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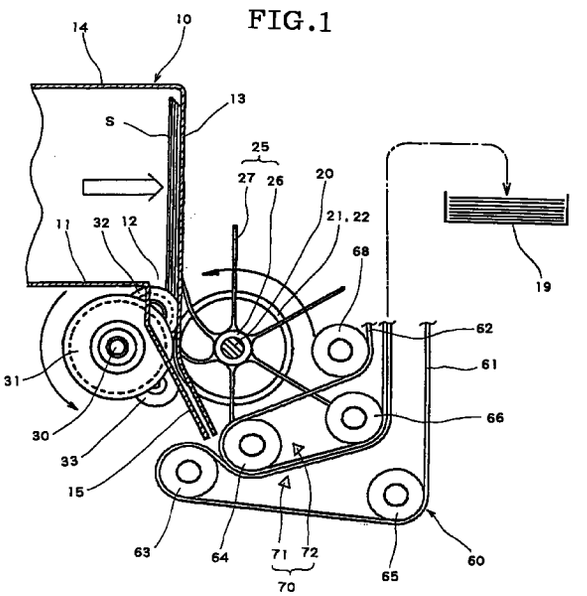
(54) DEVICE FOR SEPARATING AND CARRYING SHEETS OF PAPER

(57) A feed roller 21 and a separation roller 31 placed facing each other are provided. Only the feed roller 21 is rotated in a paper transport direction, whereby a plurality of paper slips arriving upstream from the rollers 21 and 31, initially supplied without separation processing, are separated one by one and transported to a target position. A runner 25 rotating integrally with the feed roller 21 is disposed on the same shaft as the feed roller 21. Each blade of the runner 25 is made of flexible material and set to a length allowing the blade to come in contact with an upstream bill not yet taken into the space between the feed roller 21 and the separation roller 31.

FIG.1



EP 0 757 961 A1

Description

TECHNICAL FIELD

This invention relates to a paper slip separation and transport system for transporting a plurality of paper slips, initially supplied without separation processing, while separating them one by one.

TECHNICAL BACKGROUND

For example, a conventional paper slip separation and transport system is described in Japanese Patent Laid-Open No. Sho 62-79143. This separation and transport system comprises a feed roller and a separation roller which are placed facing each other and a plurality of storage conveyor belts for feeding bills passing between the rollers into a storage chamber. It uses an acceptance conveyor belt to transport bills to both of the rollers. The separation and transport system rotates only the feed roller so as to allow bills arriving upstream from both the rollers to be fed downward and feeds downward only bills coming in contact with the feed roller even when a plurality of bills overlap each other, thereby separating the overlapped bills. It transports the separated bills one by one into the storage chamber using the storage conveyor belts.

However, in such a separation and transport system, for example, if the tip of a bill is bent or becomes crimped, the bill may not be taken in between the rollers from the acceptance conveyor belt; there is a high probability that a paper jam will occur upstream from both the rollers.

In such a separation and transport system, after a plurality of overlapped bills are separated, the speed of the bills transported on the storage conveyor belt is not necessarily faster than that of the bills fed by the feed roller. Thus, the rear end of the bill separated and arriving earlier at the storage conveyor belt among the overlapped bills may abut or overlap the tip of the bill arriving at the storage conveyor belt later; this phenomenon will be hereinafter referred to as a rear-end collision phenomenon. If such a rear-end collision phenomenon occurs, separation of the bills by the feed roller and the separation roller does not take effect and in addition, a paper jam may occur. The bills are usually separated for counting the number of bills or storing them in an aligned manner. Even if a paper jam does not occur when the rear-end collision phenomenon occurs, the phenomenon will interfere with counting the number of bills or storing them in an aligned manner.

That is, the conventional separation and transport system cannot reliably separate a plurality of overlapped bills or smoothly transport each bill.

DISCLOSURE OF INVENTION

It is therefore an object of the invention to provide a paper slip separation and transport system that can reliably separate a plurality of overlapped paper slips and smoothly transport each paper slip.

To this end, according to the invention, there is provided a paper slip separation and transport system comprising:

a feed roller and a separation roller being placed facing each other for sandwiching a supplied paper slip therebetween;
a runner being disposed on the same shaft as the feed roller;
a first drive mechanism for rotating the feed roller and the runner integrally in a direction in which the paper slip can be transported to the target position; and
a second drive mechanism for rotating the separation roller in a direction from which the paper slip is supplied,
the runner having a plurality of flexible blades extending radially, each of the blades being set to a length allowing the blade to come in contact with an upstream paper slip not yet taken into a space between the feed roller and the separation roller.

