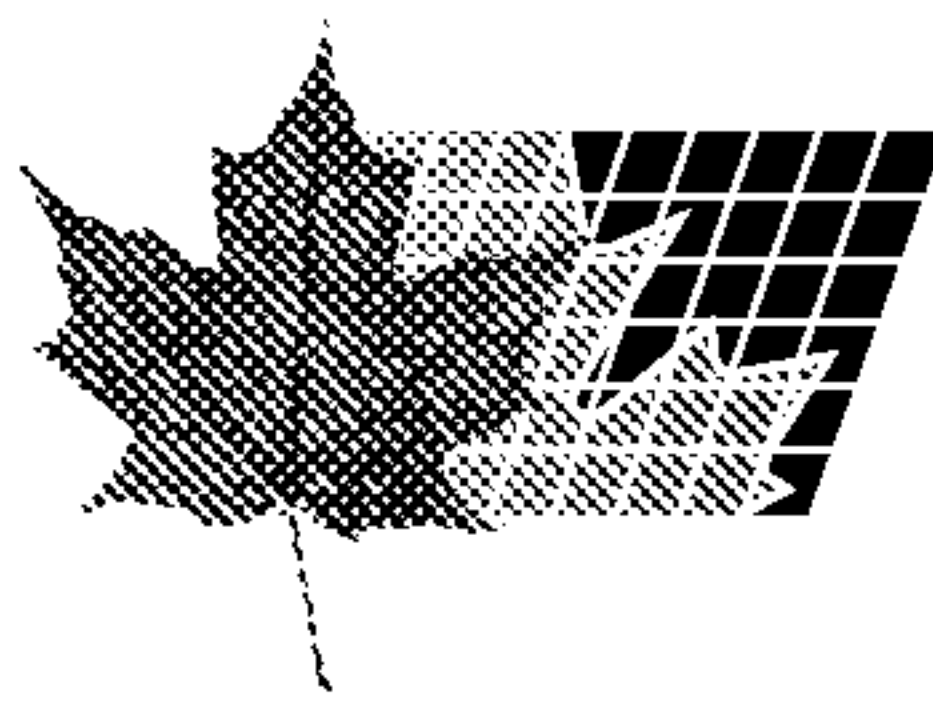




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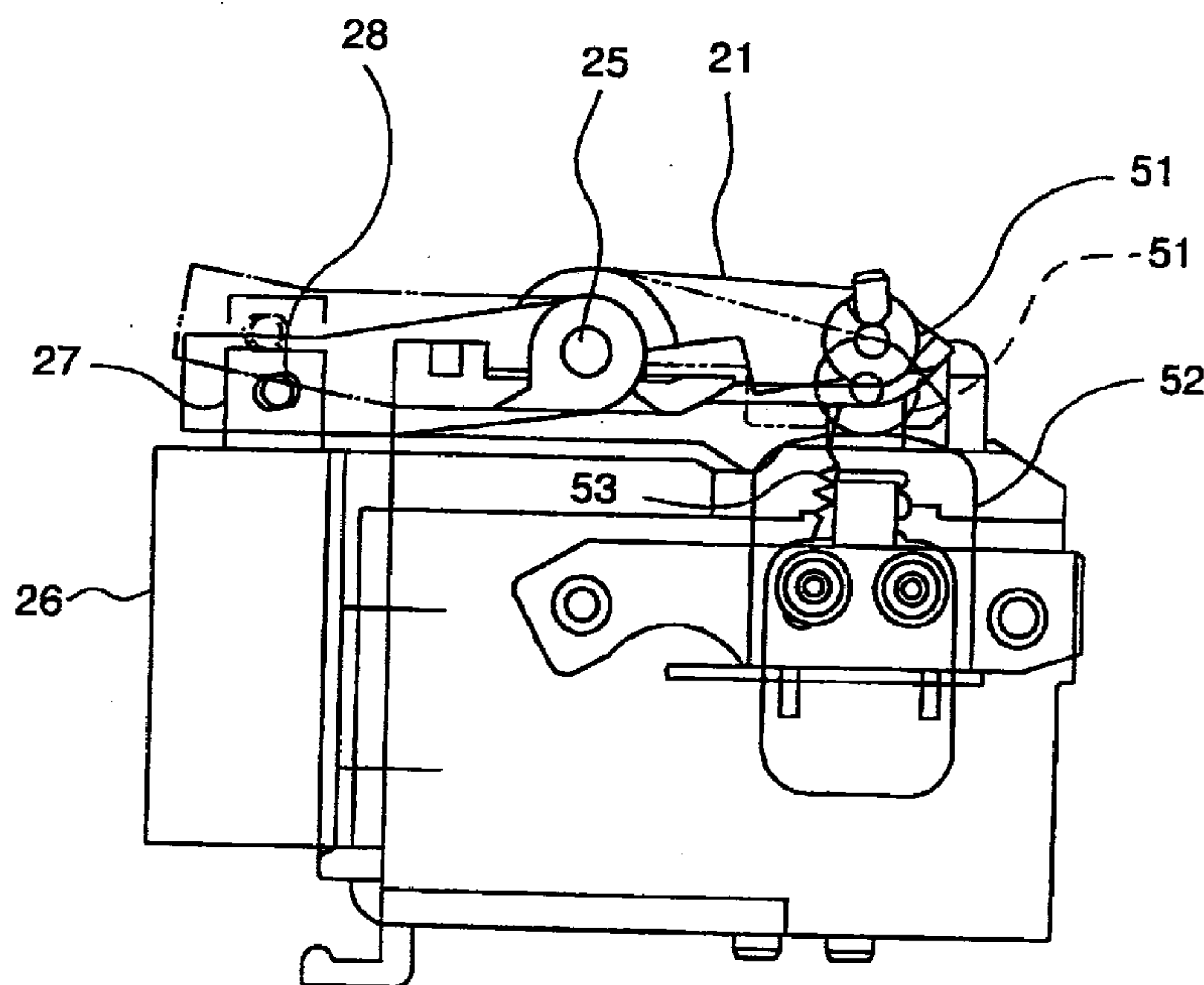
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(54) **APPAREIL ET METHODE DE DETECTION D'INFORMATIONS
ENREGISTREES SUR UN SUPPORT**

(54) **INFORMATION DETECTION APPARATUS AND
INFORMATION DETECTION METHOD FOR RECORDING
MEDIA**



(57) An information detection apparatus and information detection method for processing recording media to check the validity of checks and other negotiable instruments and print as necessary to said recording media are characterized by reliable operation and good operability. The information detection apparatus for processing recording media comprises in sequence along transportation path 9 from the insertion opening 6 a recording medium transportation mechanism 3, printing mechanism 4, and reading mechanism 5. When recording medium 8 is transported by transportation mechanism 3 along transportation path 9 to a predetermined position, the check is positioned between presser roller 51 and detection means 52 of reading mechanism 5. Presser roller 51 then presses recording medium 8 against detection means 52 while transportation mechanism 3 pulls the recording medium and particular information recorded to the recording medium is detected. This operation straightens wrinkles and removes slack from recording medium 8 to reduce reading errors. Based on the read information, a printing process is then executed by printing mechanism 4 and the recording medium is ejected from insertion opening 6. Task efficiency is therefore good, and the occupied space can be minimized.



Abstract

An information detection apparatus and information detection method for processing recording media to check the validity of checks and other negotiable instruments and print as necessary to said recording media are characterized by reliable operation and good operability.

