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(71) Applicant: **Konica Minolta IJ Technologies, Inc.**
**Hino-shi**
**Tokyo 191-8511 (JP)**

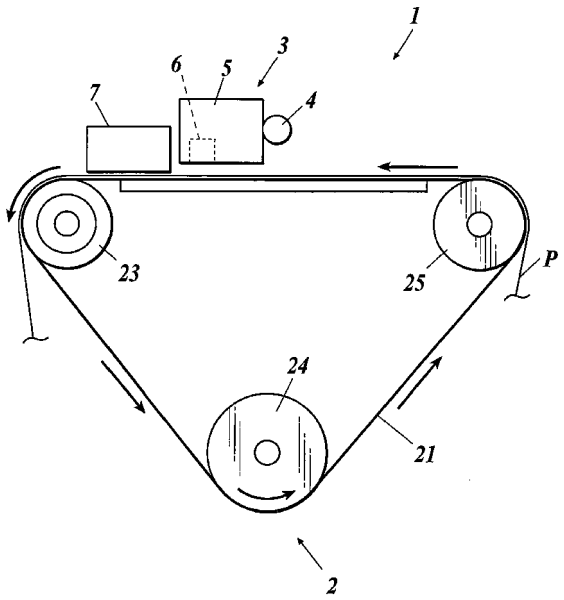
(72) Inventors:
- **Mizoguchi, Shuri**
  **Tokyo, 191-8511 (JP)**
- **Ogishima, Tadahisa**
  **Tokyo, 191-8511 (JP)**

(74) Representative: **Henkel, Breuer & Partner**
**Patentanwälte**
**Maximiliansplatz 21**
**80333 München (DE)**

## (54) Recording medium carrier device, image forming apparatus and ink-jet recording apparatus

(57) A recording medium carrier device (2) includes: an endless belt (21); a plurality of carrier rollers (23, 24, 25) for revolving the belt; a detection section (7) for detecting its own displacement amount in a pathway along the belt (21); a calculation section (8) for calculating carried distance of a recording medium based on a detection result of the detection section (7); and a controller (8). The detection section includes: a base (72); a scale section (74); a sensor (75); a switching section (76); and a driver (77) including: a drive source (771); a transmission mechanism (772) for transmitting power of the drive source (771) to the scale section (74); and a release section (773) for releasing power transmission between the drive source (771) and the transmission mechanism (772). The release section (773) releases the power transmission between the drive source (771) and the transmission mechanism (772) when the switching section (76) engages the belt (21) and the scale section (74), and stops the release when the switching (76) section disengages the belt (21) and the scale section (74).

***FIG.1***

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## Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

**[0001]** The present invention relates to a recording medium carrier device, an image forming apparatus and an ink-jet recording apparatus.

2. Description of Related Art

**[0002]** Heretofore, there exists an image forming apparatus such as an ink-jet recording apparatus provided with a recording medium carrier device for carrying a sheet-shaped recording medium by revolving an endless belt with the recording medium put on the endless belt. In such a recording medium carrier device, there is known a device in which an encoder is installed on a rotary shaft of a driving roller for driving the endless belt, and controls a feeding distance of the recording medium based on the number of pulses from the encoder (see Japanese Patent No.4449924, for example).

**[0003]** Meanwhile, there is a possibility that the above-described recording medium carrier device cannot accurately measure the feeding distance of the recording medium owing to such factors as an eccentricity of the encoder or a variation in the thickness of the endless belt.

SUMMARY OF THE INVENTION

**[0004]** It is, therefore, a main object of the present invention to enable an accurate measurement of a feeding distance of a recording medium.

**[0005]** According to a first aspect of the present invention, there is provided a recording medium carrier device, comprising: an endless belt on the surface of which a recording medium is set; a plurality of carrier rollers for supporting the endless belt so that a part of the endless belt constitutes a planar portion, and for intermittently revolving the endless belt; a detection section that is movable back and forth between a default position and a predetermined position in a pathway along the planar portion of the endless belt, the predetermined position being located downstream of the default position in a revolving direction of the endless belt, and the detection section detects its own displacement amount during the forward movement; a calculation section for calculating a feeding distance of the recording medium based on a detection result of the detection section; a controller for controlling revolution amount of at least one of the plurality of carrier rollers based on the feeding distance calculated by the calculation section; the detection section comprising: a base; a scale section that is slidable to the base and follows the endless belt with being engaged with the endless belt; a sensor for measuring a displacement amount of the scale section; a switching section for switching engagement and disengagement between the endless belt and the scale section by making the scale section contact with or apart from the endless belt; and a driver for bringing the scale section back to the default position from the predetermined position; the driver comprising: a drive source; a transmission mechanism for transmitting power of the drive source to the scale section; and a release section for releasing power transmission between the drive source and the transmission mechanism, wherein the release section releases the power transmission when the switching section switches the endless belt and the scale section to be engaged, and stops the release of the power transmission when the switching section switches the endless belt and the scale section to be disengaged.

**[0006]** According to a second aspect of the present invention, there is provided a recording medium carrier device, comprising: an endless belt on the surface of which a recording medium is set; a plurality of carrier rollers for supporting the endless belt so that a part of the endless belt constitutes a planar portion, and for intermittently revolving the endless belt; a detection section that is movable back and forth between a default position and a predetermined position in a pathway along the planar portion of the endless belt, the predetermined position being located downstream of the default position in a revolving direction of the endless belt, and the detection section detects its own displacement amount during the forward movement; a calculation section for calculating feeding distance of the recording medium based on a detection result of the detection section; a controller for controlling revolution amount of at least one of the plurality of carrier rollers based on the feeding distance calculated by the calculation section; the detection section comprising: a rotary shaft extending along the planar portion of the endless belt; a base pivotally supported to rotate in conjunction with the rotary shaft; a guide shaft provided on the base in a side far from the rotary shaft and in parallel with the rotary shaft; a scale section that is slidable to the base and is engaged with the endless belt to follow the same while being guided by the guide shaft; a sensor provided on the base for measuring a displacement amount of the scale section; a rotary drive source to rotate the base around the rotary shaft; and a driver for bringing the scale section back to the default position from the predetermined position, wherein the rotary drive source rotates the base before the revolution of the endless belt at the default position to make the scale section be engaged with the planar portion, and rotates the base to release the engagement between the scale section and the endless belt after the scale section moves following the revolution of the endless belt and reaches the predetermined position, and the driver brings the scale section back to the default position when the endless belt stops after the disengagement; and wherein the calculation section calculates the feeding distance of the recording medium based on a detection result of the sensor, which result being obtained during a period where the scale section moves from the default position

to the predetermined position.

**[0007]** According to a third aspect of the present invention, there is provided a recording medium carrier device installed in an ink-jet recording apparatus for forming an image on a recording medium while scanning a recording head in a sub-scanning direction, the recording medium carrier device comprising: an endless belt on the surface of which a recording medium is set; a plurality of carrier rollers for supporting the endless belt so that a part of the endless belt constitutes a planar portion, and for intermittently revolving the endless belt; a detection section that is movable back and forth between a default position and a predetermined position in a pathway along the planar portion of the endless belt, the predetermined position being located downstream of the default position in a revolving direction of the endless belt, the distance from the default position to the predetermined position being set to be a recording width of a single scanning performed by the recording head, and the detection section detecting its own displacement amount during the forward movement; a calculation section for calculating feeding distance of the recording medium based on a detection result of the detection section; a controller for controlling revolution amount of at least one of the plurality of carrier rollers based on the feeding distance calculated by the calculation section; the detection section comprising: a base; a scale section that is slidable to the base and follows the endless belt with being engaged with the endless belt; a sensor provided on the base for measuring a displacement amount of the scale section; a switching section for switching engagement and disengagement between the endless belt and the scale section by making the scale section contact with or apart from the endless belt; and a driver for bringing the scale section back to the default position from the predetermined position, wherein the switching section switches the scale section and the planar portion to be engaged before the revolution of the endless belt at the default position, the switching section disengages the scale section and the endless belt after the scale section moves following the revolution of the endless belt and reaches the predetermined position, and the driver brings the scale section back to the default position when the endless belt stops after the disengagement; and wherein the calculation section calculates the feeding distance of the recording medium based on a detection result of the sensor, which result being obtained during a period where the scale section moves from the default position to the predetermined position.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0008]** The above and other objects, advantages and features of the present invention will become more fully understood from the detailed description given hereinbelow and the appended drawings which are given by way of illustration only, and thus are not intended as a definition of the limits of the present invention, and wherein:

FIG. 1 is a view showing an internal constitution of an ink-jet recording apparatus according to an embodiment of the present invention;

FIG. 2 is a perspective view showing a skeleton framework of a detection section provided on the ink-jet recording apparatus of FIG. 1;

FIG. 3 is a front view of the detection section of FIG. 2;

FIG. 4 is a rear view of the detection section of FIG. 2;

FIG. 5 is an enlarged perspective view showing a part of rear side of the detection section of FIG. 2;

FIG. 6 is a perspective view showing the detection section of FIG. 2 in a state that the detection section and the endless belt are engaged;

FIG. 7 is a front view of the detection section of FIG. 2;

FIG. 8 is an enlarged perspective view showing a part of the rear side of the detection section of FIG. 6;

FIG. 9 is a front view showing the detection section of FIG. 3 in a state that the release section connects the drive source and the front side pulley;

FIG. 10 is a block diagram showing main control structure of the ink-jet recording apparatus;

FIG. 11 is a perspective view showing the detection section of FIG. 6 in which the scale section reaches the predetermined position; and

FIG. 12 is a perspective view showing the detection section of FIG. 11 in a state that the engagement between the scale section and the endless belt is released.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0009]** Hereinafter, preferred embodiments of the present invention will be described with reference to the drawings. Although technically preferable various limitations for implementing the present invention are given to the embodiments described below, the limitations are not intended to limit the scope of the present invention to the following embodiments or examples shown in the drawings.