In the paper slip separation and transport system, the blade of the runner is in contact with an upstream paper slip not yet taken into the space between the feed roller and the separation roller. Therefore, the paper slip in contact with the blade of the runner is forcibly taken into the space between the feed roller and the separation roller. When two overlapped bills arrive upstream from the feed roller and the separation roller, only the bill in contact with the feed roller immediately passes through between the rollers, and the bill in contact with the separation roller passes between the rollers after the bill in contact with the feed roller has passed through. Thus, the paper slip separation and transport system can reliably take paper slips into the space between the rollers and smoothly and reliably separate and transport a plurality of paper slips.

Preferably, the blades of the runner are made of urethane rubber, etc., which is flexible and has a large friction coefficient with respect to paper slips. If the blades are made of urethane rubber, etc., the friction force acting on the paper bill increases and the force for pulling the paper slip into the space between the rollers by the runner can be enhanced.

To this end, according to the invention, there is provided a paper slip separation and transport system comprising:

a feed roller and a separation roller being placed facing each other for sandwiching a supplied paper slip therebetween;
a transport mechanism for transporting the paper slip passing between the feed roller and the separation roller to the target position;
a first drive mechanism for rotating the feed roller in a direction in which the supplied paper slip is fed to

the transport mechanism;

a second drive mechanism for rotating the separation roller in a direction from which the paper slip is supplied,

paper slip passage sensing means for sensing passage of a downstream end and an upstream end of the paper slip arriving at the transport mechanism; and

rotation drive force control means for reducing a rotation drive force transmitted from the first drive mechanism to the feed roller when the paper slip passage sensing means senses the passage of the downstream end of the paper slip arriving at the transport mechanism and for recovering the rotation drive force transmitted from the first drive mechanism to the feed roller when the paper slip passage sensing means senses the passage of the upstream end of the paper slip arriving at the transport mechanism.

In the paper slip separation and transport system, when two overlapped bills arrive upstream from the feed roller and the separation roller, only the bill in contact with the feed roller immediately passes between the rollers, and the bill in contact with the separation roller passes through between the rollers after the bill in contact with the feed roller passes therebetween. The bills passing between the rollers are taken into the transport mechanism and transported to the target position. In this process, if the paper slip passage sensing means senses the downstream end of the paper slip, the rotation drive force from the first drive mechanism is not transmitted to the feed roller and the paper slip positioned upstream from the feed roller is temporarily stopped from being fed to the transport mechanism. After the downstream end of the paper slip is sensed, when the upstream end of the paper slip is sensed, the rotation drive force from the first drive mechanism is again transmitted to the feed roller and transport of the paper slip upstream from the feed roller to the transport mechanism is started. Since the feed roller is rotated intermittently, the rear-end collision phenomenon of bills between the feed roller and the transport mechanism can be prevented. Therefore, the paper slip separation and transport system can reliably separate a plurality of overlapped bills and smoothly transport each bill.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a sectional side view of a bill separation and transport system of one embodiment according to the invention and more particularly a sectional view taken on line I-I in Figure 2;

Figure 2 is a plan view of the bill separation and transport system of the embodiment according to the invention;

Figure 3 is a sectional view taken on line III-III in Figure 2;

Figure 4 is a sectional side view of the bill separation and transport system of the embodiment according to the invention while taking a bill into the system; and

Figure 5 is a sectional side view of the bill separation and transport system of the embodiment according to the invention just after bill separation.

BEST MODE FOR CARRYING OUT THE INVENTION

Referring now to the accompanying drawings, there is shown one embodiment of a paper slip separation and transport system according to the invention.

The paper slip separation and transport system of the embodiment is a bill separation and transport system; for example, it is disposed in a bill storage installation placed at one end of a pachinko (Japanese pinball) machine island. Bills input to a pachinko ball lending machine in the pachinko machine island are transported by transport means in the pachinko machine island to the storage installation. As shown in Figure 1, the storage installation comprises a temporary storage chamber 10 for temporarily storing bills S transported by the transport means in the pachinko machine island, the separation and transport system according to the invention, and a final storage chamber 19 for storing bills S transported by the separation and transport system from the temporary storage chamber 10.

Before the separation and transport system according to the invention is described, the temporary storage chamber 10 positioned upstream from the separation and transport system will be discussed.

