 of a sixth aspect of the invention, in any one of the first aspect to the fifth aspect described above, a meandering detection sensor 16 is further included, that, when being disposed at a predetermined position, is capable of detecting whether or not the medium P is meandered and transported by detecting the end portion 25 at the predetermined position, and the controller 34 sets the movement range in the intersecting direction B of the scan sensor 20 based on the position of the meandering detection sensor 16.

[0085] According to the aspect, the meandering detection sensor 16 is included, and the controller 34 sets the movement range in the intersecting direction B of the scan sensor 20 based on the position of the meandering detection sensor 16. Accordingly, a movement of the scan sensor 20 to an unnecessary range from the position of the meandering detection sensor 16 can be suppressed.

[0086] According to the liquid discharging apparatus 1 of a seventh aspect of the invention, in any one of the first aspect to the sixth aspect described above, the scan sensor 20 is disposed at an upstream side further than the line head 19 in the transport direction A.

[0087] According to the aspect, the scan sensor 20 is disposed at an upstream side further than the line head 19 in the transport direction A. Accordingly, the position of the medium P can be detected before discharging the liquid.

[0088] According to the liquid discharging apparatus 1 of an eighth aspect of the invention, in any one of the first aspect to the seventh aspect described above, the transport section 10 is a transporting belt which causes the medium P to be attached to and transported by the transporting belt.

[0089] According to the aspect, the transport section 10 is a transporting belt which transports the medium P while being attached thereto. In the transporting belt transporting the medium P while being attached thereto, once the medium P is attached thereto (medium P is supported), the deviation of the medium P from the transporting belt can be suppressed, and thus the deviation of the medium P can be further suppressed, after detecting the transporting deviation of the medium P from the original position where the medium is intended to be transported. Accordingly, with only one scan sensor 20, the transporting deviation of the medium P from the original position where the medium is intended to be transported can be detected with a high accuracy.

[0090] According to the liquid discharging apparatus 1 of a ninth aspect of the invention, in the eighth aspect described above, the cleaning section 13 is included, which is capable of cleaning the transporting belt, and changing the cleaning region of the transporting belt in the intersecting direction B, and the controller 34 sets the cleaning region based on the detection result of the scan sensor 20.

[0091] According to the aspect, the cleaning section 13 which changes the cleaning region of the transporting belt in the intersecting direction B is included, and the controller 34 sets the cleaning region based on the detection result of the scan sensor 20. That is, the discharging region of the liquid is determined based on the detection result of the scan sensor 20, and the cleaning

region can be set based on such a determined result. Accordingly, inefficiency of cleaning an unnecessary region of the transporting belt can be suppressed.

[0092] According to the liquid discharging apparatus 1 of a tenth aspect of the invention, in any one of the first aspect to the ninth aspect described above, the controller 34 is capable of setting the position of the line head 19 in the intersecting direction B to any one of a plurality of positions, in a case in which the length L1 in the intersecting direction B of the medium P based on the detection result of the scan sensor 20 is shorter than a length of which the nozzles N in the intersecting direction B are arrayed.

[0093] According to the aspect, the controller 34 is capable of setting the position of the line head 19 in the intersecting direction B to any one of a plurality of positions, in a case in which the length L1 in the intersecting direction B of the medium P based on the detection result of the scan sensor 20 is shorter than the length of which the nozzles N in the intersecting direction B are arrayed. Accordingly, for example, even when a defect is generated in the nozzles N at one end in the intersecting direction B, deterioration of a quality of discharging of the liquid can be suppressed by disposing the line head 19 at a position where those nozzles N do not face the medium P.

[0094] According to the liquid discharging apparatus 1 of an eleventh aspect of the invention, in the tenth aspect described above, in a case in which the length L1 in the intersecting direction B of the medium P based on the detection result of the scan sensor 20 is shorter than the length in which the nozzles N in the intersecting direction B are arrayed, the controller 34 is capable of setting the position of the line head 19 in the intersecting direction B in accordance with a use frequency of the nozzles N.