**[0010]** Fig. 1 is a schematic view of an ink-jet recording apparatus as an image forming apparatus according to an embodiment of the present invention. As shown in Fig. 1, the ink-jet recording apparatus 1 includes: a recording medium carrier device 2 for carrying a sheet-shaped recording medium P, and an image forming section 3 for forming images onto the recording medium P carried by the recording medium carrier device 2.

**[0011]** The image forming section 3 is provided with a rod-shaped carriage rail 4 that is arranged in a horizontal direction. Supported by the carriage rail 4 is a carriage 5 which is driven by a non-illustrated carriage driving mechanism and is movable back and forth in a direction along the carriage rail 4 (referred to as a main-scanning direction, hereinafter).

**[0012]** A recording head 6 for injecting ink to the recording medium below is mounted on the carriage 5. In this embodiment, there are provided eight or sixteen recording heads 6 in order to be able to correspond to a

set of inks such as yellow (Y), magenta (M), cyan (C) and black (K), or s set of light YMCK in addition thereto. Further, although not shown, subsidiary ink tanks for supplying inks for each color to the recording head 6 are mounted on the carriage 5. The subsidiary ink tanks are connected with ink-supplying tubes (or pipes) that are connected with ink tanks storing inks of corresponding colors, respectively. The inks are respectively and appropriately supplied from the ink tanks to the subsidiary ink tanks through the ink supplying tubes.

**[0013]** The recording head 6 is configured to inject inks of each color to the recording medium P to form images thereon while scanning in the main scanning direction according to a back and forth movement of the carriage 5 along the carriage rail 4. In this embodiment, the recording head 6 is set to inject inks in both scanning directions including forward direction and backward direction to perform an ink-jet recording.

**[0014]** The recording medium carrier device 2 is arranged under the image forming apparatus 3 of the ink-jet recording apparatus 1. The recording medium carrier device 2 includes an endless belt 21 for carrying the recording medium P in a direction perpendicular to the main scanning direction (referred to as a sub-scanning direction, hereinafter) with the recording medium P opposed to a nozzle plane of the recording head 6. The recording medium carrier device 2 also includes a plurality of carrier rollers 23, 24 and 25 for revolving the endless belt 21. Among the carrier rollers 23, 24 and 25, one roller 23 is a driving roller and the other two rollers 24 and 25 are driven rollers. The endless belt 21 is bridged across the carrier rollers 23, 24 and 25. A part of the bridged endless belt 21 constitutes a horizontal plane (a planar portion) that is parallel to the nozzle plane of the recording head 6. The recording medium P is put on the surface of the horizontal plane.

**[0015]** The recording medium carrier device 2 also includes a detection section 7 for calculating feeding distance of the recording medium P. Specifically, the detection section 7 is movable back and forth between a default position and a predetermined position in a pathway along the planar portion of the endless belt 21. The predetermined position is located downstream of the default position in a revolving direction of the endless belt 21, and the distance from the default position to the predetermined position is set to be a recording width of a single scanning performed by the recording head 6. The detection section 7 detects its own displacement amount during the forward movement.

**[0016]** Fig. 2 is a perspective view showing a skeleton framework of the detection section 7, Fig. 3 is a front view of the detection section 7, Fig. 4 is a rear view of the detection section 7 and Fig. 5 is an enlarged perspective view showing a part of the rear side of the detection section 7. As shown in Figs. 2 to 5, the detection section 7 includes a rotary shaft 71, a base 72, a guide shaft 73, a scale section 74, a sensor 75, a rotary drive source 76 and a driver 77.

**[0017]** The rotary shaft 71 is a rod-shaped shaft extending along the planar portion of the endless belt 21, specifically extending along the sub-scanning direction. Both end portions of the rotary shaft 71 is supported by a pair of supports 711 that are respectively fixed to a flame of the ink-jet recording apparatus 1.

**[0018]** The base 72 rotates around the rotary shaft 71 and includes a pair of rotary members 721 and a connection member 722. The pair of rotary members 721 is assembled to the end portions of the rotary shaft 72, respectively, and is pivotally supported by the rotary shaft 71 so as to be rotatable to the same. The connection member 722 is a member for connecting the pair of rotary members 721 and is assembled to the rotary members 721 on a side far from the endless belt 21.

**[0019]** The guide shaft 73 is a rod-shaped shaft which is fixed to the rotary member 721 on a side far from the rotary shaft 71 and is arranged so as to be parallel to the rotary shaft 71.

**[0020]** The scale section 74 is slidable to the base 72 and is engaged with the endless belt 21 to follow the same. The scale section 74 includes a main body 741 slidably assembled to the rotary shaft 71 and the guide shaft 73, a scale 742 arranged on the main body 741 in the side of the rotary shaft 71, and an engagement section 743 for belt arranged in the main body 741 in the side of the guide shaft 73.

**[0021]** Being assembled to the rotary shaft 71 and the guide shaft, the main body 741 is configured to rotate following the rotation of the base 72 in the same manner as the base 72.

**[0022]** The scale 742 extends along the sub-scanning direction and has scale marks (not shown) on one side thereof.

**[0023]** The engagement section 743 is arranged downwardly protruding from the main body 741. The undersurface of the engagement section 743 includes a friction surface. When the friction surface contacts to the endless belt 21, the engagement section 743 engages with the endless belt 21. According to this engagement, the scale section 74 becomes slidable to the base 72 following the revolution of the endless belt 21.

**[0024]** Here, a nip portion 744 which cooperates the engagement section 743 to nip the endless belt 21 is provided at a position opposite to the engagement section 743 across the endless belt 21. The nip portion 744 is slidable together with the engagement section 743.

**[0025]** The sensor 75 is to measure a displacement amount of the scale section 74. The sensor 75 is provided at a predetermined position of the connection member 722 so that the sensor 75 faces the scale marks of the scale 742. The scale 742 moves by the movement of the scale section 74, and then, on this occasion, the sensor 75 measures the displacement amount of the scale section 74 by detecting the scale marks.

**[0026]** The rotary drive source 76 is to rotate the base 72 around the rotary shaft 71. The rotary drive source 76 is an air cylinder connected to one end portion of the

rotary member 721 in an inner rear side of the ink-jet recording apparatus 1. The rotary drive source 76 rotates the rotary member 721 by moving a rod up and down to rotate the base 72 around the rotary shaft 71. Figs. 2 to 5 show a state in which the rod of the rotary drive source 76 contracts and the planar portion of the endless belt 21 and the engagement section 743 are disengaged. Then, from this state, when the rod of the rotary drive source 76 extends, the rotary member 721 rotates, the under surface of the engagement section 743 contacts with the planar portion of the endless belt 21, then the scale section 74 and the endless belt 21 come to be engaged, as shown in Figs. 6 to 8. The rotary drive source 76, in this manner, constitutes a switching section for switching engagement and disengagement between the endless belt 21 and the scale section 74 by making the scale section 74 contact with or apart from the endless belt 21.

**[0027]** The driver 77 is to bring the scale section 74 back to the default position from the predetermined position, and includes a drive source 771, a transmission mechanism 772 and a release section 773.

**[0028]** The drive source 771 is a motor, for example, and is arranged near the rotary member 721 in an inner front side of the ink-jet recording apparatus 1.

**[0029]** The transmission mechanism 772 is to transfer power of the drive source 771 to the scale section 74, and includes a pair of pulleys 774, 775 and an endless connection belt 776 bridged across the pair of pulleys 774, 775. The front side pulley 774 is arranged to face the drive source 771. The rear side pulley 775 is arranged close to the rotary drive source 76. The connection belt 776 is, as a whole, arranged along the sub-scanning direction. A part of the connection belt 776 and the main body 741 of the scale section 74 are connected with each other, thus, revolution of the connection belt 776 is transferred to the main body 741.

**[0030]** The release section 773 is, for example, a clutch such as an electromagnetic clutch, and is configured to engage or disengage the drive source 771 and the front side pulley 774. Fig. 3 shows a state in which the release section disengages the drive source 771 and the front side pulley 774. Fig. 9 shows a state in which the release section 773 engages the drive source 771 and the front side pulley 774.

**[0031]** Fig. 10 is a block diagram showing a main control structure of the ink-jet recording apparatus 1. As shown in this Fig. 10, a controller 8 of the ink-jet recording apparatus 1 electrically connects a roller drive source 231 for the carrier roller 23, the recording head 6, the carriage 5, the sensor 75, the rotary drive source 76, the drive source 771, the release section 773, and so on.

**[0032]** The controller 8 includes a central processing unit (CPU) and a memory, and controls each component of the ink-jet recording apparatus 1. The memory stores data of the image to be formed on the recording medium P and a program for controlling the each component of the ink-jet recording apparatus 1. The CPU performs calculation based on the image data or the program that are stored in the memory to send control signal to each of the components on the basis of the calculation result.

**[0033]** Moreover, the controller 8 calculates a feeding distance of the recording medium P based on a detection result of the sensor 75. Specifically, the detection result of the sensor 75 is obtained during a period where the scale section 74 moves from the default position to the predetermined position. The controller, in this manner, constitutes a calculation section and controls revolution amount of the carriage roller 23 based on the calculated displacement amount to control a feeding distance of the recording medium P.