As shown in Figure 1, the temporary storage chamber 10 stores a plurality of bills S with the long side of each rectangular bill S directed horizontally and the short side thereof directed perpendicularly. It has a bottom board 11 with which the long side of the bill S comes in contact, a top board 14 opposed to the bottom plate 11, and a side board 13 opposed to the paper face of the bill S in the storage chamber 10. An outlet 12 for discharging the bills S in the storage chamber 10 is made in the side board 13 side of the bottom board 11. The storage chamber 10 contains a push mechanism (not shown) for pushing the bills S in the storage chamber 10 toward the side board 13. For example, a runner having a plurality of flexible blades is available as the push mechanism. The bills S are pushed toward the side board 13 of the storage chamber 10 with the blades of the runner by turning the runner.

As shown in Figures 1 and 2, the separation and transport system comprises a first shaft 20 and a second shaft 30 placed below the temporary storage chamber 10, first feed rollers 21, a second feed roller 22, and runners 25 attached to the first shaft 20, separation rollers 31 attached to the second shaft 30, an electromagnetic clutch 24 attached to one end of the first shaft 20, a first drive mechanism 40 for rotating the first shaft 20 via the electromagnetic clutch 24, a one-way clutch 34 for rotating the second shaft 30 only in one direction, a second drive mechanism 50 for rotating the second

shaft 30, a belt transport mechanism 60 for feeding bills S sent from the feed rollers 21 and 22 to the final storage chamber 19, and a bill detection sensor 70 for sensing the bills S arriving at the transport mechanism 60. Since Figure 1 is a sectional view taken on line I-I in Figure 2, the belt transport mechanism 60 in Figure 1 should become a cross section. However, to make the figure easy to understand, the belt transport mechanism 60 is not hatched here. In the description which follows, we will discuss with reference to Figures 1 and 2 unless otherwise specified.

The first shaft 20 and the second shaft 30 are placed in parallel with the long side of the bill S in the temporary storage chamber 10 in almost symmetrical positions with the outlet 12 as the center, below the temporary storage chamber 10.

The second feed roller 22 is attached to the first shaft 20 via a one-way clutch 23. The two first feed rollers 21 and 21 are fixed to the first shaft 20 on both sides of the second feed roller 22. The two runners 25 and 25 are fixed to the first shaft 20 outside the two first feed rollers 21 and 21 with the second feed roller 22 as the center.

The runner 25 has a cylindrical shaft attachment part 26 attached to the first shaft 20 and a plurality of blades 27, 27, ... extending radially from the shaft attachment part 26. For example, the blade 27 is made of a material which is flexible and has a large friction coefficient with respect to the bill S, such as urethane rubber. The radius of the runner 25, namely, the length of the blade 27, is set to a length which enables the blade to come in contact with the lower end of the bill S positioned closest to the side board 13 side of the temporary storage chamber 10.

As shown in Figure 3, subrollers 32 and 33 are disposed slightly above and slightly below the first shaft 20 at positions opposed to the second feed roller 22. When no bill S exists between the subrollers 32 and 33 and the second feed roller 22, the outer peripheral surfaces of the subrollers and the second feed roller come in contact with each other; as the second feed roller 22 rotates, the subrollers 32 and 33 also rotate.

The two separation rollers 31 and 31 are fixed to the second shaft 30 at positions opposed to the two first feed rollers 21 and 21. The radius of the separation roller 31 is set so that the gap between the outer peripheral surfaces of the separation roller 31 and the first feed roller 21 becomes 1.5 times the thickness of one bill S. This means that the gap between the separation roller 31 and the first feed roller 21 is set so as to allow only one bill S to easily pass through between the rollers 21 and 31, but not to allow two or more bills to easily pass through between the rollers 21 and 31 at the same time, even if a plurality of overlapped bills attempt to enter the space between the rollers 21 and 31.

The first drive mechanism 40 comprises a rotating shaft 43 positioned coaxially with the first shaft 20 and coupled at one end to the electromagnetic clutch 24, a driven pulley 41 fixed to the other end of the rotating shaft 43, a drive pulley (not shown) for rotating the driven pulley 41, an endless drive belt 42 placed on the pulleys, and a motor (not shown) for rotating the drive pulley. The second drive mechanism 50 comprises a driven pulley 51 fixed to the end of the second shaft 30, a drive pulley (not shown) for rotating the driven pulley 51, an endless drive belt 52 placed on the pulleys, and a motor (not shown) for rotating the drive pulley.