[0095] According to the aspect, in a case in which the length L1 in the intersecting direction B of the medium P based on the detection result of the scan sensor 20 is shorter than the length in which the nozzles N are arrayed in the intersecting direction B, the controller 34 is capable of setting the position of the line head 19 in the intersecting direction B in accordance with a use frequency of the nozzles N. Accordingly, a deviation of the use frequency of between the nozzles N of the line head 19 can be reduced, and thus it is possible to suppress rapid deterioration of the line head 19 according to deviation of the use frequency of each of the nozzles N of the line head 19.

[0096] According to the liquid discharging apparatus 1 of a twelfth aspect of the invention, in any one of the first aspect to the eleventh aspect described above, in a case in which the length L1 in the intersecting direction B of the medium P based on the detection result of the scan sensor 20 is shorter than the length in which the nozzles N are arrayed in the intersecting direction B, the controller 34 is capable of setting the position of the line head 19 in the intersecting direction B to a position in which the nozzles N of the end portion side of the line head 19 in the intersecting direction B do not face the medium P.

[0097] According to the aspect, in a case in which the length L1 in the intersecting direction B of the medium P based on the detection result of the scan sensor 20 is shorter than the length in which the nozzles N are arrayed in the intersecting direction B, the controller 34 is capable of setting the position of the line head 19 in the intersecting direction B to a position in which the nozzles N of the end portion side of the line head 19 in the intersecting direction B do not face the medium P. Instability of discharging is easily generated in the nozzles N at the end portion of the line head 19, more than the nozzles N at the center portion of the line head 19. Accordingly, a position is set, of which the nozzles N at the end portion of the line head 19 in the intersecting direction B do not face the medium P, and thus the liquid can be discharged using only the nozzles N at the center portion. Therefore, deterioration of the discharging quality of the liquid can be suppressed.

Claims

1. A liquid discharging apparatus comprising:

a transport section for a medium;
a line head in which nozzles discharging liquid in an intersecting direction that intersects a direction of transporting the medium are arrayed;
a scan sensor that is capable of detecting an end portion of the medium in the intersecting direction by being moved in the intersecting direction; and
a controller that controls movement in the intersecting direction of the scan sensor and controls discharging of the liquid,
wherein the line head is movable in the intersecting direction and
wherein the controller sets a position of the line head in the intersecting direction based on a detection result of the scan sensor.

2. The liquid discharging apparatus according to Claim 1,
wherein, at the time of discharging operation of the liquid, when the scan sensor is reciprocated in the intersecting direction and the detection result of the scan sensor is input, the controller changes the position of the line head based on the detection result.

3. The liquid discharging apparatus according to Claim 1,
wherein the controller outputs an error, in a case in which a length in the intersecting direction of the medium based on discharging data of the liquid is different from a length in the intersecting direction of the medium based on the detection result of the scan sensor.

4. The liquid discharging apparatus according to Claim 1,
wherein the controller calculates a discharging width in the intersecting direction based on discharging data of the liquid and in a case in which the calculated discharging width is longer than a length in the intersecting direction of the medium based on the detection result of the scan sensor, the controller outputs an error.

5. The liquid discharging apparatus according to Claim 1,
wherein one end side in the intersecting direction is a reference position for matching a position in the intersecting direction of the medium and
wherein the controller sets a movement range in the intersecting direction of the scan sensor corresponding to a length of the medium in the intersecting direction based on discharging data of the liquid.

6. The liquid discharging apparatus according to Claim 1, further comprising:

a meandering detection sensor that when being disposed at a predetermined position is capable of detecting whether or not the medium is transported in a meandering manner by detecting the end portion at the predetermined position,

wherein the controller sets the movement range of the scan sensor in the intersecting direction, based on the position of the meandering detection sensor.

7. The liquid discharging apparatus according to Claim 1,
wherein the scan sensor is disposed at an upstream side further than the line head in the transport direction.

8. The liquid discharging apparatus according to Claim 1,
wherein the transport section includes a transporting belt causing the medium to be attached to and transported by the transporting belt.

9. The liquid discharging apparatus according to Claim 8, further comprising:

a cleaning section that is capable of cleaning the transporting belt and changing a cleaning region of the transporting belt in the intersecting direction,

wherein the controller sets the cleaning region based on the detection result of the scan sensor.