**[0034]** Next, an operation of the present embodiment will be described.

**[0035]** The controller 8 controls the roller drive source 231 to intermittently carry the recording medium P at the time to start the image recording. When the recording medium P is in a stopped state after the intermittent feeding, the controller 8 controls the carriage 5 to cause the recording heads 6 to scan the recording medium P. During the scanning of the carriage 5, the controller 8 controls the recording heads 6 so that each of the recording heads 6 injects ink to record images onto the recording medium P.

**[0036]** Here, during the feeding of the recording medium P, the controller 8 calculates the feeding distance thereof. Concretely, before the feeding of the recording medium P that is before the revolution of the endless belt 21, the scale section 74 is positioned so that the main body 741 contacts with the rear side rotary member 721, as shown in Fig. 2. This contact position is referred to as the default position. The controller 8 then controls the rotary drive source 76 and rotates the base 72 to engage the scale section 74 with the planar portion of the endless belt 21 (see Figs. 6 and 7). After the endless belt 21 and the scale section 74 are engaged, the controller 8 controls the release section 773 to release the power transmission between the drive source 771 and the transmission mechanism 772.

**[0037]** When the endless belt 21 goes around to carry the recording medium P, the scale section 74 moves following the revolution of the endless belt 21. Then, the scale 742 also be moved and the displacement amount of the scale 742 is detected by the sensor 75.

**[0038]** The scale 74 then reaches the predetermined position, as shown in Fig. 11. Here, as described above, the predetermined position is a position where a distance H from the default position is set to be a recording width of a single scanning performed by the recording head 6. As shown in Fig. 12, when the scale 74 reaches the predetermined position, the controller 8 controls the rotary drive source 76 to release the engagement between the endless belt 21 and the engagement section 741. When the engagement between the endless belt 21 and the engagement section 741 is released, the controller 8 controls the release section 773 to stop the release of the power transmission between the drive source 771 and

the transmission mechanism 772.

**[0039]** Since the power of the drive source 771 is transferred to the transmission mechanism 772 as a result of the stop of the release, the pulley 774 rotates and the connection belt 776 revolves accordingly. The main body 741 of the scale section 74 moves following the connection belt 776 and is brought back to the default position. In this regard, the controller 8 ignores a detection result of the sensor 75 though the scale 742 also moves with the main body 741. That is, the controller 8 calculates the feeding distance of the recording medium P based on the detection result of the sensor 75 obtained during the movement of the scale section 74 from the default position to the predetermined position. Here, the controller 8 may calculate a pull-back amount, by which the scale section 74 is brought back to the default position, based on the detection result of the sensor 75 to control the drive source 771 so that the scale section 74 could be brought back by the calculated pull-back amount.

**[0040]** The controller 8 then controls the revolution amount of the carriage roller 23 based on the calculated feeding distance to control the feeding distance of the recording medium P.

**[0041]** After the scale section 74 has brought back to the default position, the controller 8 controls the rotary drive source 76 to rotate the base 72, and engages the scale section 74 and the endless belt 21 (see Figs. 6 and 7). Then, after the scale section 74 is engaged with the endless belt 21, the controller 8 controls the release section 773 and releases the power transmission between the drive source 771 and the transmission mechanism 772 to prepare for the next revolution of the endless belt 21.

**[0042]** As described above, according to the present embodiment, since the release section 773 releases the power transmission between the drive source 771 and the transmission mechanism 772 when the endless belt 21 engages with the scale section 74, the power of the drive source 771 does not operate while the scale section 74 moves following the endless belt 21. Therefore, at the time of the detection by the sensor 75, the detection result of the sensor 75 can be free of negative effects of noises that are caused by the power transmission from the drive source 771. As a result, the feeding distance of the recording medium P can be measured accurately.

**[0043]** Moreover, if the engagement between the endless belt 21 and the scale section 74 is released, the release section 773 stops the release of the power transmission between the drive source 771 and the transmission mechanism 772, thereby the power of the drive source 771 can be transferred to the transmission mechanism 772 and the bring-back motion can be smoothly achieved when bringing the scale section 75 back to the default position.

**[0044]** Moreover, according to the present embodiment, the scale section 74 is contacted with or apart from the endless belt 21 by the rotation of the base 72 around the rotary shaft 71 in order to engage or disengage the endless belt 21 and the scale section 74. The scale section 74 is slidable following the revolution of the endless belt 21 while being guided by the guide shaft 73 which is parallel to the rotary shaft 71. Accordingly, it is possible to obtain high-repetition positional accuracy because the engagement/disengagement between the scale section 74 and the endless belt 21 and the slide operation of the scale section 74 are achieved by such a simple structure as based on the pair of shafts (the rotary shaft 71 and guide shaft 73) having high rigidity. Therefore, the feeding distance of the recording medium P can be accurately measured regardless of the feeding distance.

**[0045]** The positional relationship between the scale section 74 and the sensor 75 is fixed even during the operation of the engagement or disengagement between the scale section 74 and the endless belt 21 by rotating the base 72. Thus, clearance between the scale section 742 and the sensor 75 never be widened, thereby it is possible to prevent trash or the like from entering therebetween. Accordingly, it is possible to inhibit an erroneous detection owing to the irruption of the trash or the like.

**[0046]** Moreover, according to the present embodiment, the revolution of the endless belt 21 is executed intermittently, wherein the endless belt 21 stops every time the endless belt 21 carries the recording medium P by the feeding distance corresponding to the recording width of the single scanning performed by the recording head 6. In other words, it is possible to achieve a precise detection by detecting the feeding distance each time the recording medium P has been carried by the intermittent revolution. The scale section 74 returns to the default position after having followed the revolution of the endless belt 21 from the default position to have been reached the predetermined position. The distance H from the default position to the predetermined position is set to the recording width of the single scanning by the recording head 6. Accordingly, the feeding distance of the recording medium P can be detected each time the recording medium P has been carried by a single intermittent motion of the revolution, thereby it is possible to accurately measure the feeding distance of the recording medium P.

**[0047]** Note that the scope of the present invention is not limited to the above embodiment and can be modified accordingly.

## Claims

**1.** A recording medium carrier device (2), comprising:

an endless belt (21) on the surface of which a recording medium (P) is set;

a plurality of carrier rollers (23, 24, 25) for supporting the endless belt (21) so that a part of the endless belt (21) constitutes a planar portion, and for intermittently revolving the endless belt (21);

a detection section (7) that is movable back and forth between a default position and a predetermined position in a pathway along the planar portion of the endless belt (21), the predetermined position being located downstream of the default position in a revolving direction of the endless belt (21) , and the detection section (7) detects its own displacement amount during the forward movement;
a calculation section (8) for calculating a feeding distance of the recording medium (P) based on a detection result of the detection section (7);
a controller (8) for controlling revolution amount of at least one of the plurality of carrier rollers (23, 24, 25) based on the feeding distance calculated by the calculation section (8);
the detection section (7) comprising:

a base (72);
a scale section (74) that is slidable to the base (72) and follows the endless belt (21) with being engaged with the endless belt (21);
a sensor (75) for measuring a displacement amount of the scale section (74);
a switching section (76) for switching engagement and disengagement between the endless belt (21) and the scale section (74) by making the scale section (74) contact with or apart from the endless belt (21); and
a driver (77) for bringing the scale section (74) back to the default position from the predetermined position;

the driver (77) comprising:

a drive source (771);
a transmission mechanism (772) for transmitting power of the drive source (771) to the scale section (74); and
a release section (773) for releasing power transmission between the drive source (771) and the transmission mechanism (772),

wherein the release section (773) releases the power transmission when the switching section (76) switches the endless belt (21) and the scale section (74) to be engaged, and stops the release of the power transmission when the switching section (76) switches the endless belt (21) and the scale section (74) to be disengaged.

**2.** A recording medium carrier device (2), comprising:

an endless belt (21) on the surface of which a recording medium (P) is set;
a plurality of carrier rollers (23, 24, 25) for supporting the endless belt (21) so that a part of the endless belt (21) constitutes a planar portion, and for intermittently revolving the endless belt (21);
a detection section (7) that is movable back and forth between a default position and a predetermined position in a pathway along the planar portion of the endless belt (21), the predetermined position being located downstream of the default position in a revolving direction of the endless belt (21), and the detection section (7) detects its own displacement amount during the forward movement;
a calculation section (8) for calculating feeding distance of the recording medium (P) based on a detection result of the detection section (7);
a controller (8) for controlling revolution amount of at least one of the plurality of carrier rollers (23, 24, 25) based on the feeding distance calculated by the calculation section (8) ;
the detection section (7) comprising:

a rotary shaft (71) extending along the planar portion of the endless belt (21);
a base (72) pivotally supported to rotate in conjunction with the rotary shaft (71);
a guide shaft (73) provided on the base (72) in a side far from the rotary shaft (71) and in parallel with the rotary shaft (71);
a scale section (74) that is slidable to the base (72) and is engaged with the endless belt (21) to follow the same while being guided by the guide shaft (73);
a sensor (75) provided on the base (72) for measuring a displacement amount of the scale section (74);
a rotary drive source (76) to rotate the base (72) around the rotary shaft (71); and
a driver (77) for bringing the scale section (74) back to the default position from the predetermined position,

wherein the rotary drive source (76) rotates the base (72) before the revolution of the endless belt (21) at the default position to make the scale section (74) be engaged with the planar portion, and rotates the base (72) to release the engagement between the scale section (74) and the endless belt (21) after the scale section (74) moves following the revolution of the endless belt (21) and reaches the predetermined position, and the driver (77) brings the scale section (74) back to the default position when the endless belt (21) stops after the disengagement; and
wherein the calculation section (8) calculates the feeding distance of the recording medium (P) based on a detection result of the sensor

(75) , which result being obtained during a period where the scale section (74) moves from the default position to the predetermined position.