The information detection apparatus for processing recording media comprises in sequence along transportation path 9 from the insertion opening 6 a recording medium transportation mechanism 3, printing mechanism 4, and reading mechanism 5. When recording medium 8 is transported by transportation mechanism 3 along transportation path 9 to a predetermined position, the check is positioned between presser roller 51 and detection means 52 of reading mechanism 5. Presser roller 51 then presses recording medium 8 against detection means 52 while transportation mechanism 3 pulls the recording medium and particular information recorded to the recording medium is detected. This operation straightens wrinkles and removes slack from recording medium 8 to reduce reading errors. Based on the read information, a printing process is then executed by printing mechanism 4 and the recording medium is ejected from insertion opening 6. Task efficiency is therefore good, and the occupied space can be minimized.

Title of the invention:INFORMATION DETECTION APPARATUS AND INFORMATION DETECTION
METHOD FOR RECORDING MEDIADetailed description of the invention

Field of the invention

The invention relates to an apparatus for detecting information recorded to recording media and to an information detection method for processing recording media, and relates particularly to an apparatus and method for reading content recorded with magnetic ink to recording media such as checks and negotiable instruments, and printing to said recording media.

Prior art

Checks are widely used to pay for shopping purchases, utility bills, and other business or personal transactions. In general the amount and signature of the account holder are written on the face of the check, which is also printed with a tracking code containing the financial institution code and account number, the check serial number, and other information in a standardized format using MICR (Magnetic Ink Character Recognition) text. The MICR text on such recording media is also normally printed in a standard area.

The presence of magnetic ink can be detected using a magnetic head, and MICR readers have been developed for reading the MICR text and extracting the printed information. When such a check or negotiable instrument is received, the operator passes the instrument through an MICR reader to detect the magnetic ink, read the information, and determine the validity of the instrument. A printing device is then used to endorse the back of the check by printing an approval code, store (business) name, and other required information.

To simplify this sequence of operations the inventor has previously developed a device for sequentially accomplishing MICR text reading and endorsement printing using a magnetic head and print head disposed to a single transportation path. This device is described briefly below with reference to FIG. 7, a simplified side view of a conventional data detection means for processing checks as the recording medium. As shown in FIG. 7 this data detection means comprises a print head 105 and a magnetic head 106. In this data detection means the opening 107 to which the check is inserted is provided in the space 104 at the front of the device, and

the check is inserted horizontally from opening 107.

Transport roller 108 is disposed between opening 107 and paper transport path 110. When the leading edge of the check inserted from opening 107 reaches the bottom of transport roller 108, presser roller 109 lifts to press the check against transport roller 108. When a drive mechanism not shown in the figure then operates, transport roller 108 rotates in the direction transporting the check into paper transport path 110.

Magnetic head 106 is disposed on the back side of paper transport path 110. Transport roller 112, which is driven by belt 111 to rotate in synchronization with transport roller 108, is disposed opposing magnetic head 106 from the other side of paper transport path 110 such that the check (recording medium) passes therebetween. When the leading edge of the check reaches magnetic head 106, transport roller 112 is moved against the check to press the check against magnetic head 106 while continuing to transport the check through the paper transport path 110. Magnetic head 106 is thus able to detect the magnetic ink in contact with the check, and can thus read the information printed using magnetic ink characters with good precision. Paper transport path 110 is formed curving gently upward with print head 105 disposed at the top end of the path. Another transport roller 113, which rotates synchronized to presser roller 109 and transport roller 112, is disposed between print head 105 and magnetic head 106. After the check is transported by presser roller 109 and transport roller 112 through the paper transport path 110 and is read by magnetic head 106, it is transported further upward by transport roller 113. After the entire check is advanced to a vertical position, specific information is printed by the print head 105, and the check is then ejected from opening 114 at the top of the data detection means to complete check processing.

This type of recording media information detection apparatus is widely used because it enables checks to be processed without using separate reading and printing devices.

With the check transported by synchronously rotating transport rollers 108., 112, and 113, however, there is no tension applied by the transport rollers to stretch and straighten the check. This means that the pressure applied by the transport roller 112 to the check must be high in order to assure positive contact against magnetic head 106 when the check is wrinkled or creased. Because of the high pressure required, the apparatus tends to become larger and more expensive because of the measures that must be taken to assure sufficient durability in the bearings of transport roller 112 and the detection surface of magnetic head 106.

Furthermore, when this type of information detection apparatus is used for check processing,

the operator's eyes and hands must travel back and forth between space 104 at the front of the apparatus and opening 114 at the top of the apparatus. As a result, the inconvenience of check processing is not completely resolved.

Problem to be resolved by the invention

The object of the present invention is therefore to further improve the prior art as described above by providing a compact, low-cost, information detection apparatus for recording media processing with improved operability, and a processing method therefor.

Means of resolving the problem

To achieve the above object an information detection apparatus for recording media processing according to the present invention comprises a data detection means for detecting information recorded to a recording medium while in contact with the recording medium, a presser for pressing the recording medium against the data detection means, a presser moving means for holding and setting the presser to either a pressing position at which the presser presses against the recording medium or an open position at which the presser does not press against the recording medium, and a transportation mechanism for transporting the recording medium in a first direction in which the recording medium travels from the transportation mechanism toward the data detection means, and a second direction that is opposite the first direction. With this configuration the presser is set to the open position when the recording medium is transported in the first direction, and is set to the pressing position at least while the recording medium is transported in the second direction during detection of the information recorded to the recording medium.

The above recording medium information detection apparatus further preferably comprises a printing mechanism disposed between the data detection means and the transportation mechanism for printing to the recording medium. In this case the presser is set to the pressing position when the recording medium is transported in the second direction for printing by the printing mechanism.

The invention also provides an information detection apparatus for processing recording media which have information recorded in a particular area on the surface thereof. This is accomplished by means of an insertion opening through which the recording medium is inserted to the transportation path, a transportation mechanism for transporting the recording

medium inserted from the insertion opening through the transportation path in both forward and reverse directions, a printing mechanism comprising a print head for printing to the recording medium, and a reading mechanism comprising a detection means for detecting the particular information recorded to the recording medium. These means are disposed in the preceding sequence along a paper transportation path through which the recording medium is transported. In this case a presser roller is disposed to the reading mechanism such that when the recording medium is transported forward toward the reading mechanism said presser roller separates from the detection means, and the recording medium is pressed by the presser roller against the detection means, the reading mechanism reads the particular information, and the printing mechanism executes a printing process for printing to the recording medium when the recording medium is transported in the opposite direction.

It is preferable in this case for the printing process to be executed to the side of the recording medium opposite that on which the particular information is recorded. It is also preferable for the paper transportation path to be constructed so that the recording medium does not curve.

Furthermore, it is preferable for the detection means to be a magnetic head when particular information is recorded in magnetic ink. It is preferable in this case for the contact between the presser roller and recording medium to be established by a self-hold solenoid such that magnetic noise is not produced while reading the particular information.

With an information detection apparatus for recording media processing thus comprised, the recording medium is transported by the transportation mechanism through the paper transportation path along which are disposed in sequence from the insertion opening the transportation mechanism, printing mechanism, and reading mechanism to position the recording medium between the detection means and presser roller of the reading mechanism. The presser roller is then operated to press the recording medium against the detection means while the recording medium is pulled by the transportation mechanism to straighten wrinkles and sagging in the recording medium at the same time the information recorded on the recording medium is read and a printing process is executed. Reading errors and printing errors can thus be reduced.

This operation also makes it possible to execute the printing process according to the information read from the recording medium, thereby enabling a process including plural steps, such as validation checking and endorsement printing dependent upon the validation

result, to be completed with a single sequence of operations for a particular recording medium such as a check or negotiable instrument.

After the printing process is completed the recording medium is ejected from the insertion opening. The insertion opening and ejection position are thus the same, thereby facilitating operation and enabling another piece of office equipment to be placed in the space above the information detection apparatus for recording media processing.