In Figure 1, the first shaft 20 is rotated counterclockwise by the first drive mechanism 40. Therefore, the first feed rollers 21, the second feed roller 22, and the runners 25 disposed on the first shaft 20 are rotated counterclockwise by driving of the first drive mechanism 40. The second shaft 30 is also rotated counterclockwise by the second drive mechanism 50. Therefore, the separation rollers 31 disposed on the second shaft 30 are also rotated counterclockwise by drive of the second drive mechanism 50. The face that the separation rollers 31 rotate counterclockwise as the feed rollers 21 and 22 do means that they rotate in the opposite direction to the bill S transport direction. The one-way clutch 23 disposed on the first shaft 20 restricts clockwise rotation of the second feed roller 22 with respect to the first shaft 20 and allows counterclockwise rotation of the second feed roller 22. Therefore, when the first shaft 20 rotates counterclockwise, the second feed roller 22 accordingly rotates counterclockwise, and even if the first shaft 20 stops, it can rotate counterclockwise freely. The one-way clutch 34 disposed on the second shaft 30 restricts clockwise rotation of the second shaft 30 and allows counterclockwise rotation thereof. Therefore, when the second shaft 30 rotates counterclockwise, accordingly the separation rollers 31 rotate counterclockwise. Further, even if a clockwise external force larger than a counterclockwise rotation drive force from the second shaft 30 is applied to the separation rollers 31, clockwise rotation by the external force is restricted by the one-way clutch 34.

The belt transport mechanism 60 comprises pairs of endless belts 61 and 62 between which bills S fed from the feed rollers 21 and 22 are sandwiched, driven pulleys 63 and 64, drive pulleys (not shown), and tension pulleys 65, 66, and 68 on which the endless belts 61 and 62 are placed, and a drive motor (not shown) for rotating the drive pulleys. The drive motor and the drive pulleys are placed in the final storage chamber 19 and are not shown. As shown in Figure 2, three pairs of endless belts 61 and 62 are provided and the belts on the temporary storage chamber 10 side are disposed just below the second feed roller 22 and on both sides thereof. Since three pairs of endless belts 61 and 62 are provided, the pulleys are also provided in three pairs. However, one drive motor is shared by three pairs.

A guide piece 15, for guiding bills S from the temporary storage chamber 10 between the separation roller 31 and the first feed roller 21 to the temporary storage chamber side end of the endless belts 61 and 62, extends from the outlet 12 of the temporary storage chamber 10. It is provided corresponding only to the

endless belt pairs 61 and 62 on both sides among the three endless belt pairs 61 and 62 so as to keep out of the way of the feed rollers 21 and 22, the separation rollers 31, etc.

The bill detection sensor 70 is an optical sensor consisting of a light emitting element 71 and a light receiving element 72. It is disposed on the temporary storage chamber 10 side in the transport passage of the belt transport mechanism 60. More particularly, it is disposed slightly downward from the driven pulleys 63 and 64 disposed closest to the temporary storage chamber 10 among the pulleys forming the belt transport mechanism 60. The bill detection sensor 70 is connected to a control circuit (not shown) by a signal line (not shown). When sensing the tip of a bill S, the bill detection sensor 70 outputs a sensing signal to the control circuit, which then outputs an off signal to the electromagnetic clutch 24 on the rising edge of the sensing signal and an on signal on the falling edge thereof. When inputting the off signal, the electromagnetic clutch 24 disconnects the first shaft 20 and the rotating shaft 43 of the first drive mechanism 40 (off state); when inputting the on signal, the electromagnetic clutch 24 connects the first shaft 20 and the rotating shaft 43 of the first drive mechanism 40 (on state). That is, when the detection sensor 70 senses the tip of the bill S, the electromagnetic clutch 24 enters the off state, and the rotation force from the first drive mechanism 40 is not transmitted to the first shaft 20; when the detection sensor 70 senses the rear end of the bill S, the electromagnetic clutch 24 enters the on state, and the rotation force from the first drive mechanism 40 is transmitted to the first shaft 20. The detection sensor 70 is used not only for control of the electromagnetic clutch 24, but also as a sensor for counting the number of bills.

Next, the operation of the bill separation and transport system will be discussed.

Basically, the first drive mechanism 40, the second drive mechanism 50, and the belt transport mechanism 60 always operate.

Here, assume that the electromagnetic clutch 24 is in the on state. When the electromagnetic clutch 24 is in the on state, the rotating shaft 43 of the first drive mechanism 40 and the first shaft 20 are coupled as described above, and the first shaft 20 rotates with rotation of the driven pulley 41 of the first drive mechanism 40. Therefore, when the electromagnetic clutch 24 is in the on state, the first feed rollers 21, the second feed roller 22, and the runners 25 rotate counterclockwise.