**3.** A recording medium carrier device (2) installed in an ink-j et recording apparatus (1) for forming an image on a recording medium (P) while scanning a recording head (6) in a sub-scanning direction, the recording medium carrier device (2) comprising:

an endless belt (21) on the surface of which a recording medium (P) is set;
a plurality of carrier rollers (23, 24, 25) for supporting the endless belt (21) so that a part of the endless belt (21) constitutes a planar portion, and for intermittently revolving the endless belt (21);
a detection section (7) that is movable back and forth between a default position and a predetermined position in a pathway along the planar portion of the endless belt (21), the predetermined position being located downstream of the default position in a revolving direction of the endless belt (21) , the distance from the default position to the predetermined position being set to be a recording width of a single scanning performed by the recording head (6) , and the detection section (7) detecting its own displacement amount during the forward movement;
a calculation section (8) for calculating feeding distance of the recording medium (P) based on a detection result of the detection section (7);
a controller (8) for controlling revolution amount of at least one of the plurality of carrier rollers (23, 24, 25) based on the feeding distance calculated by the calculation section (8);
the detection section (7) comprising:

a base (72);
a scale section (74) that is slidable to the base (72) and follows the endless belt (21) with being engaged with the endless belt (21);
a sensor (75) provided on the base (72) for measuring a displacement amount of the scale section (74);
a switching section (76) for switching engagement and disengagement between the endless belt (21) and the scale section (74) by making the scale section (74) contact with or apart from the endless belt (21); and
a driver (77) for bringing the scale section (74) back to the default position from the predetermined position,

wherein the switching section (76) switches the scale section (74) and the planar portion to be engaged before the revolution of the endless belt (21) at the default position, the switching section (76) disengages the scale section (74) and the endless belt (21) after the scale section (74) moves following the revolution of the endless belt (21) and reaches the predetermined position, and the driver (77) brings the scale section (74) back to the default position when the endless belt (21) stops after the disengagement; and
wherein the calculation section (8) calculates the feeding distance of the recording medium (P) based on a detection result of the sensor (75) , which result being obtained during a period where the scale section (74) moves from the default position to the predetermined position.

**4.** An image forming apparatus (1), comprising:

the recording medium carrier device (2) according to claim 1 or 2, and
an image forming section (3) to form an image on the recording medium (P) carried by the recording medium carrier device (2).

**5.** An ink-jet recording apparatus (1), comprising:

the recording medium carrier device (2) according to claim 3; and
an image forming section (3) to form an image on the recording medium (P) carried by the recording medium carrier device (2) with the recording head (6) being moved in the sub-scanning direction.

FIG.1

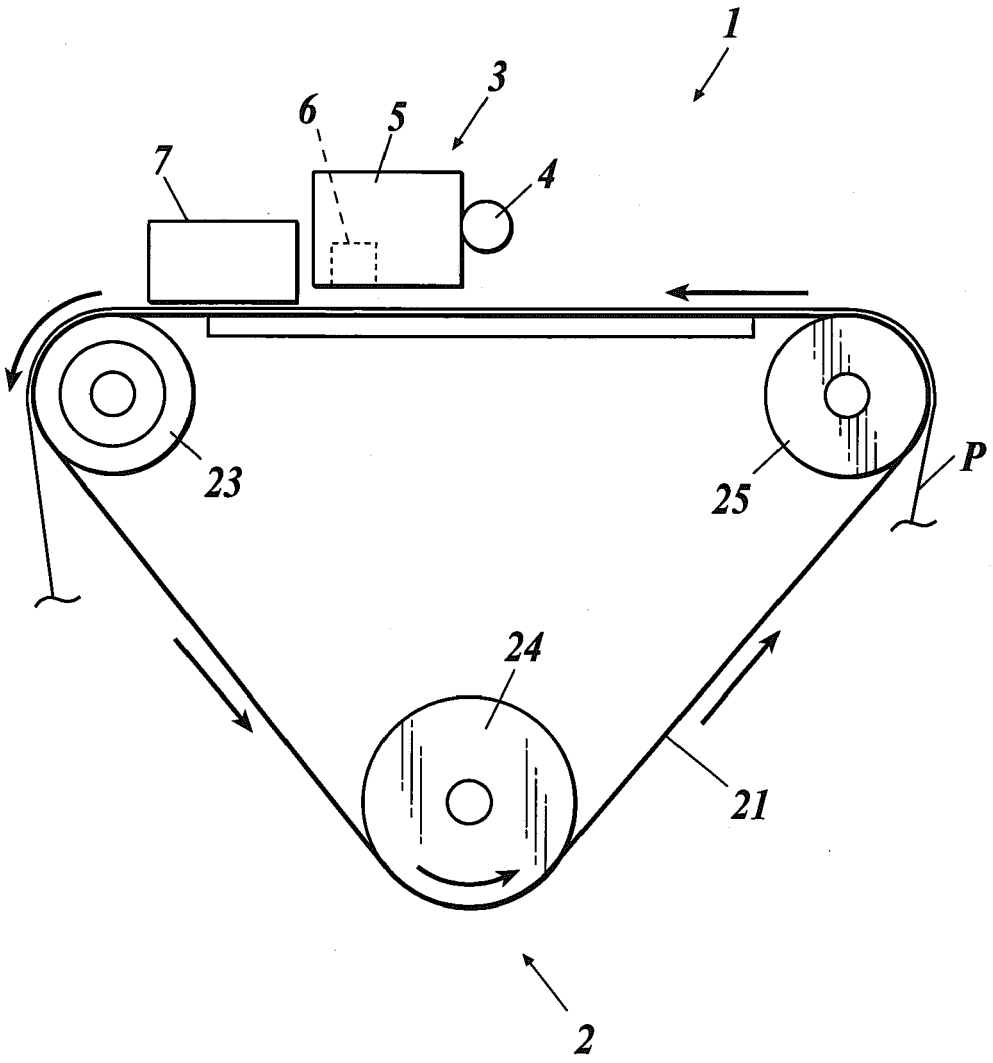

FIG.2

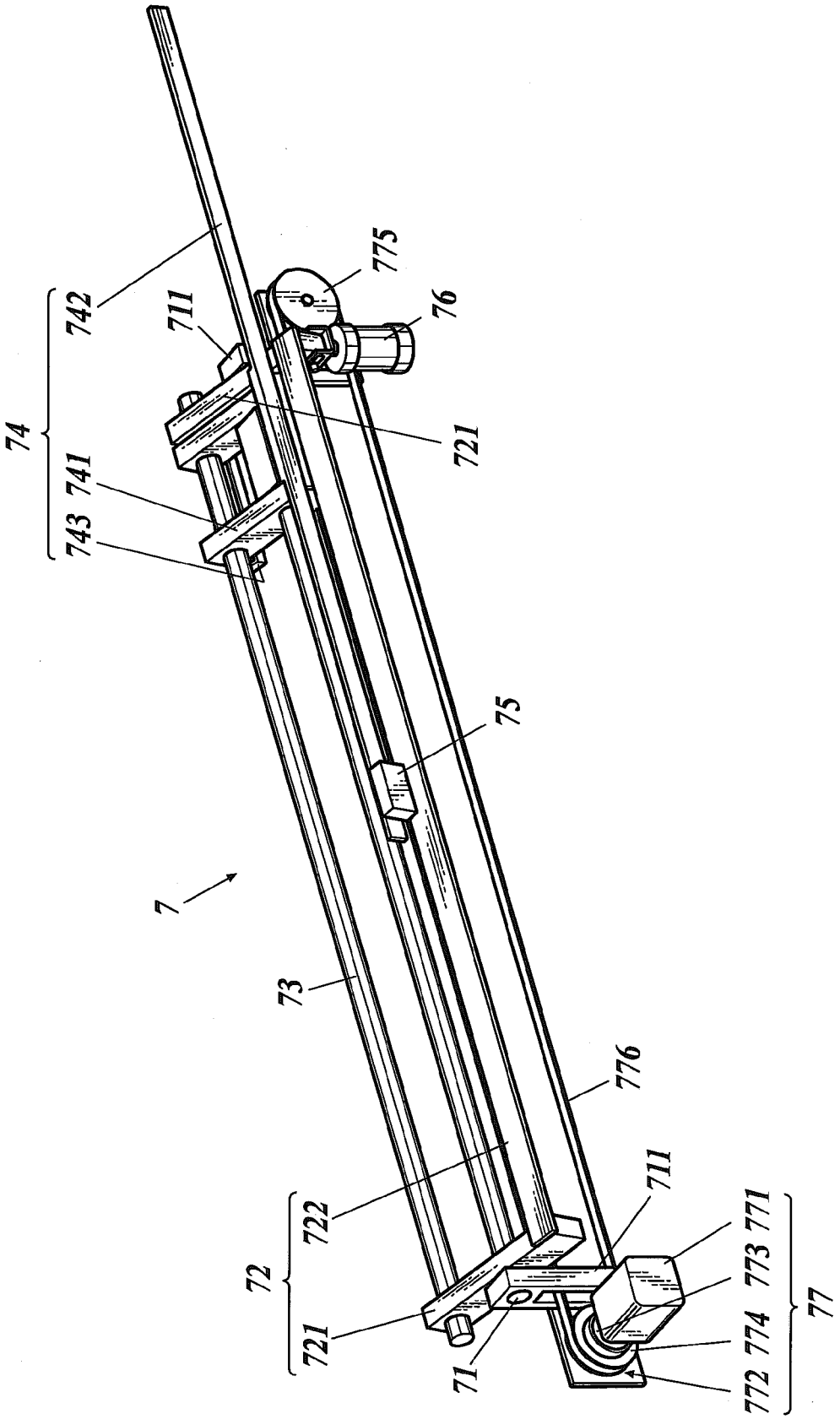
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FIG.3