The recording media processed by this type of recording medium information detection apparatus are commonly checks and other types of negotiable instruments. Endorsement printing can therefore be accomplished by arranging the printing mechanism to print on the side of the recording medium opposite that to which the particular information read by the reading mechanism is recorded.

Furthermore, if the paper transportation path is arranged in a straight line so that the recording medium does not curve, the component mechanisms can be disposed in close proximity. This makes it possible to process checks and other similarly small negotiable instruments, and reduces the potential for paper jams.

The particular information read by the reading mechanism from checks and other types of negotiable instruments is also commonly recorded using magnetic ink. This makes it possible to use a magnetic head as the detection means. If contact between the presser roller and recording medium is established by a solenoid in this case, it is only necessary to supply current to the solenoid when it is necessary to move the presser roller. The current flow can therefore be stopped when the presser roller is held pressed to the detection means, thereby preventing magnetic noise when reading the information recorded with magnetic ink.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of a recording media information detection apparatus according to the present invention.

FIG. 2 is a plan view of a recording media information detection apparatus shown in FIG. 1.

FIG. 3 is used to describe the operation of the recording media information detection apparatus shown in FIG. 1.

FIG. 4 is used to describe the relative positions of major components in the recording media information detection apparatus shown in FIG. 1.

FIG. 5 is used to describe the operation of a recording media information detection apparatus

according to a second embodiment of the present invention.

FIG. 6 is used to describe the relative positions of major components in the recording media information detection apparatus shown in FIG. 5.

FIG. 7 is a simplified side view of a conventional recording media information detection apparatus.

Key to the figures

- 3 transportation mechanism
- 31, 32 paper transport rollers
- 4 printing mechanism
- 41 print head
- 5 reading mechanism
- 51 presser roller
- 52 magnetic head
- 6 insertion opening
- 7 slide mechanism
- 71, 72 slide rollers
- 8 recording medium
- 9 transportation path

Description of Preferred Embodiments

The preferred embodiment of the present invention is described below with reference to the accompanying figures.

FIG. 3 is a simplified view showing the major operating components of the preferred embodiment of an information detection apparatus for recording media processing according to the present invention. As shown in FIG. 3, this information detection apparatus for recording media processing comprises an insertion opening 6 at the left end of the apparatus as seen in FIG. 3. The insertion opening 6 leads in sequence to paper transport roller 31, print head 41, and presser roller 51 disposed on the top side of the transportation path 9 as seen in FIG. 3.

Opposing paper transport roller 31, print head 41, and presser roller 51 with transportation path 9 disposed therebetween are, respectively, paper transport roller 32, platen 42, and magnetic head 52, which is the detection means. Paper transport roller 31 and paper

transport roller 32 thus constitute transportation mechanism 3, print head 41 and platen 42 constitute printing mechanism 4, and presser roller 51 and magnetic head 52 constitute reading mechanism 5.

Paper transport rollers 31 and 32 and presser roller 51 can move vertically up and down. Presser roller 51 and magnetic head 52, and the part of transportation path 9 formed thereby, are a single unit. A side view of this unit is shown in FIG. 1, and a plan view in FIG. 2.

Presser roller 51 is mounted on one end of arm 21, the other end of which is connected to plunger 27 by means of shaft 28. The middle of arm 21 is supported by shaft 25 in a freely rocking manner such that plunger 27 operates vertically when current is supplied to a solenoid contained in housing 26, thus causing presser roller 51 to either contact or separate from magnetic head 52. It should be noted that as described below the solenoid housed in housing 26 is a solenoid that drives plunger 27 up or down depending upon the direction of current flow, and uses a magnet to hold plunger 27 in the position it was at when the current supply is stopped.

Self-hold type solenoids generally have two operating positions: "pull" and "open." When in the pull position the plunger is pulled to and held by the magnet built in to the solenoid. When in the open position the plunger is repulsed by the magnet and stops at a position separated from the magnet. The plunger moves between these two positions depending upon the direction of current flow.

More specifically, the magnetic field strength produced by current flow in a particular direction pulls the plunger from the open position to the pull position. When the current flow is reversed, the field strength works in the opposite direction to move the plunger from the pull position to the open position. When the current flow is stopped, the plunger is held by a magnet in the position at which the plunger was when the current flow stopped. Therefore, the force of magnetic attraction acting on the plunger in the pull position is great, and magnetic repulsion acting on the plunger in the open position is relatively weak.

Presser roller 51 is thus separated from magnetic head 52 when the solenoid of the present embodiment is in the pull position, and presses against magnetic head 52 when in the open position. The pressure applied by presser roller 51 on magnetic head 52 can thus be set to a substantially constant value using the elastic force of presser spring 53 because the effects of force from the magnet when pressure is applied can be made small.

It should be noted that a magnetic latching type solenoid is used for self-hold solenoid in the present embodiment, but the invention shall not be so limited and a leaf spring type solenoid can be used. It should be also noted that a helical spring is used for presser spring 53 in the present embodiment, but the invention shall not be so limited and other types of elastic members, including leaf springs and torsion coil springs, can be used.

The operating sequence of a recording media information detection apparatus comprising this unit is described below with reference to FIG. 3.

In the default state paper transport roller 31 and paper transport roller 32 are separated and transportation mechanism 3 is open. Presser roller 51 is also separated from magnetic head 52, and reading mechanism 5 is open.

When the information detection apparatus receives a MICR read mode signal from the host device, current flow in a particular direction is supplied to the magnetic latching type solenoid described above, thereby causing plunger 27 to travel down to the solenoid pull position and presser roller 51 to lift to the open roller position. This operation confirms that presser roller 51 is reset to the default open roller state before operation continues even when some overpowering external force has overcome and cancelled the pull position of the magnetic latching type solenoid. When this operation is completed an operating indicator lights to notify the operator that the information detection apparatus is ready for normal use and operation.

It should be noted that a photo interrupter or known detector means can be used on an end of arm 21 to detect whether arm 21 (plunger 27) is in the pull position. If arm 21 is already in the pull position, the above operation can be skipped because the path between presser roller 51 and magnetic head 52 is already open.

When reading mechanism 5 is open and presser roller 51 is raised, a foam stop 14 provided between printing mechanism 4 and reading mechanism 5 also slides to the up position (shown by a dotted line in FIG. 3) blocking transportation path 9. When a check is then inserted from insertion opening 6, the leading edge of the check contacts foam stop 14, and the check is thus positioned in transportation path 9.

Paper detector 12 for detecting the presence of a check is disposed between insertion opening 6 and transportation mechanism 3, and a similar paper detector 13 is disposed between printing mechanism 4 and foam stop 14. When paper detectors 12 and 13 detect that a check has been inserted to transportation path 9, the control unit of the recording media

information detection apparatus operates transportation mechanism 3 so that the check is held by paper transport rollers 31 and 32, and retracts foam stop 14 from transportation path 9. Note that the operating mechanism of the paper transport rollers and foam stop 14 can be achieved using various known configurations such as a plunger and linkage. A counter for indicating the paper feed position is also reset at this time. Note that the counter in this embodiment is provided in the control circuit (not shown in the figures) controlling stepping motor 34 for paper transport. Note also that the counter increments or decrements according to the direction and amount of stepping motor 34 rotation.

Rotation of stepping motor 34 is transferred by speed reducer 33 to drive paper transport rollers 31 and 32, thereby transporting the check through transportation path 9 (forward) into reading mechanism 5. When paper detector 12 then detects the trailing end of the check, the check is advanced a limited known distance and thus positioned so that the check does not leave transportation mechanism 3. The paper transport rollers 31 and 32 are then stopped and arm 21 is operated so that presser roller 51 presses the check against magnetic head 52. Note that arm 21 is operated by the magnetic latching type solenoid, and current flow to the magnetic latching type solenoid can therefore be stopped once the check is against magnetic head 52. This makes it possible to suppress magnetic noise resulting from noise in the current supply and switching noise from other electronic devices.