10. The liquid discharging apparatus according to Claim 1,
wherein the controller is capable of setting the position of the line head in the intersecting direction to one of a plurality of positions, in a case in which a length in the intersecting direction of the medium based on the detection result of the scan sensor is shorter than a length in which the nozzles are arrayed in the intersecting direction.

11. The liquid discharging apparatus according to Claim 10,
wherein, in a case in which a length in the intersecting direction of the medium based on the detection result of the scan sensor is shorter than a length in which the nozzles are arrayed in the intersecting direction, the controller is capable of setting the position of the line head in the intersecting direction in accordance with a use frequency of the nozzles.

12. The liquid discharging apparatus according to Claim 1,
wherein, in a case in which a length in the intersecting direction of the medium based on the detection result of the scan sensor is shorter than a length in which the nozzles are arrayed in the intersecting direction, the controller is capable of setting the position of the line head in the intersecting direction to a position where the nozzles of an end portion side of the line head in the intersecting direction do not face the medium.

FIG. 1

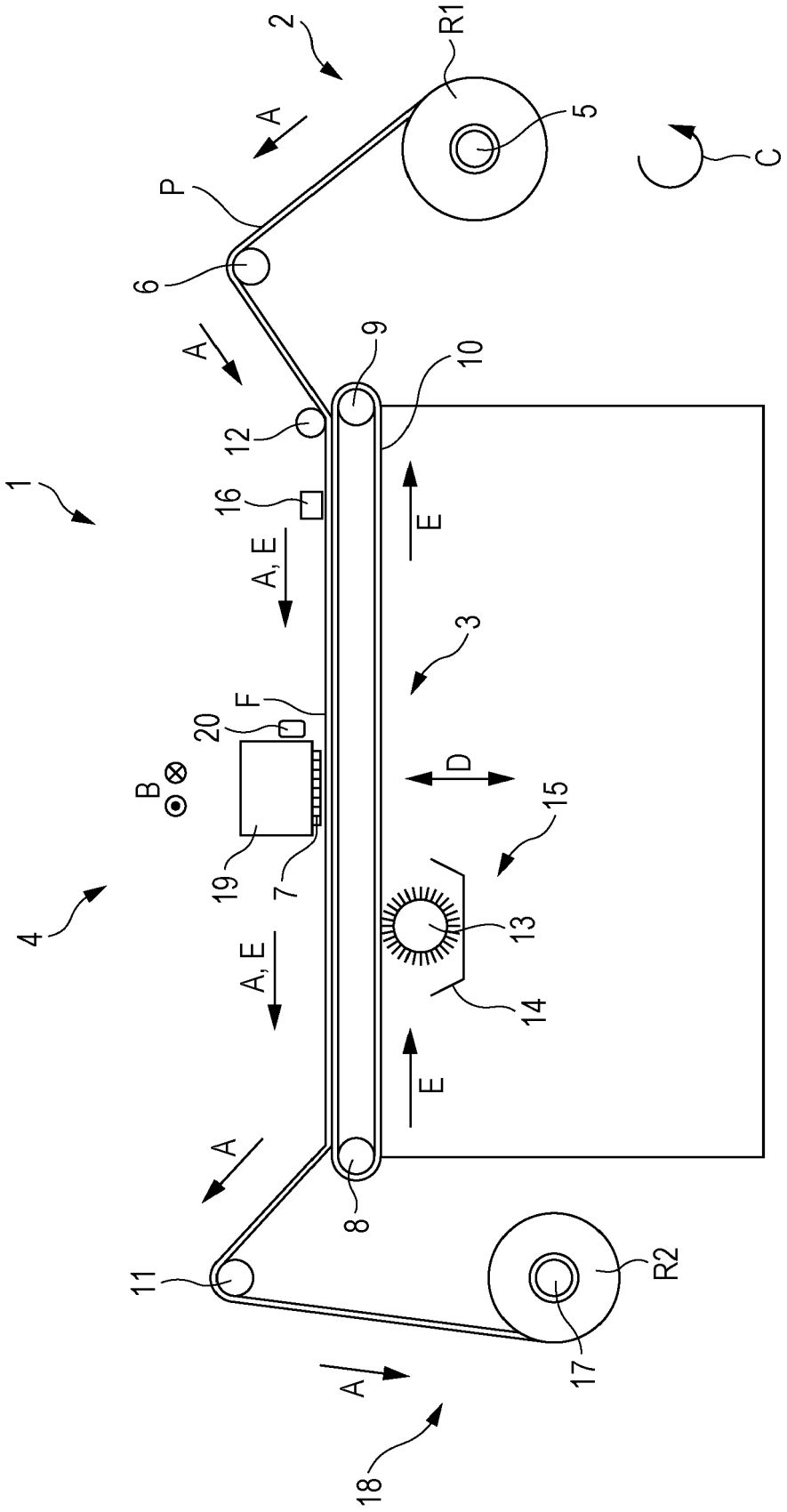
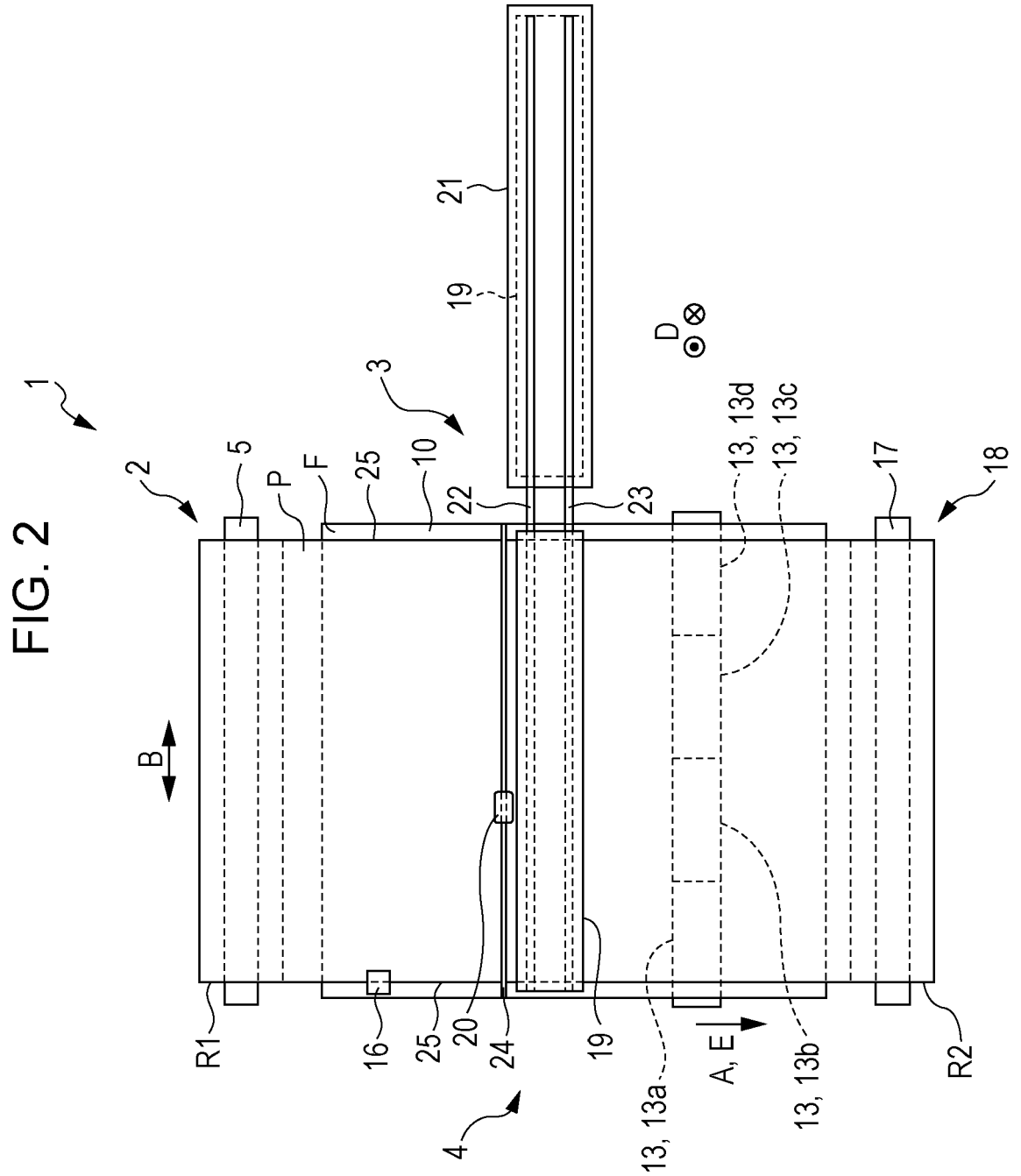