As shown in Figures 1 and 4, the lower end of the bill S positioned closest to the side board 13 side in the temporary storage chamber 10 is in contact with the tip of one blade 27 of the runner 25. Therefore, as the runner 25 rotates counterclockwise, the bill S in contact with the runner 25 is drawn out from the outlet 12 of the temporary storage chamber 10 and is guided by the guide piece 15 formed from the outlet 12 of the temporary storage chamber 10 to the space between the first feed roller 21 and the separation roller 31 between the upper subroller 32 and the second feed roller 22. This means that the runner 25 forcibly takes the bill S in the temporary storage chamber 10 into the space between the first feed roller 21 and the separation roller 31. Therefore, the bills S positioned upstream from the separation and transport system of the embodiment can be reliably taken into the separation and transport system and a paper jam upstream from the separation and transport system can be minimized.

When two overlapped bills S arrive between the first feed roller 21 and the separation roller 31, only the bill S in contact with the first feed roller 21 is transported in the direction of the belt transport mechanism 60. Since the separation roller 31 rotates in the opposite direction to the bill transport direction, the bill S in contact with the separation roller 31 temporarily remains upstream from the separation roller 31 and the first feed roller 21 and after the bill S in contact with the first feed roller 21 passes through between the rollers 21 and 31, comes in contact with the first feed roller 21 and passes between the rollers 21 and 31.

The bill S passing through between the rollers 21 and 31 are guided by the guide piece 15, passes through between the second feed roller 22 and the lower subroller 33, and is sandwiched between a pair of endless belts 61 and 62 of the belt transport mechanism 60. The bill S sandwiched between the pair of endless belts 61 and 62 is transported to the final storage chamber 19 on the pair of endless belts 61 and 62.

As shown in Figure 5, just after transport of the bill S sandwiched between the pair of endless belts 61 and 62 is started on the endless belts 61 and 62, the tip of the bill S is sensed by the bill detection sensor 70 and the electromagnetic clutch 24 enters the off state. At this time, the rear end of the bill S is sandwiched between the second feed roller 22 and the lower subroller 33. When the electromagnetic clutch 24 enters the off state, the rotating shaft 43 of the first drive mechanism 40 and the first shaft 20 are disconnected and the rotation force from the first drive mechanism 40 is not transmitted to the first shaft 20, as described above. Thus, the runner 25 and the first feed roller 21 fixed to the first shaft 20 lose the rotation drive force and bill S from the temporary storage chamber 10 cannot be taken into the space between the first feed roller 21 and the separation roller 31. By the way, the second feed roller 22 is attached to the first shaft 20 via the one-way clutch 23 and even if the first shaft 20 stops rotating, it can rotate freely only counterclockwise. Therefore, the bill S sandwiched at the tip between the pair of endless belts 61 and 62 and at the rear end between the second feed roller 22 and the lower subroller 33 is transported downward with the motion of the pair of endless belts 61 and 62.

When the rear end of the bill S is sensed by the bill detection sensor 70 and the electromagnetic clutch 24 again enters the on state, the rotation force from the first drive mechanism 40 is transmitted to the first shaft 20; the runner 25, the first feed roller 21, and the second feed roller 22 fixed to the first shaft 20 again get the rota-

tion drive force; and the bill S temporarily remaining upstream from the first feed roller 21 or the bill S in the temporary storage chamber 10 can be taken into the space between the first feed roller 21 and the separation roller 31.

Thus, just after the tip of the bill S is taken into the belt transport mechanism 60, the runner 25, the first feed roller 21, and the second feed roller 22 lose the rotation drive force, and the bill S cannot be taken into the space between the first feed roller 21 and the separation roller 31. Just after the rear end of the bill S is taken into the belt transport mechanism 60, the runner 25, the first feed roller 21, and the second feed roller 22 again receive the rotation drive force, and the bill S can be taken into the space between the first feed roller 21 and the separation roller 31. This means that bills pass intermittently the first feed roller 21 and the separation roller 31, so that the rear-end collision phenomenon of bills S can be prevented in the process of transferring the bills S from the feed rollers 21 and 22 to the belt transport mechanism 60. Therefore, a paper jam between the feed rollers 21 and 22 and the belt transport mechanism 60 can be minimized, the number of bills S can be counted correctly, and the bills S can be stored in an aligned manner in the final storage chamber 19.

In the embodiment, rotation drive and stop of the first shaft are controlled by the electromagnetic clutch 24 receiving signals from the detection sensor 70. Instead, signals may be output from the detection sensor 70 to the drive motor of the first drive mechanism 40 for controlling rotation drive and stop of the first shaft.