Note that check 8 shown in FIG. 3 is inserted face down so that the side on which the desired information is printed in magnetic ink contacts magnetic head 52.

When paper transport rollers 31 and 32 are then driven in the opposite direction the check is transported in the reverse direction toward insertion opening 6. Note that the check is pressed by presser roller 51 against magnetic head 52 at this time so that an appropriate amount of friction acts on the check. Tension corresponding to the combination of this friction and the drive force from the paper transport rollers thus acts on the check to straighten wrinkles or folds, for example, and thereby make it easier to assure good contact between the check and magnetic head 52.

The tension acting on the check can be increased in various ways, including substituting a sliding presser for presser roller 51 or providing a mechanical resistance such as a damper producing viscous drag on the presser roller 51 bearing. Note that the sliding presser in this example produces a sliding friction between the presser and the check. In these cases the position of shaft 25, which functions as the fulcrum of arm 21, is preferably moved

away from presser roller 51 closer to insertion opening 6. By thus shifting the fulcrum away from presser roller 51, the load of the presser roller 51 bearing acts on arm 21 in the direction increasing the pressure of presser roller 51 against magnetic head 52.

When reverse paper transport, i.e., paper transport in the direction toward insertion opening 6, starts, a blank area of the check containing no magnetic ink characters moves over magnetic head 52. This blank area can thus be used to measure by means of magnetic head 52 the background level of magnetic noise affecting MICR reading. This magnetic noise signal level can also be stored.

As paper transport rollers 31 and 32 continue to transport the check and the area in which magnetic ink is printed passes over magnetic head 52, magnetic head 52 outputs a magnetic ink detection signal. This signal is A/D converted by a signal processing circuit not shown in the figures and stored to memory, also not shown in the figures, on a specific cycle.

The magnetic ink detection signal continues to be stored as the check continues to be transported at a particular speed. After the leading edge (now the trailing edge) of the check passes back over magnetic head 52, magnetic head 52 again measures the magnetic noise level. The average of this noise level and the magnetic noise level obtained from the blank check area above is then obtained to determine the background noise level. This process can be accomplished by a microprocessor or other known signal processing device using the signal processing circuit and memory mentioned above.

When the check is transported forward into reading mechanism 5 transportation stops at a position where the check continues to be held by transportation mechanism 3, and the information printed with magnetic ink is then read as the check is transported in the opposite direction back toward insertion opening 6 as described above. As a result, the gap C between paper transport rollers 31 and 32 and reading mechanism 5 must be less than the distance A from the edge of check 8 to the area in which the magnetic ink information 8a is printed, as seen in FIG 4. Note that passage of the leading edge of the check over magnetic head 52 can be estimated from the gap between foam stop 14 and magnetic head 52 and the check travel distance.

After the check is transported to the endorsement printing start position, the magnetic latching type solenoid lifts presser roller 51 from magnetic head 52, and the MICR detection data is obtained by subtracting the background signal level from the magnetic ink detection signal. This detection data is then used to recognize the MICR code by means of a known

method, and the MICR code is then sent to the host device. The host device then references the bank on which the check is drawn < or other data source > to determine check validity based on the MICR code content, and sends the result to the information detection apparatus for recording media processing.

If the validity check is passed, the information detection apparatus for recording media processing operates the paper transport rollers 31 and 32 according to the print data from the host device to transport the check toward insertion opening 6 while printing the endorsement information using printing mechanism 4. When the printing process is completed the check is ejected from insertion opening 6 to finish the check processing sequence combining MICR code reading and endorsement printing.

It should be noted that depending upon the printing start position it may be necessary to again transport the check in the forward direction toward reading mechanism 5 during the printing process, and the magnetic latching type solenoid is therefore driven to release the pressure of presser roller 51 on the check. Once the check is positioned to the printing start position, however, printing can be accomplished while the check travels in the reverse direction toward insertion opening 6, and presser roller 51 is therefore set to press against the check before printing starts in this embodiment. As described above, this applies tension to the check and straightens wrinkles in the check as the check passes through the transportation path inside printing mechanism 4 to enable sharp, accurate printing. The pressure from presser roller 51 is again released once printing is completed. Note that the pressure from presser roller 51 is released after printing is completed because releasing presser roller 51 during printing also changes the load on paper transport rollers 31 and 32 and can result in the printing position changing.

If the validity check is not passed, the printing process is not executed, and the check is restored to the same condition in which it was inserted. MICR code reading is then repeated and the host repeats the validity check. If the validity check is again failed, the check is ejected from insertion opening 6 without printing an endorsement, an invalid check is indicated for the operator, and the MICR code reading and endorsement process ends.

An alternative embodiment of the present invention is described below with reference to FIG. 5. As shown in FIG. 5 this information detection apparatus for recording media processing further comprises slide mechanism 7 having opposing slide rollers 71 and 72. Note

that slide rollers 71 and 72 can move vertically apart. Slide mechanism 7 and transportation mechanism 3 are also disposed at a position lower than printing mechanism 4 and reading mechanism 5 on the side of platen 42 and magnetic head 52. In the default (starting) position paper transport rollers 31 and 32 are separated and slide rollers 71 and 72 are separated.

The insertion (forward transportation) operation of the check is similar to that described above. When paper detectors 12 and 13 detect that a check has been inserted, the check is held and transported by paper transport rollers 31 and 32. When paper detector 12 then detects the trailing end of the check, the check is advanced a limited known distance and positioned so that the check does not leave transportation mechanism 3. The paper transport rollers 31 and 32 are then stopped and the check is clamped by slide rollers 71 and 72.

When the check is then transported in the reverse direction toward insertion opening 6, tension corresponding to the combination of the friction from slide rollers 71 and 72 and the drive force from the paper transport rollers 31 and 32 acts on the check to straighten wrinkles or folds. Because paper transport rollers 31 and 32 and slide rollers 71 and 72 are positioned lower than magnetic head 52, good contact between the check and magnetic head 52 can also be easily maintained. As a result, this embodiment achieves the same effects as the first embodiment described above.

It should be noted that a second transportation mechanism similar to the first transportation mechanism 3 described above can be substituted for slide rollers 71 and 72. In this case the transportation speed of the second transportation mechanism is set to be slower than the transportation speed of the first transportation mechanism 3, thereby creating a speed differential. This speed differential results in tension applied to the check, and thus also achieves the same effects as the first embodiment described above.

In addition to the limitation of the first embodiment shown in FIG. 4, the distance D between magnetic head 52 and slide rollers 71 and 72 (or the paper transport rollers of the second transportation mechanism) must be shorter than the distance B between the leading edge (insertion edge) of the check and the area to which the magnetic ink information 8a is printed, as seen in FIG. 6.

It should be noted that while the present invention has been described above as processing a check, the invention shall not be so limited. More specifically, any recording media information detection apparatus for reading information recorded to a recording medium and printing to said recording medium based on the content of the read information

shall be considered within the scope of the present invention.

Furthermore, the recorded information shall not be limited to information recorded using magnetic ink, and can be any type of information detected using a contact type detection means. More specifically, it will be obvious to those skilled in the art that the present invention can also be applied in an information detection apparatus for recording media processing comprised to read bar code information using a presser roller and a reflection type bar code reader, and then execute an appropriate printing process.

What is claimed is:

1. An information detection apparatus for recording media processing comprising a data detection means for detecting information recorded to a recording medium while in contact with the recording medium,

a presser for pressing the recording medium against the data detection means,

a presser moving means for holding and setting the presser to a pressing position at which the presser presses against the recording medium, and an open position at which the presser does not press against the recording medium, and

a transportation mechanism for transporting the recording medium in a first direction in which the recording medium travels from the transportation mechanism toward the data detection means, and a second direction that is opposite the first direction,

wherein the presser is set to the open position when the recording medium is transported in the first direction, and is set to the pressing position at least while the recording medium is transported in the second direction during detection of the information recorded to the recording medium.