FIG. 2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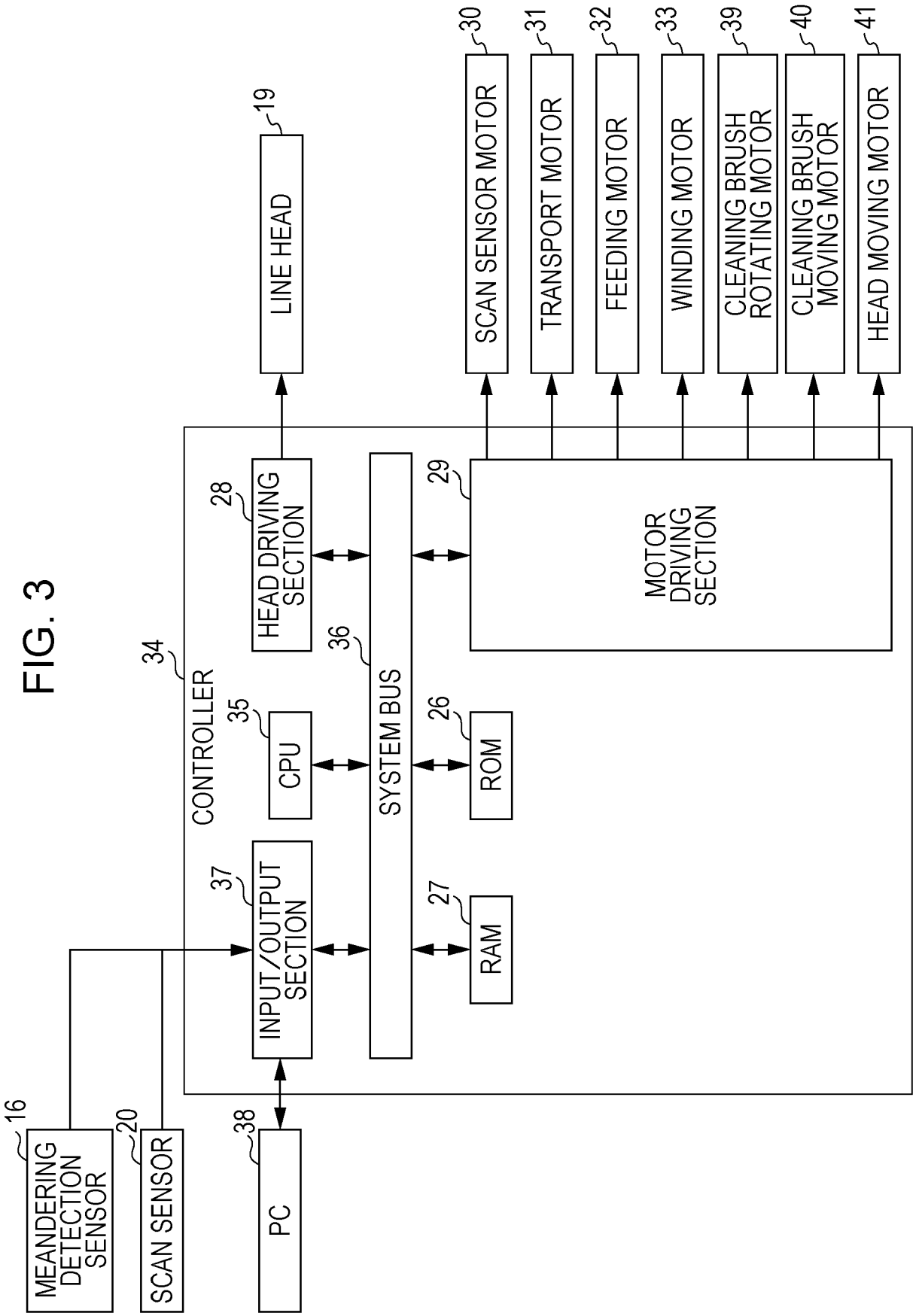
13, 13b
R2