Claims

1. A paper slip separation and transport system for transporting a plurality of paper slips, initially supplied without separation processing, to a target position while separating them one by one, said system comprising:

   a feed roller and a separation roller being placed facing each other for sandwiching a supplied paper slip therebetween;
   a runner being disposed on the same shaft as said feed roller;
   a first drive mechanism for integrally rotating said feed roller and said runner integrally in a direction in which the paper slip can be transported to the target position; and
   a second drive mechanism for rotating said separation roller in a direction from which the paper slip is supplied,
   said runner having a plurality of flexible blades extending radially, each of said blades being set to a length allowing said blade to come in contact with an upstream paper slip not yet taken into a space between said feed roller and said separation roller.

2. The paper slip separation and transport system as claimed in claim 1 wherein said blades are made of urethane.

3. The paper slip separation and transport system as claimed in claim 1 or 2 further including:

   a transport mechanism for transporting the paper slip passing through between said feed roller and said separation roller to the target position;
   paper slip passage sensing means for sensing passage of a downstream end and an upstream end of the paper slip arriving at said transport mechanism; and
   rotation drive force control means for losing a rotation drive force transmitted from said first drive mechanism to said feed roller and said runner when said paper slip passage sensing means senses the passage of the downstream end of the paper slip arriving at said transport mechanism and for recovering the rotation drive force transmitted from said first drive mechanism to said feed roller and said runner when said paper slip passage sensing means senses the passage of the upstream end of the paper slip arriving at said transport mechanism.

4. The paper slip separation and transport system as claimed in claim 1, 2, or 3 further including a guide piece for guiding the upstream paper slip not yet taken into the space between said feed roller and said separation roller to the space between said feed roller and said separation roller.

5. The paper slip separation and transport system as claimed in claim 3 further including a guide piece for guiding the upstream paper slip not yet taken into the space between said feed roller and said separation roller to said transport mechanism via the space between said feed roller and said separation roller.

6. A paper slip separation and transport system for transporting a plurality of paper slips, initially supplied without separation processing, to a target position while separating them one by one, said system comprising:

   a feed roller and a separation roller being placed facing each other for sandwiching a supplied paper slip therebetween;
   a transport mechanism for transporting the paper slip passing between said feed roller and said separation roller to the target position;
   a first drive mechanism for rotating said feed roller in a direction in which the supplied paper slip is fed to said transport mechanism;

a second drive mechanism for rotating said separation roller in a direction from which the paper slip is supplied,

paper slip passage sensing means for sensing passage of a downstream end and an upstream end of the paper slip arriving at said transport mechanism; and

rotation drive force control means for removing a rotation drive force transmitted from said first drive mechanism to said feed roller when said paper slip passage sensing means senses the passage of the downstream end of the paper slip arriving at said transport mechanism, and for recovering the rotation drive force transmitted from said first drive mechanism to said feed roller when said paper slip passage sensing means senses the passage of the upstream end of the paper slip arriving at said transport mechanism.