2. The information detection apparatus for recording media processing according to claim 1 further comprising a printing mechanism disposed between the data detection means and the transportation mechanism for printing to the recording medium,

wherein the presser is set to the pressing position when the recording medium is transported in the second direction for printing by the printing mechanism.

3. An information detection apparatus for processing recording media which have particular information recorded in a particular area on the surface thereof by means of

an insertion opening through which the recording medium is inserted into the transportation path,

a transportation mechanism for transporting the recording medium inserted from the insertion opening through a transportation path in both forward and reverse directions,

a printing mechanism comprising a print head for printing to the recording medium, and

a reading mechanism comprising a detection means for detecting the particular

information recorded to the recording medium

disposed in the above sequence along a paper transportation path through which the recording medium is transported,

wherein a presser roller is disposed to the reading mechanism such that when the recording medium is transported forward said presser roller separates from the detection means, and

when the recording medium is transported in the opposite direction the recording medium is pressed by the presser roller against the detection means, the reading mechanism reads the particular information, and the printing mechanism executes a printing process for printing to the recording medium.

4. The information detection apparatus for recording media processing according to claim 3 wherein the printing process is executed to a side of the recording medium opposite that on which the particular information is recorded.

5. The information detection apparatus for recording media processing according to claim 3 or 4 wherein the paper transportation path is constructed so that the recording medium does not curve.

6. The information detection apparatus for recording media processing according to any of claims 3 to 5 wherein the particular information is recorded in magnetic ink, and the detection means is a magnetic head.

7. The information detection apparatus for recording media processing according to claim 6 wherein contact between the presser roller and recording medium is established by a solenoid such that magnetic noise is not produced while reading the particular information.

8. The information detection apparatus for recording media processing according to claim 3 wherein the transportation mechanism comprises
a single transport roller for holding and transporting the recording medium,
a drive mechanism for driving the transport roller, and
a transfer mechanism for transferring the drive power of the drive mechanism to the

transport roller.

9. An information detection apparatus for recording media processing comprising a data detection means for detecting information recorded to a recording medium while in contact with the recording medium,

a transportation mechanism for transporting the recording medium in a first direction in which the recording medium travels from the transportation mechanism toward the data detection means, and a second direction that is opposite the first direction, and

a holding means positioned on a side of the data detection means opposite the transportation mechanism for holding the recording medium,

wherein the data detection means is positioned at a height different from that of the transportation mechanism and holding means,

the holding means does not hold the recording medium when the recording medium is transported in the first direction, and

the holding means holds the recording medium at least while the recording medium is transported in the second direction during detection of the information recorded to the recording medium.

10. An information detection method for an information detection apparatus for recording media processing used to process a recording medium to which particular information is recorded on at least one side thereof by means of at least a transportation mechanism, printing mechanism, and reading mechanism disposed in this sequence along a paper transportation path from the insertion opening to said path, comprising

transporting the recording medium inserted from the insertion opening through the paper transportation path by means of the transportation mechanism in a first direction from the transportation mechanism to the reading mechanism,

positioning the recording medium between the detection means and the presser roller of the reading mechanism,

pressing the recording medium to the detection means by means of a presser roller,

reading the particular information from the recording medium by means of the detection means while pulling the recording medium in a second direction opposite the first direction by means of the transportation mechanism with the recording medium held in

contact with the detection means,

executing a printing process for printing to the recording medium using a print head of the printing mechanism based on the content of the information read by the detection means, and

ejecting the recording medium from the insertion opening after printing is completed.