FIG. 3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SYSTEM BUS
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RAM
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ROM
26
HEAD DRIVING SECTION
28
MOTOR DRIVING SECTION
29
LINE HEAD
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SCAN SENSOR MOTOR
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TRANSPORT MOTOR
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FEEDING MOTOR
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WINDING MOTOR
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CLEANING BRUSH ROTATING MOTOR
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HEAD MOVING MOTOR
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FIG. 4

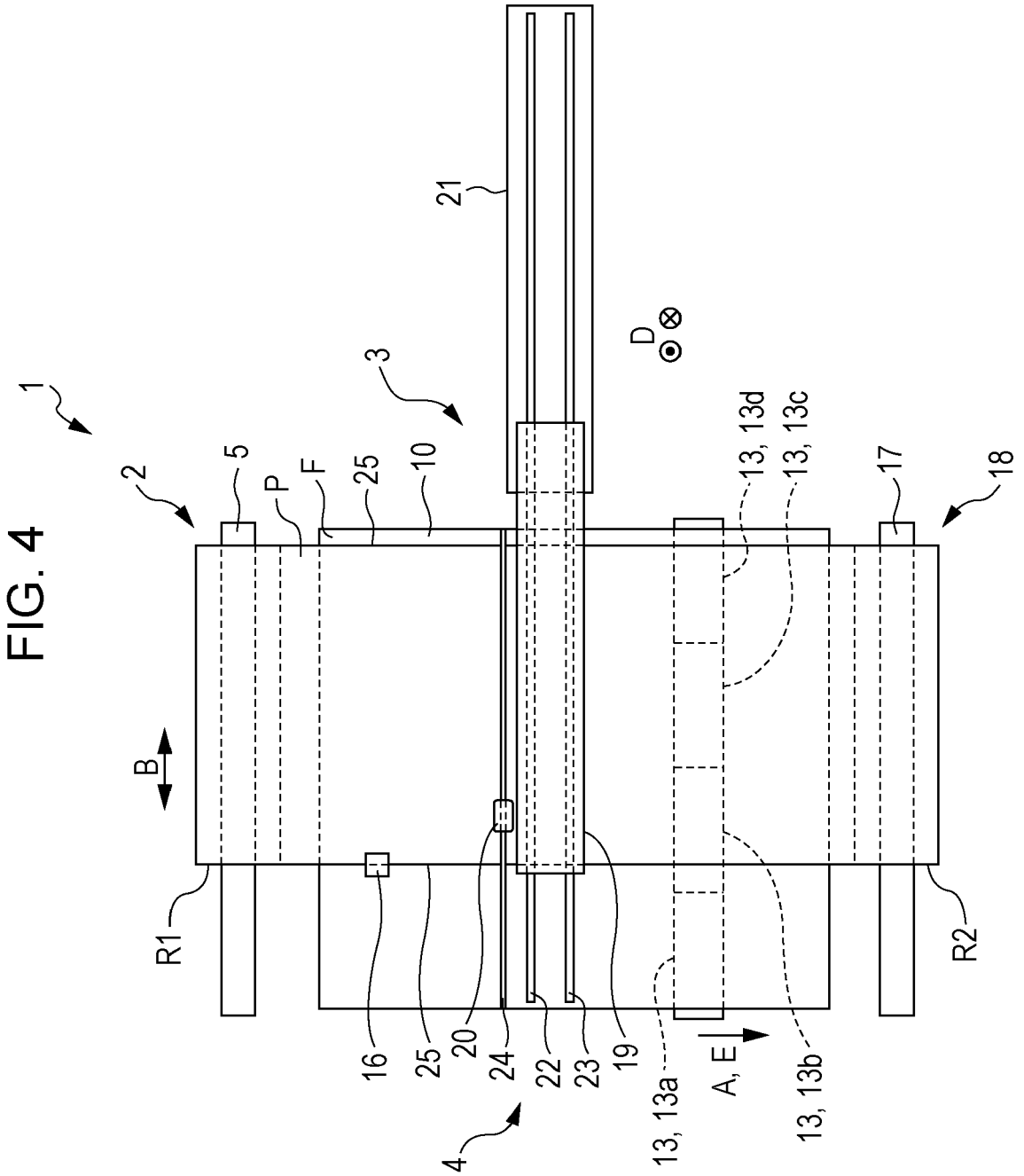
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FIG. 5A