FIG.1

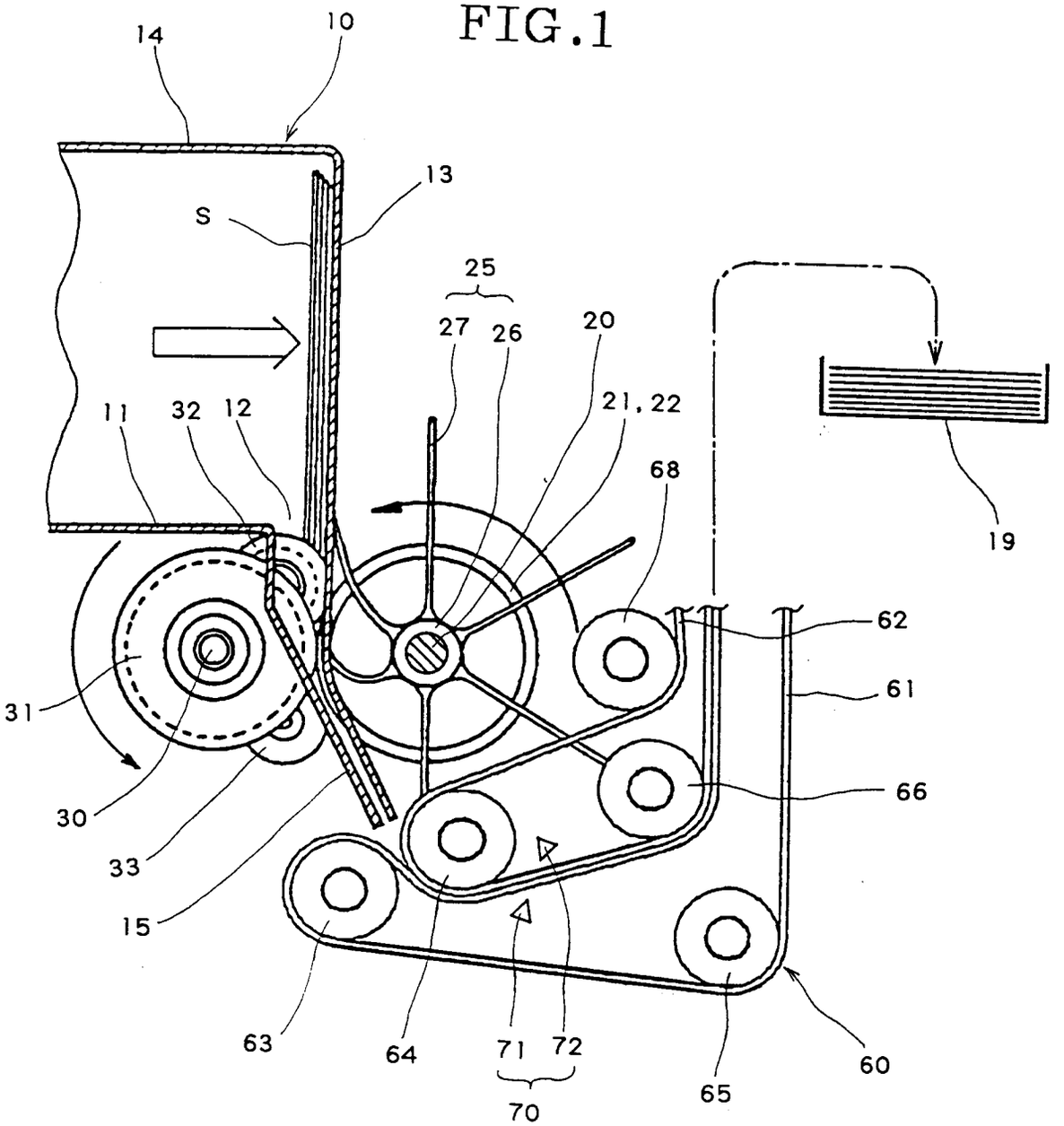

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FIG.2

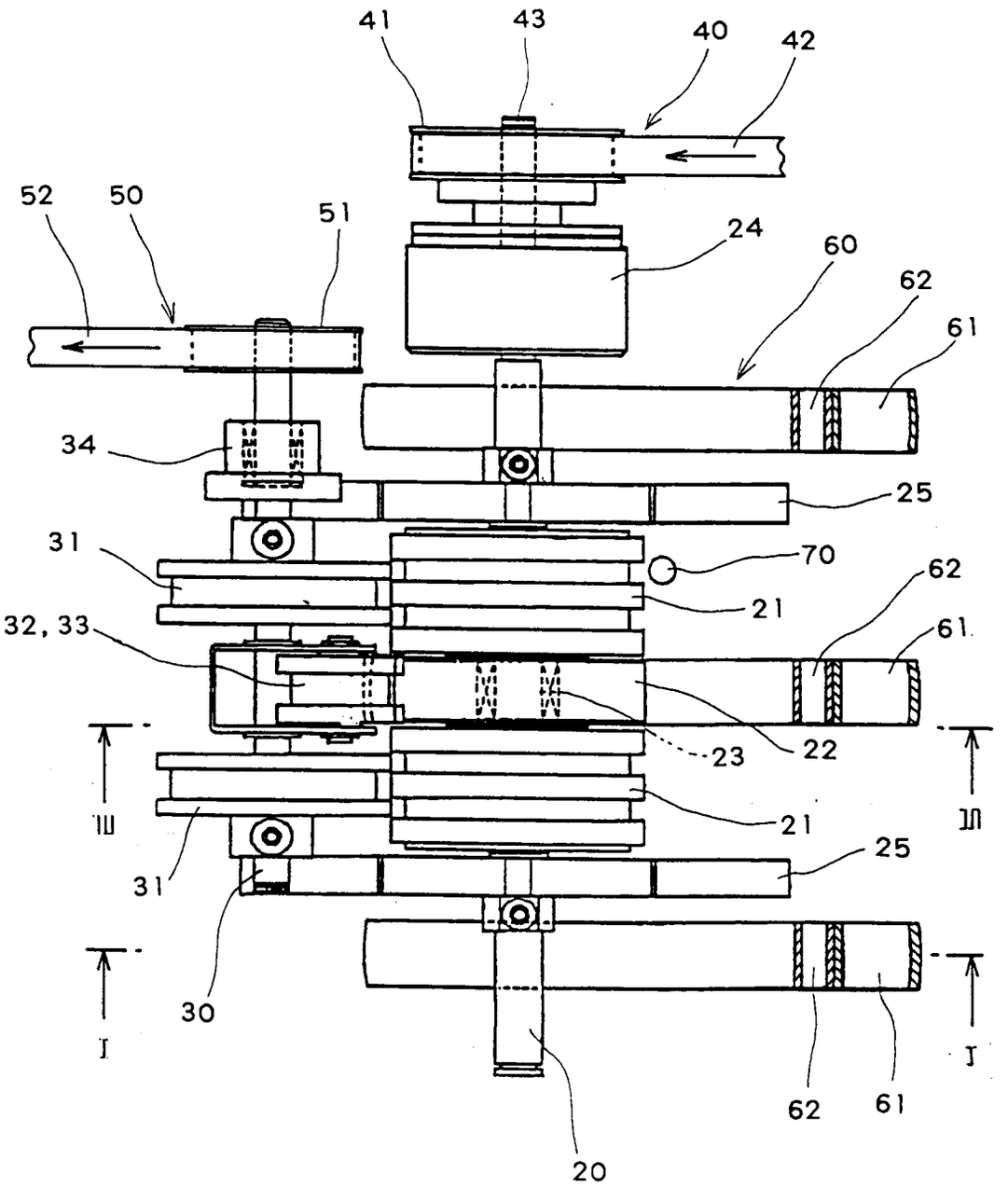
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FIG.3