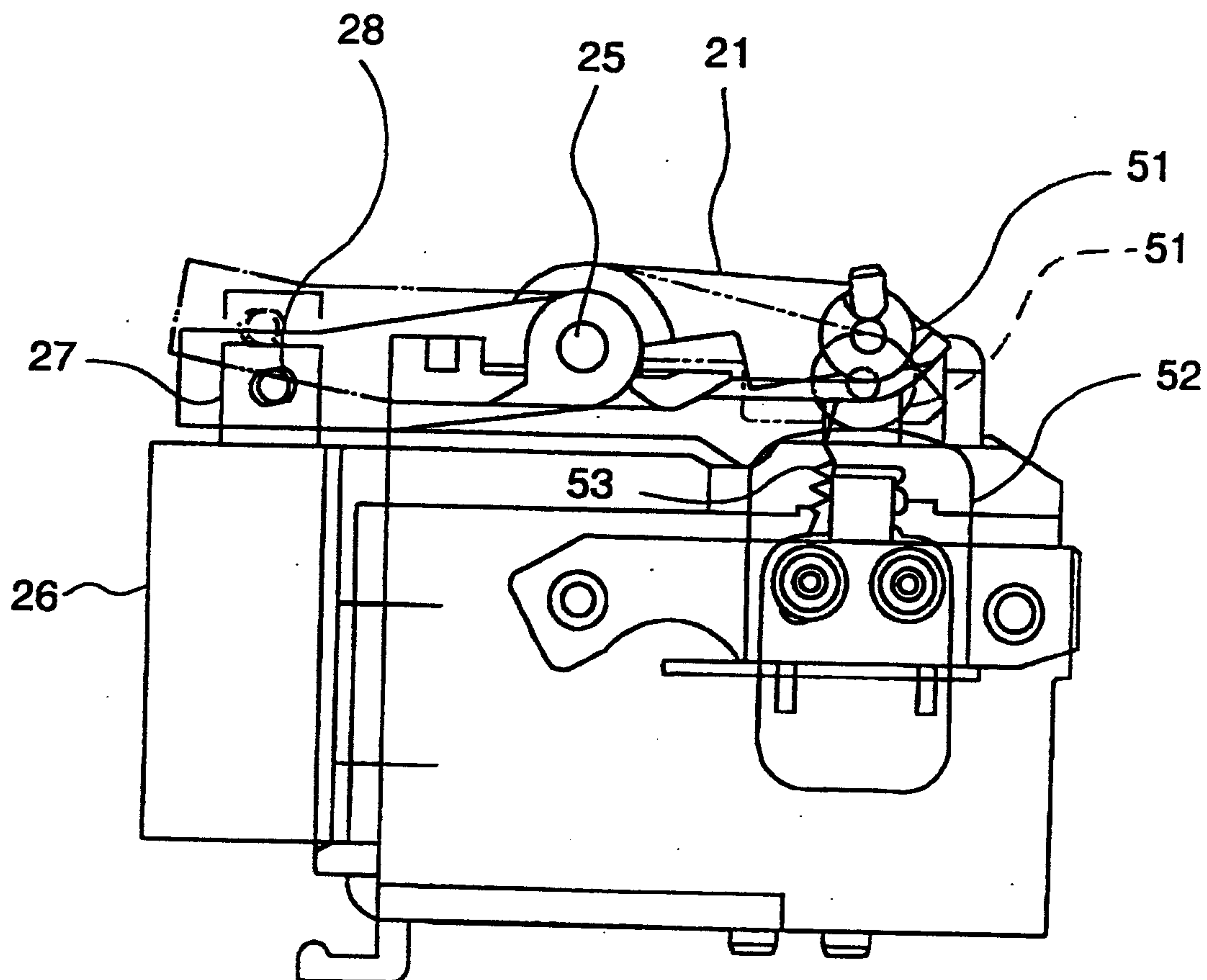


FIG. 1

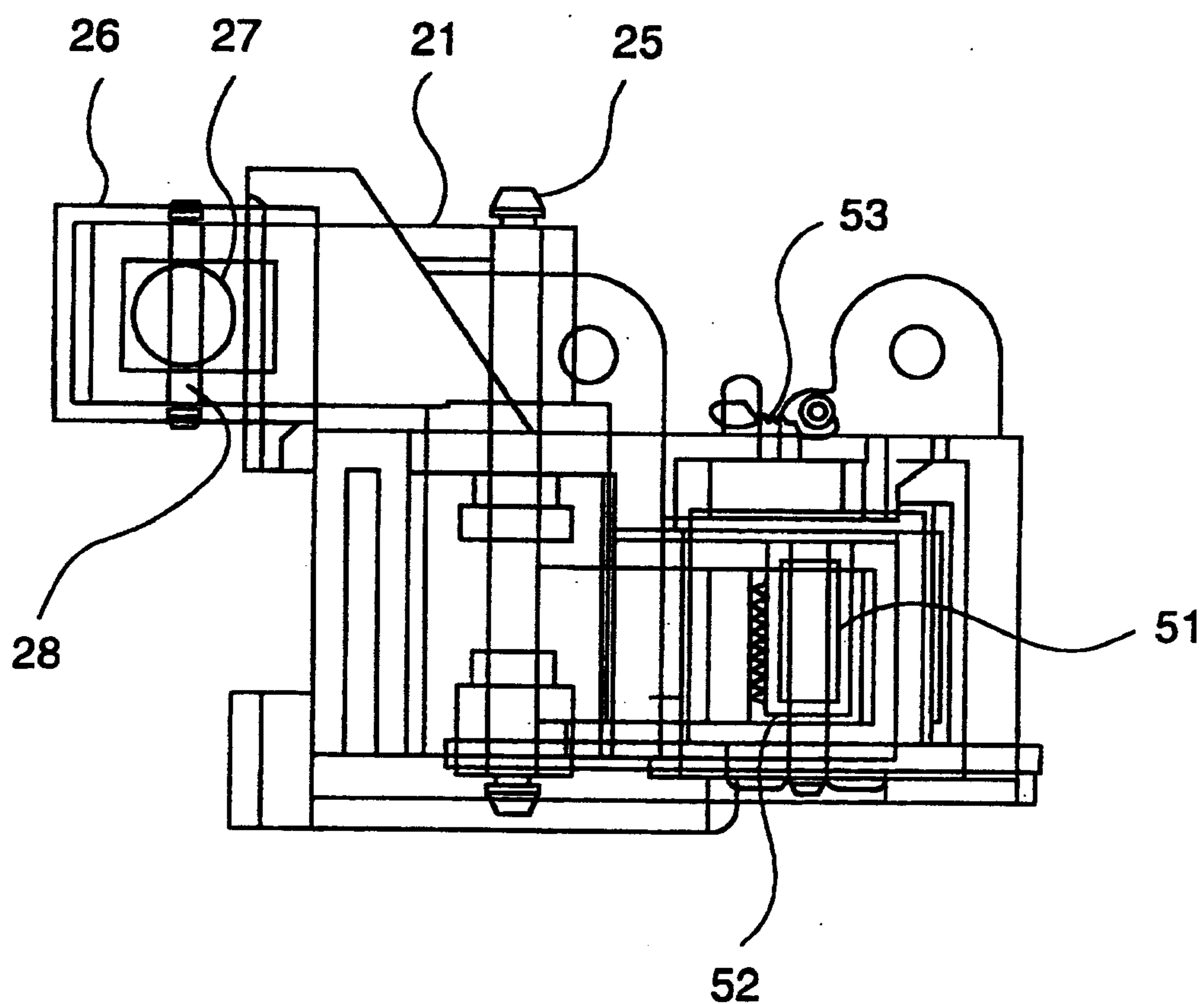


FIG. 2