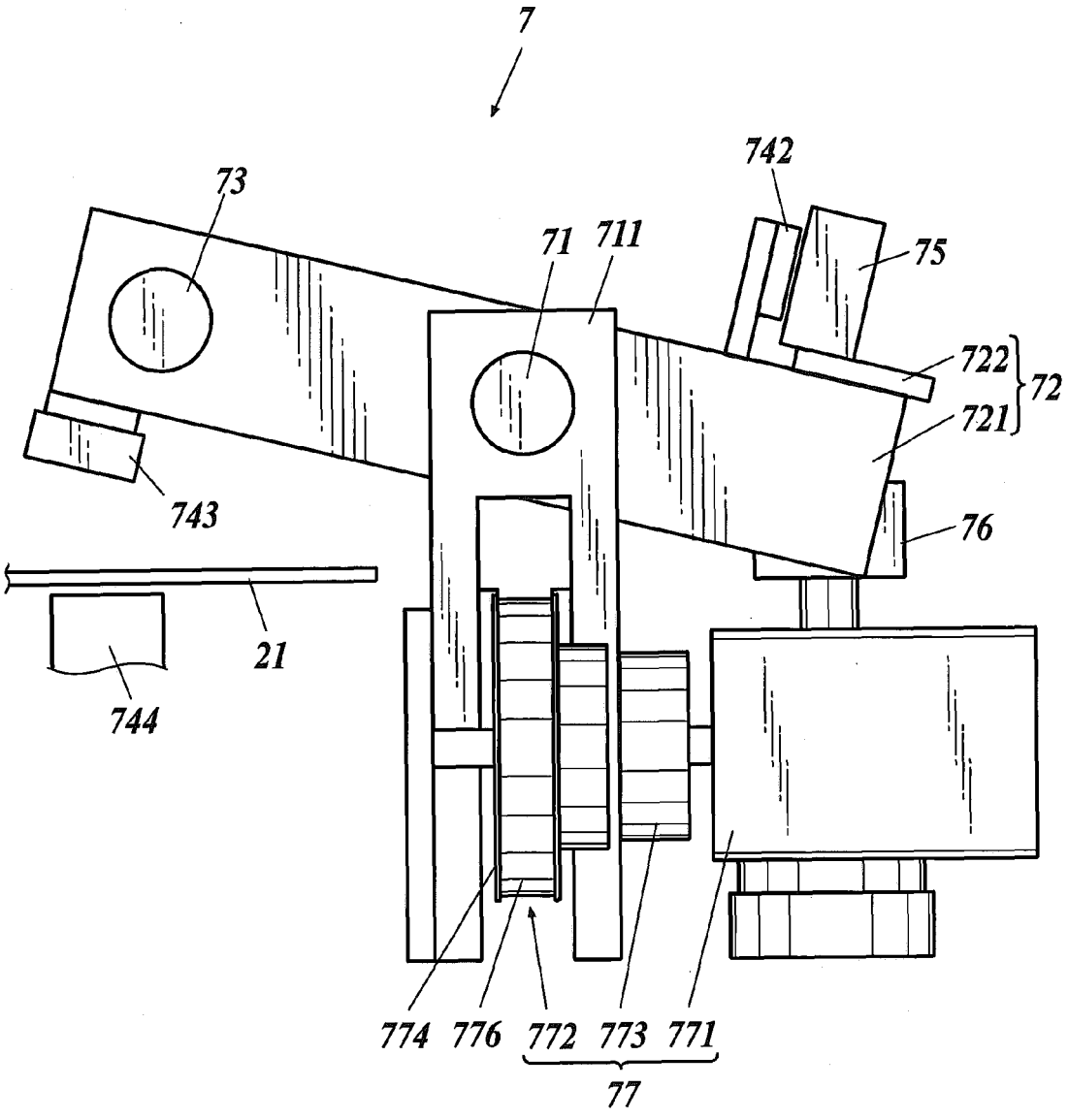

FIG.4

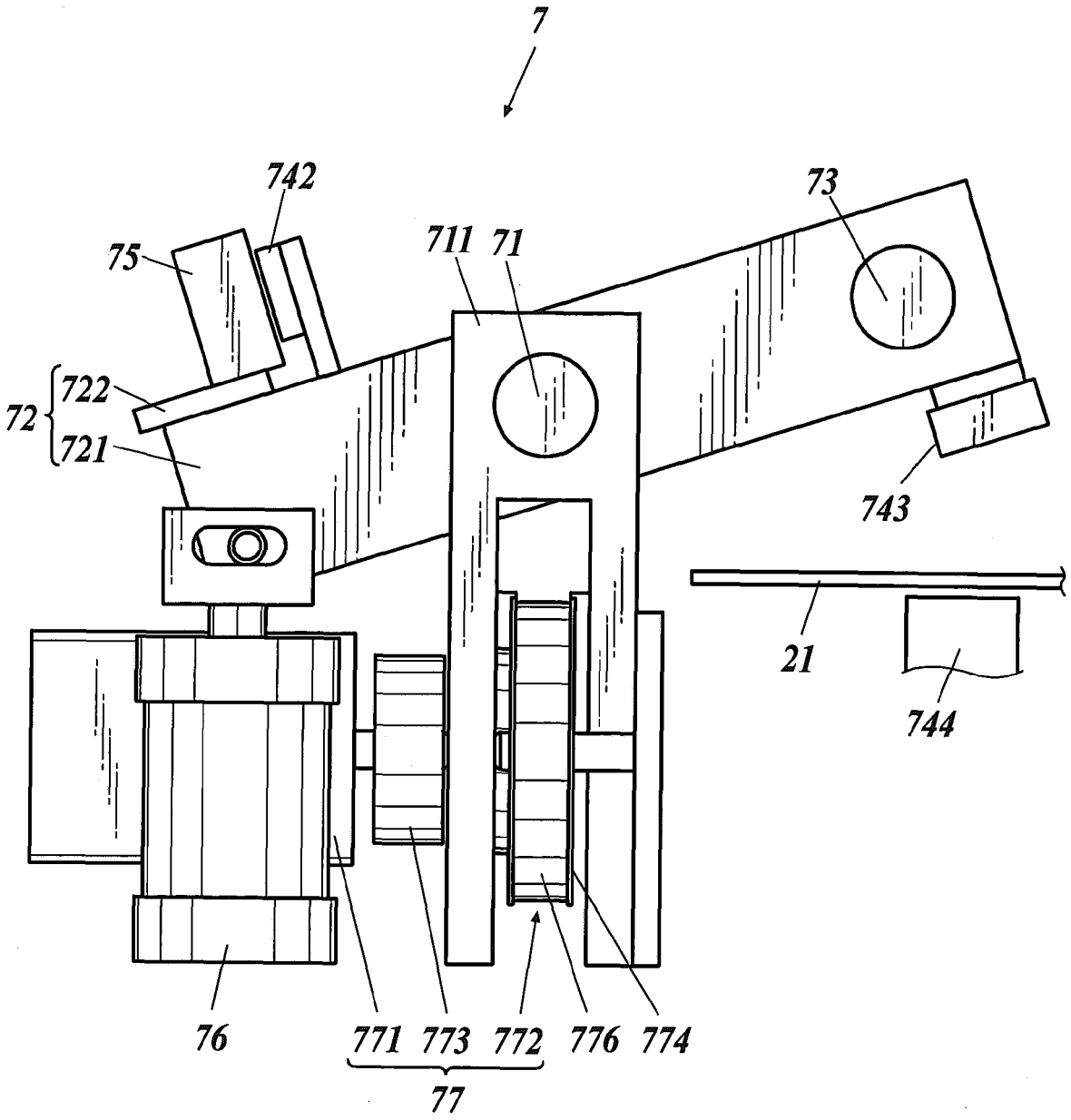

FIG.5

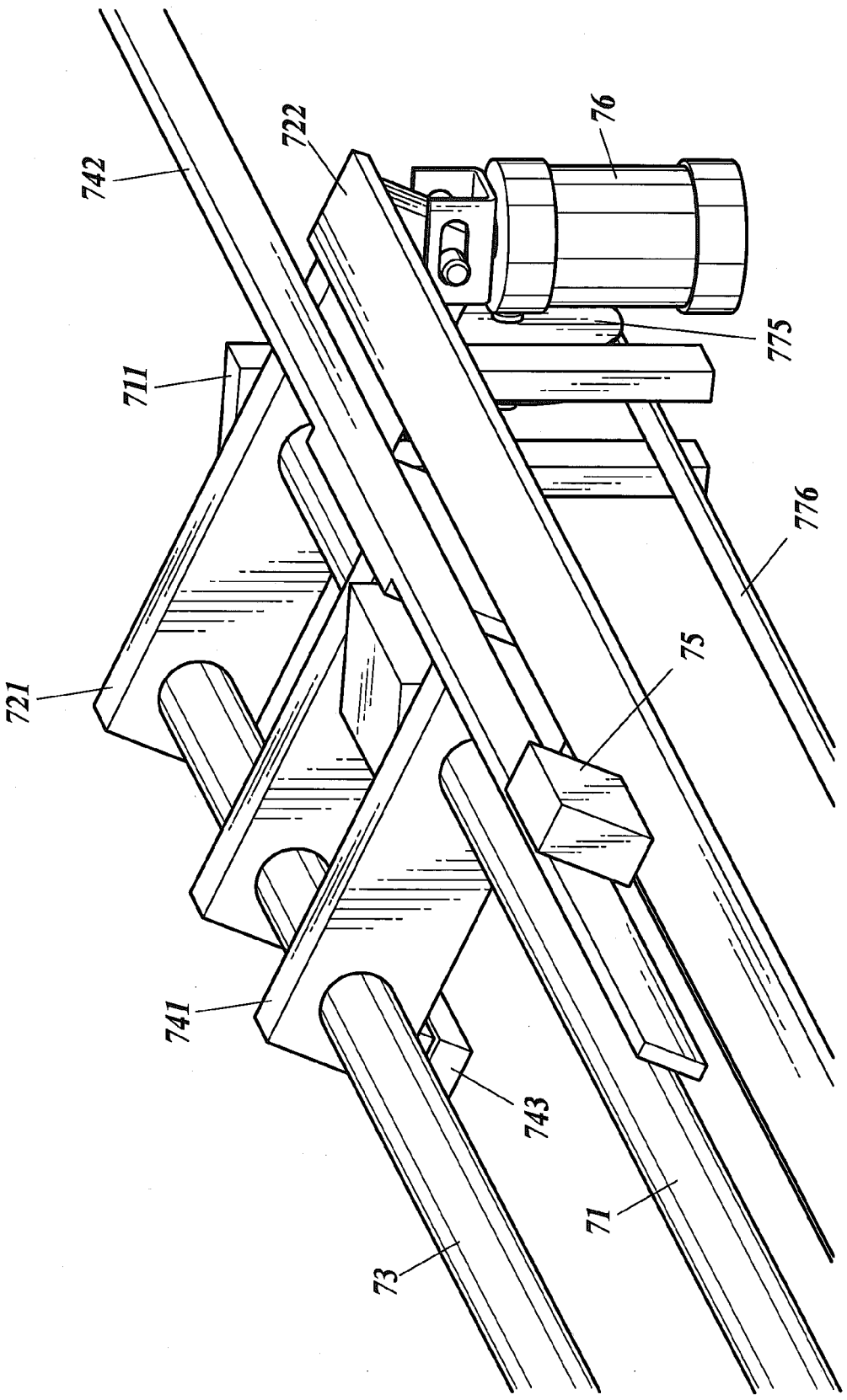