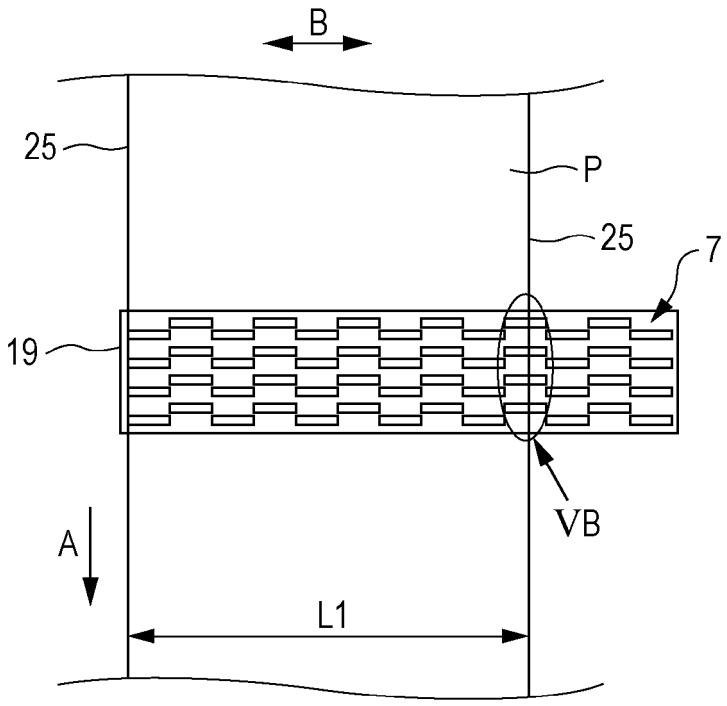
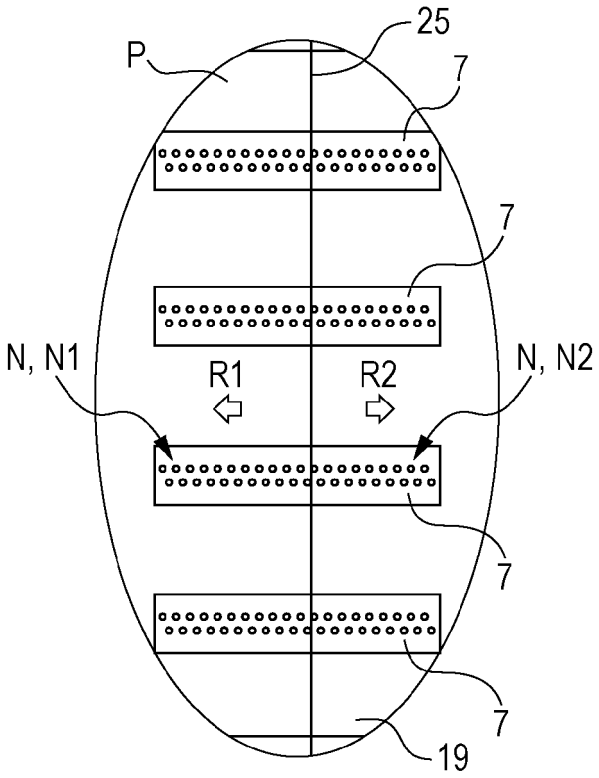


FIG. 5B



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EUROPEAN SEARCH REPORT

Application Number
EP 16 16 1649

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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B41J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 November 2016	Gaubinger, Bernhard

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09-11-2016

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