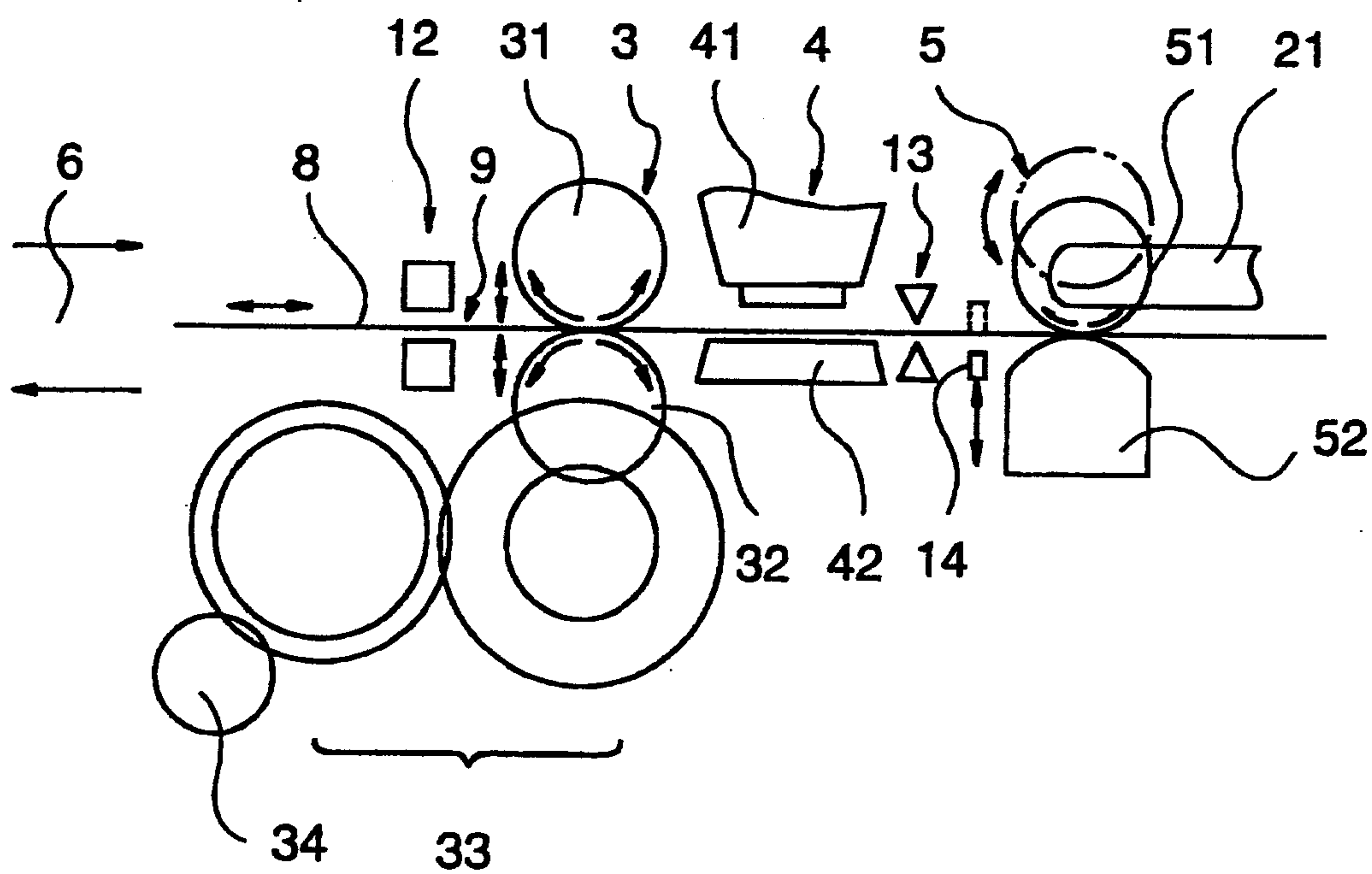


FIG. 3

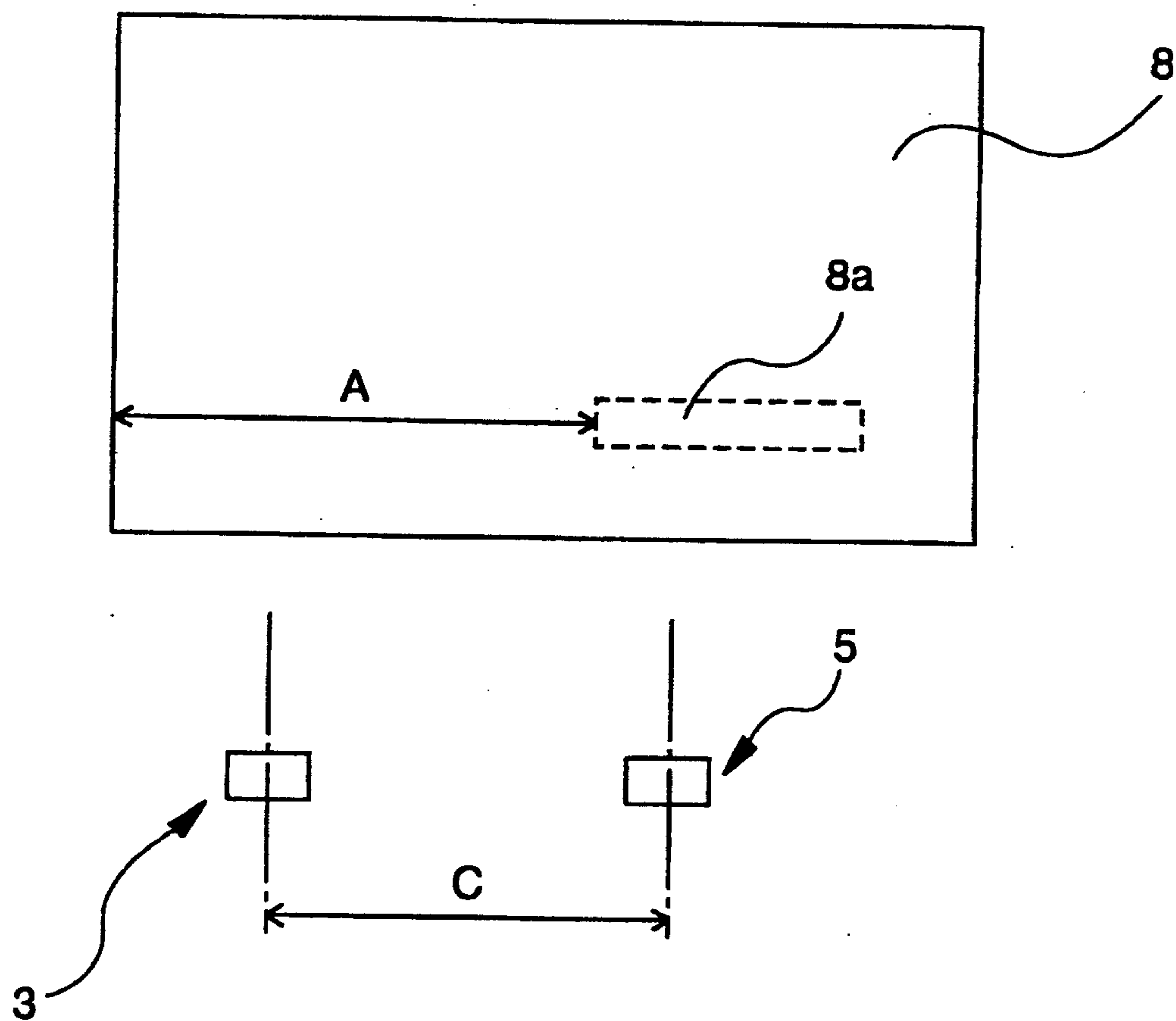


FIG. 4

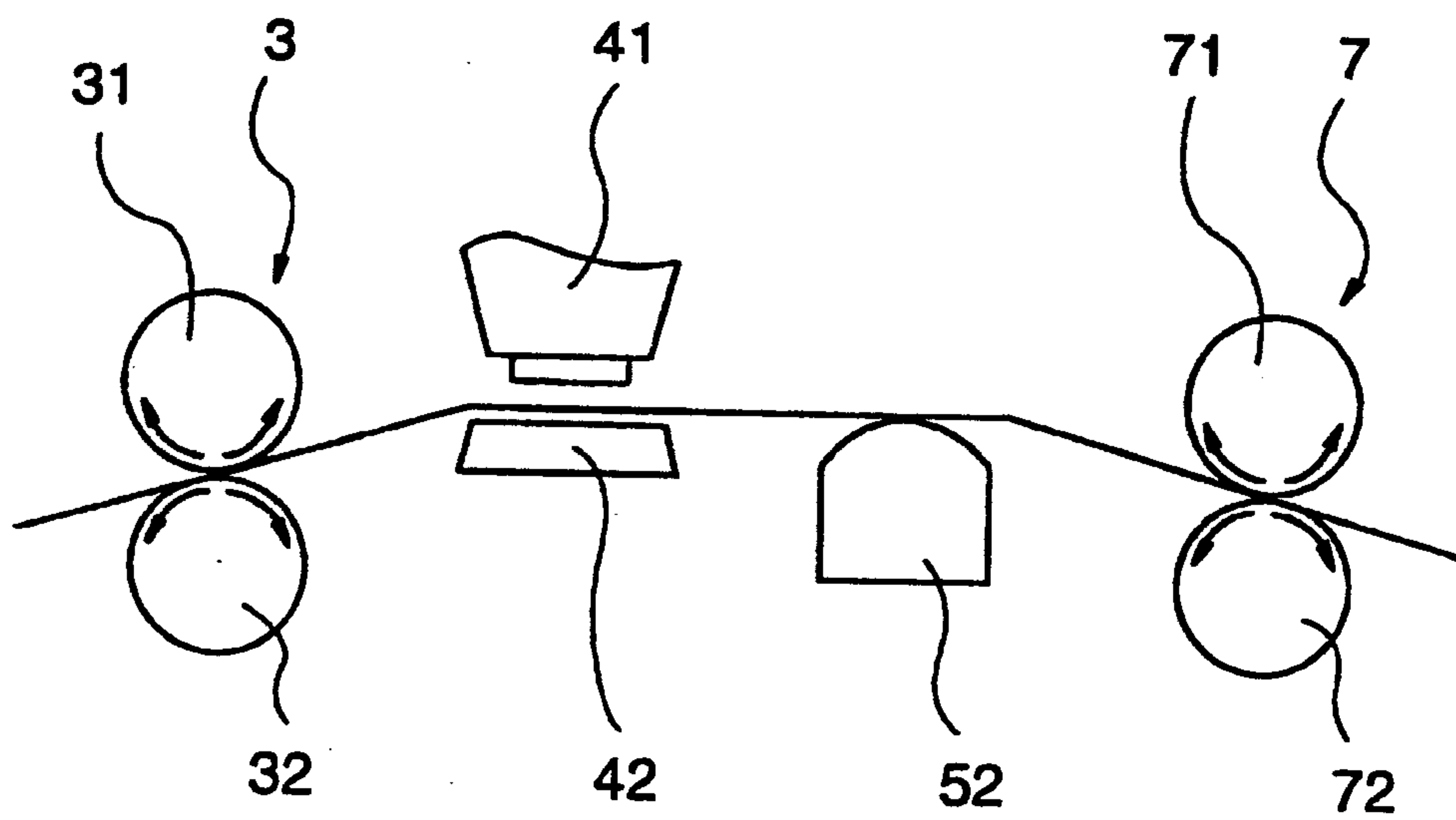