FIG.6

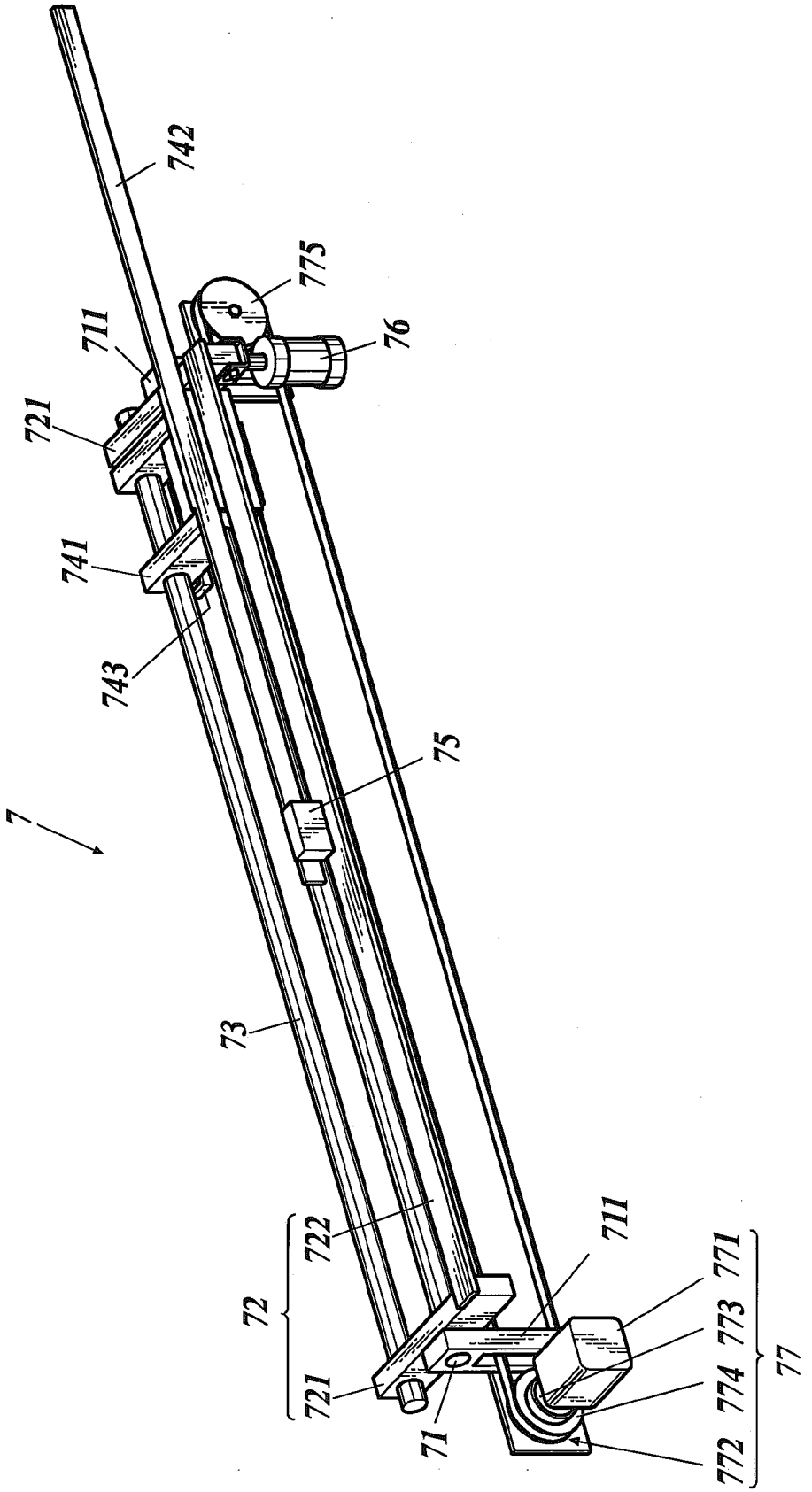
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FIG. 7