FIG. 5

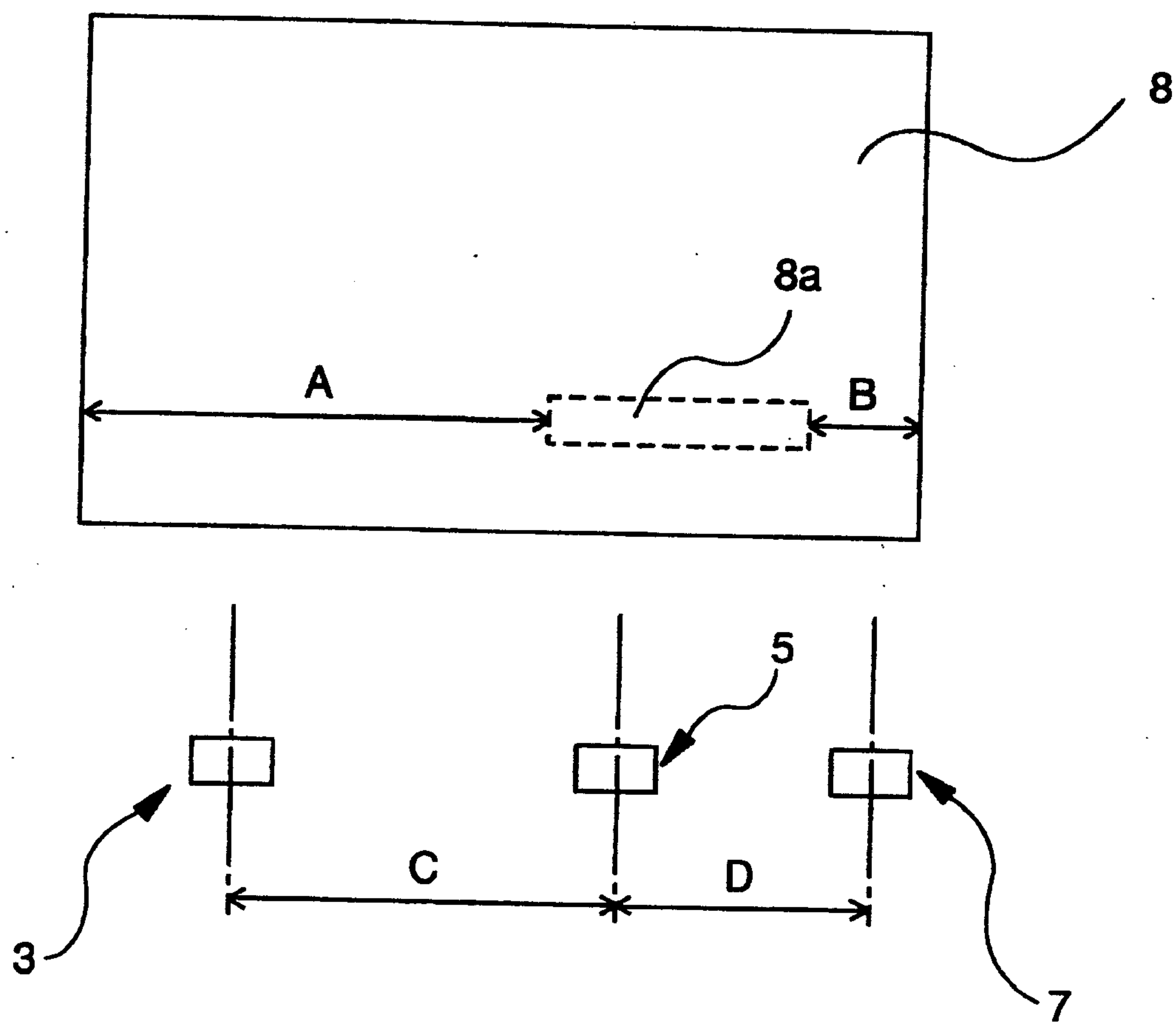


FIG. 6

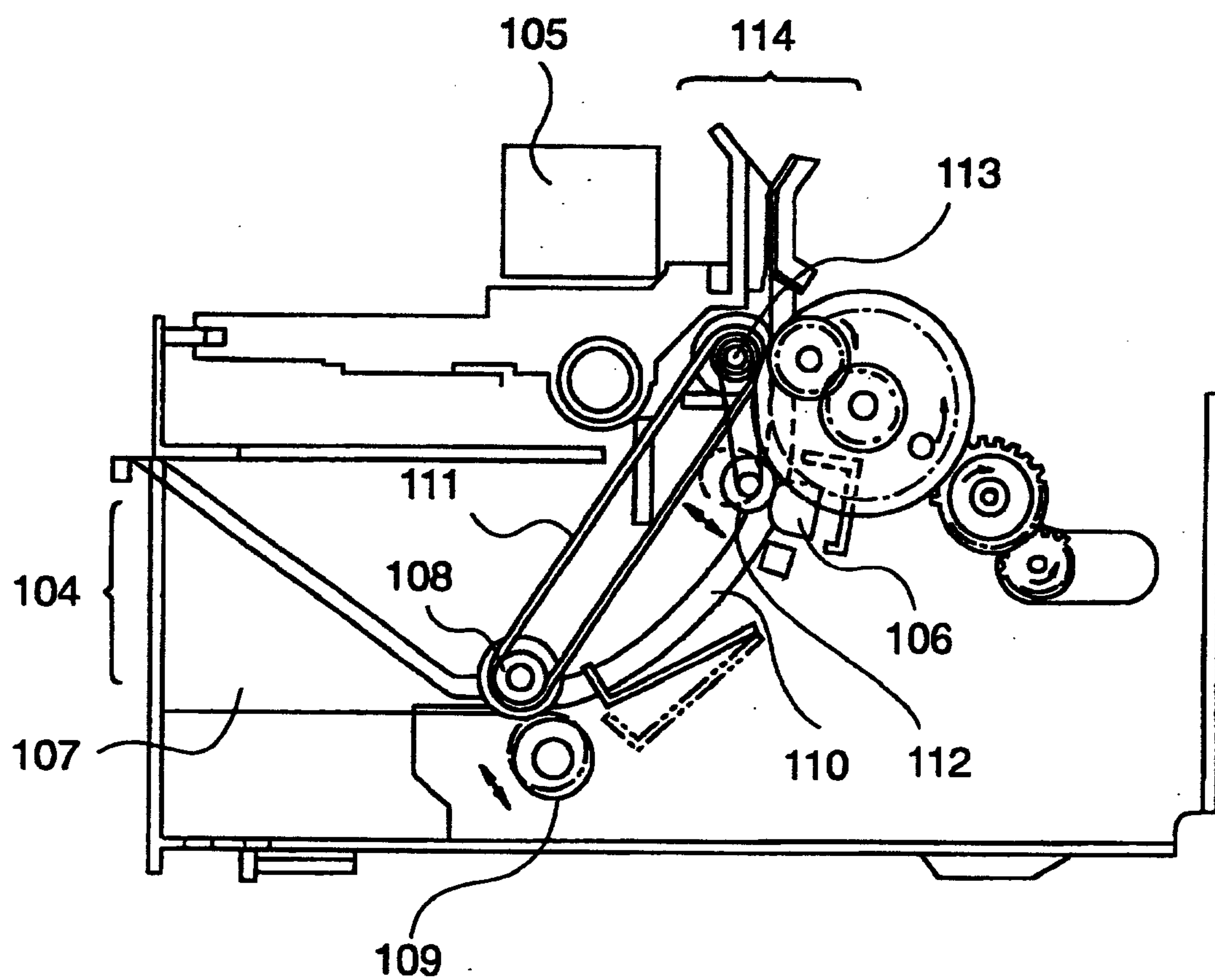


FIG. 7