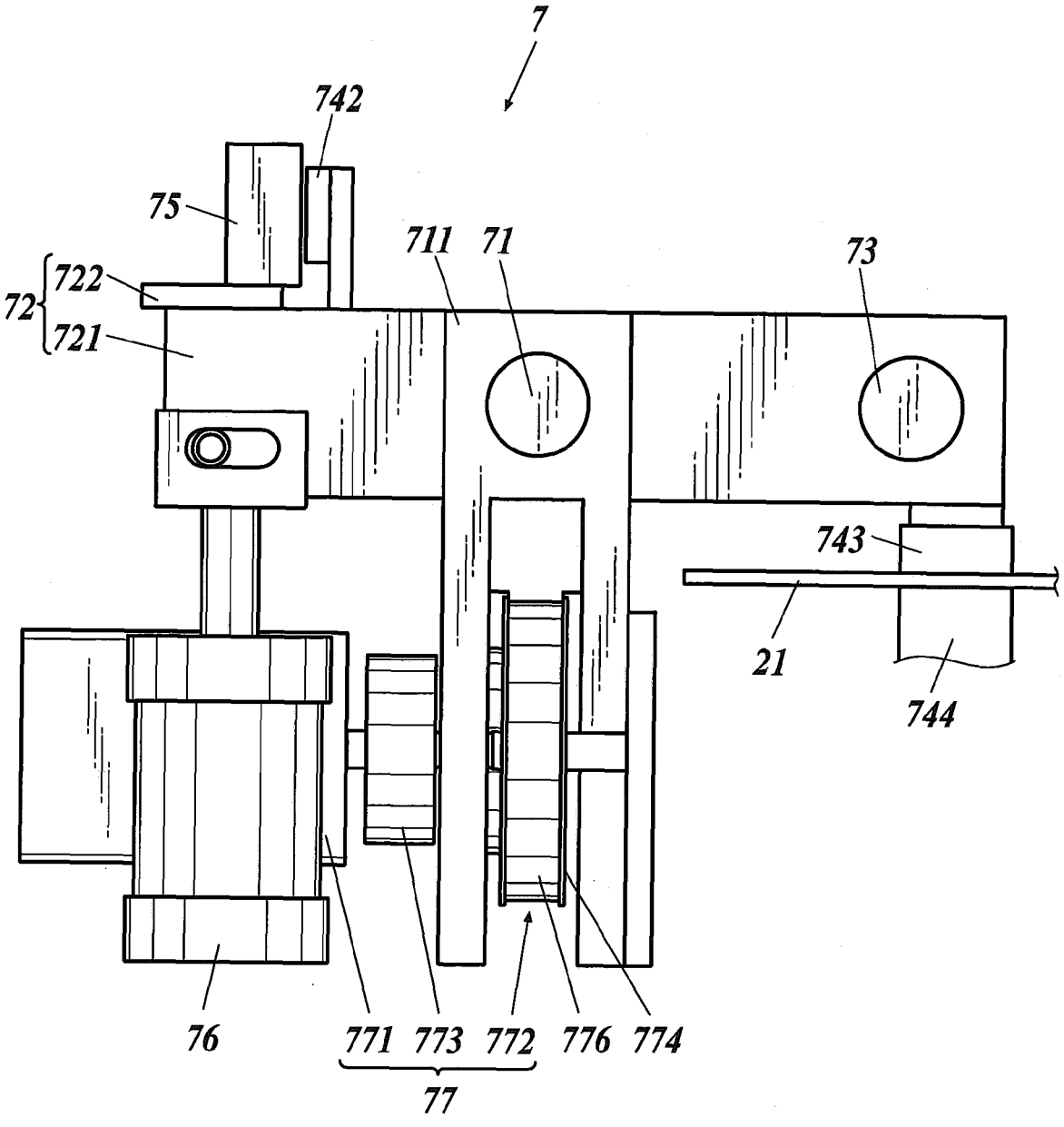


FIG.8

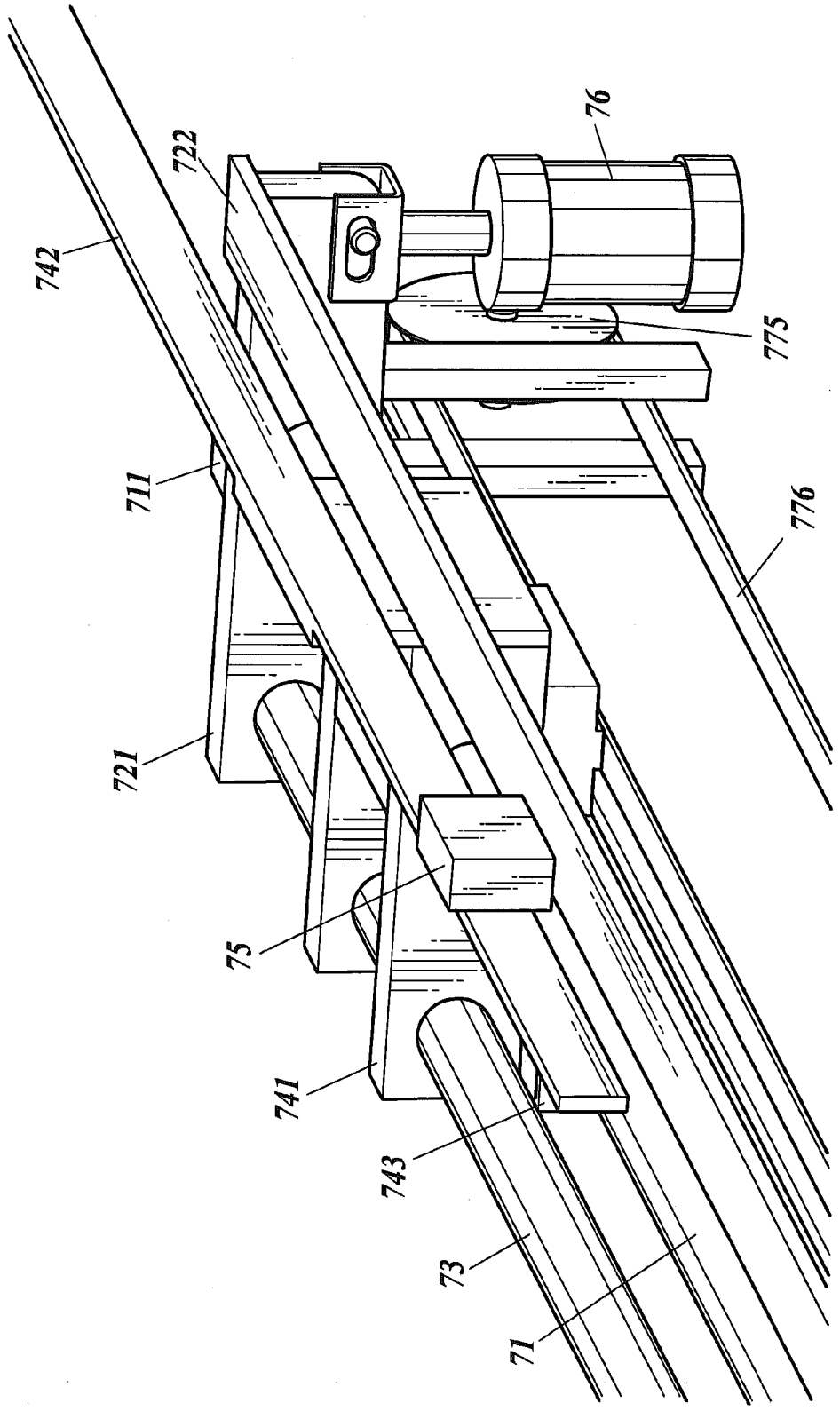


FIG.9

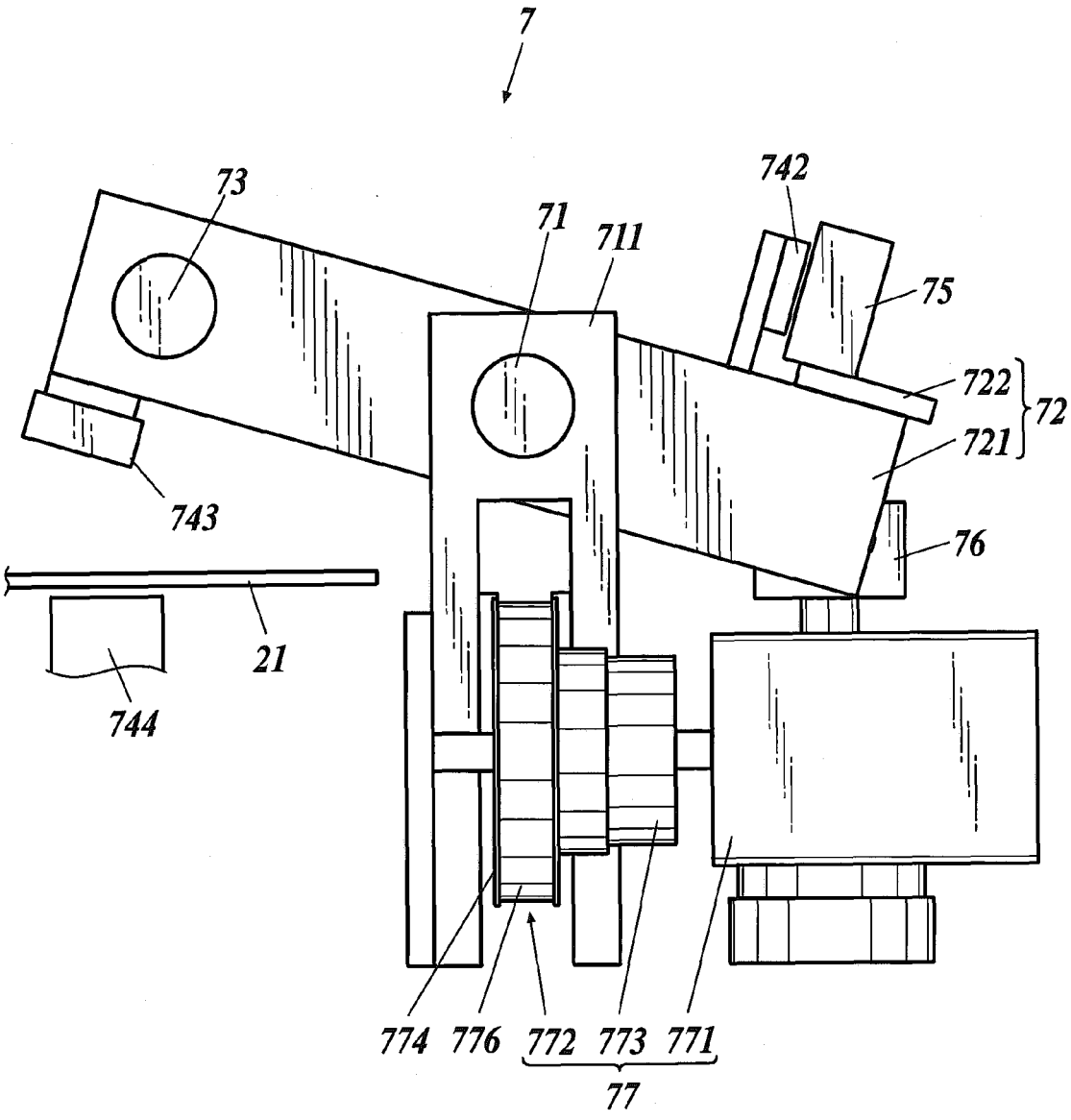
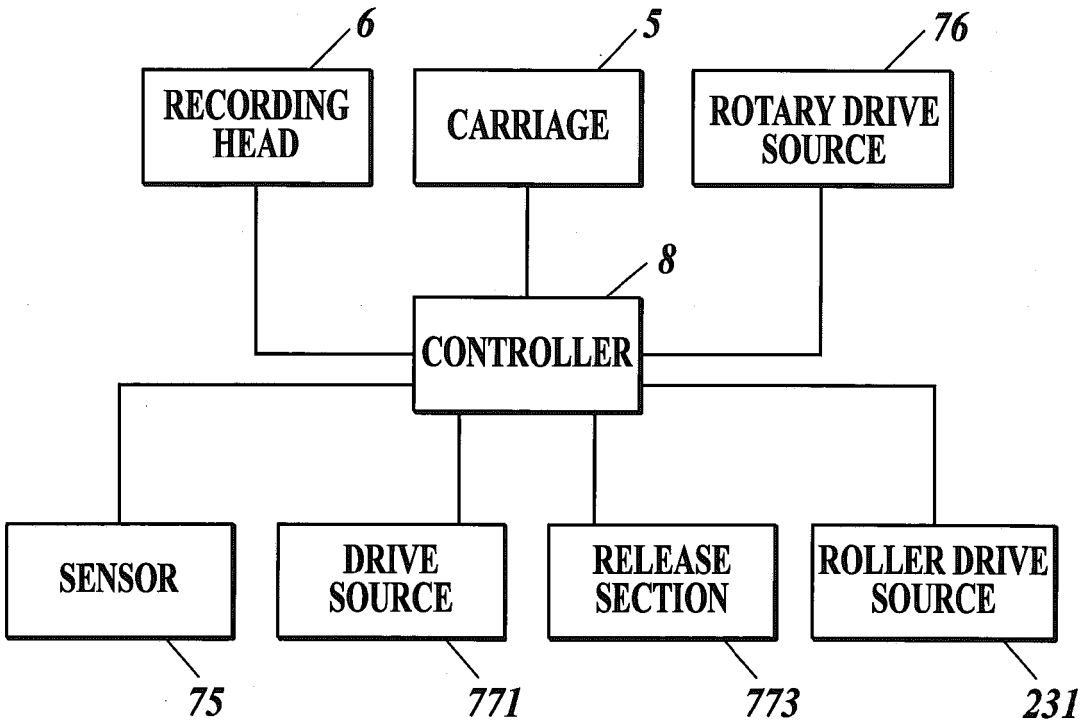


*FIG.10*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76
RECORDING HEAD
CARRIAGE
ROTARY DRIVE SOURCE
8
CONTROLLER
SENSOR
DRIVE SOURCE
RELEASE SECTION
ROLLER DRIVE SOURCE
75
771
773
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FIG.11

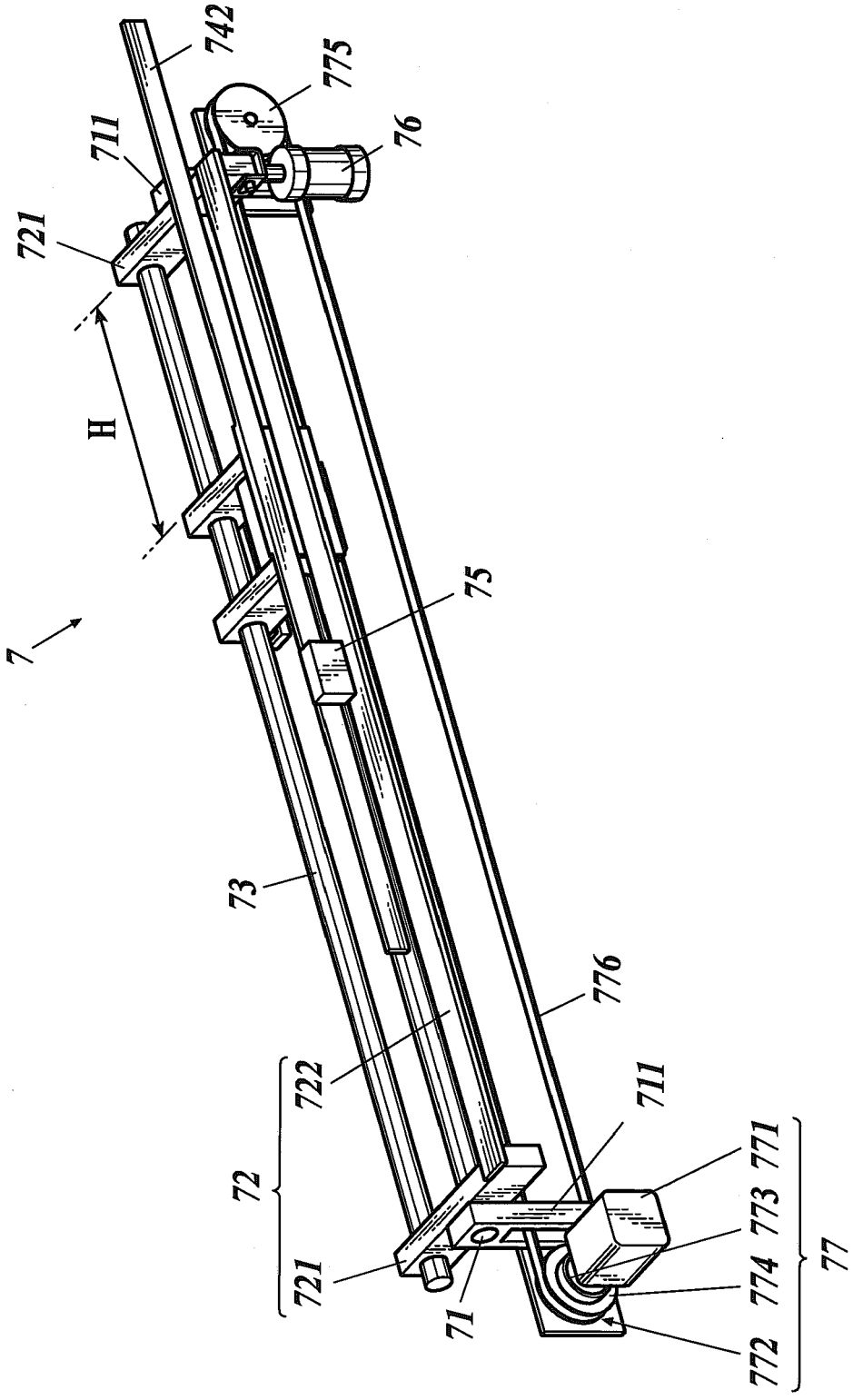
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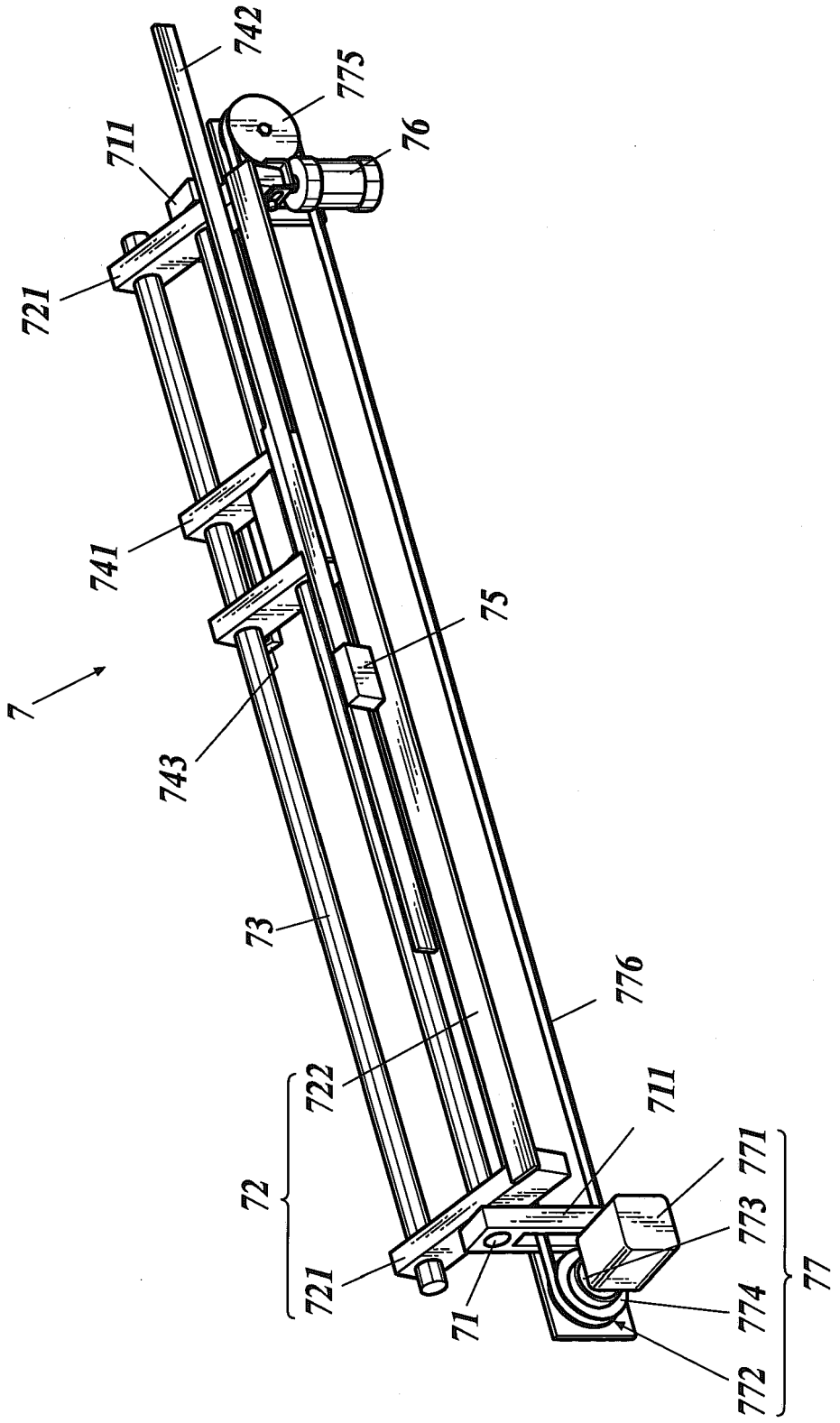
FIG.12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# EUROPEAN SEARCH REPORT

Application Number
EP 12 17 6944

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B41J
B65H

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
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| The Hague | 12 December 2012 | Curt, Denis |

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1

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