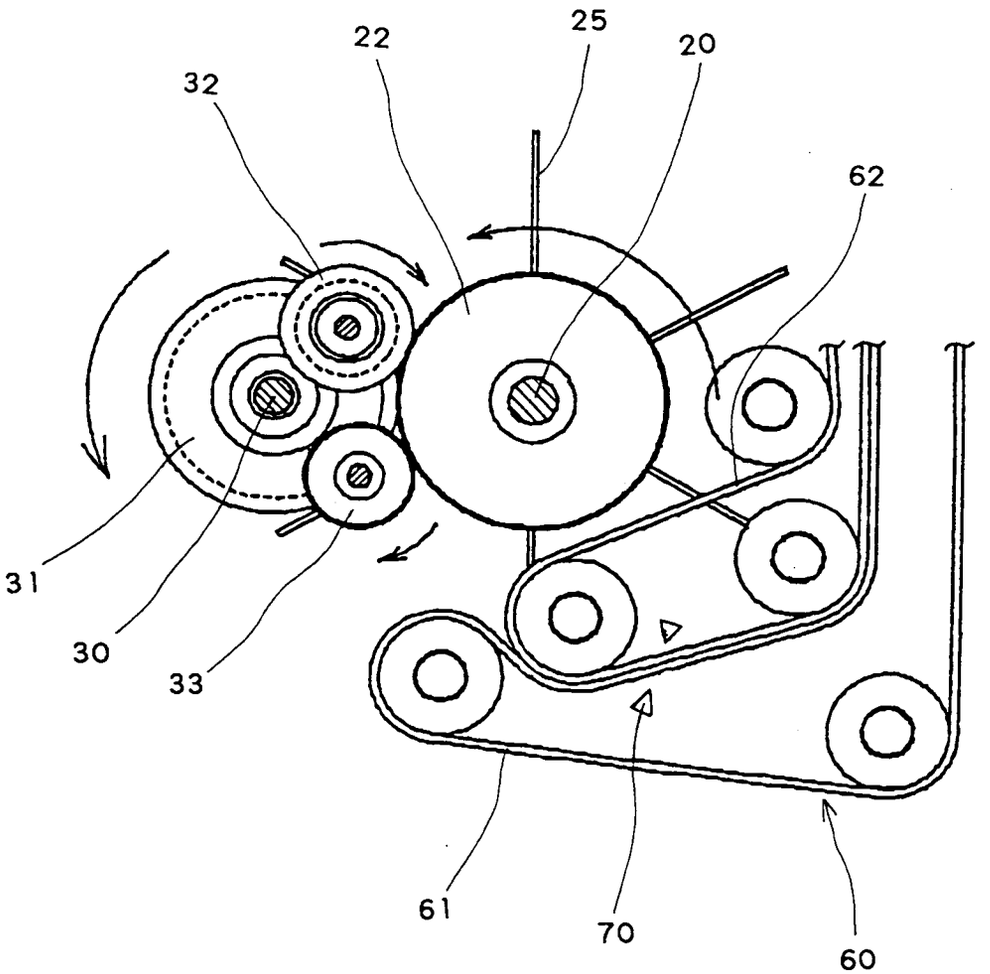


FIG.4

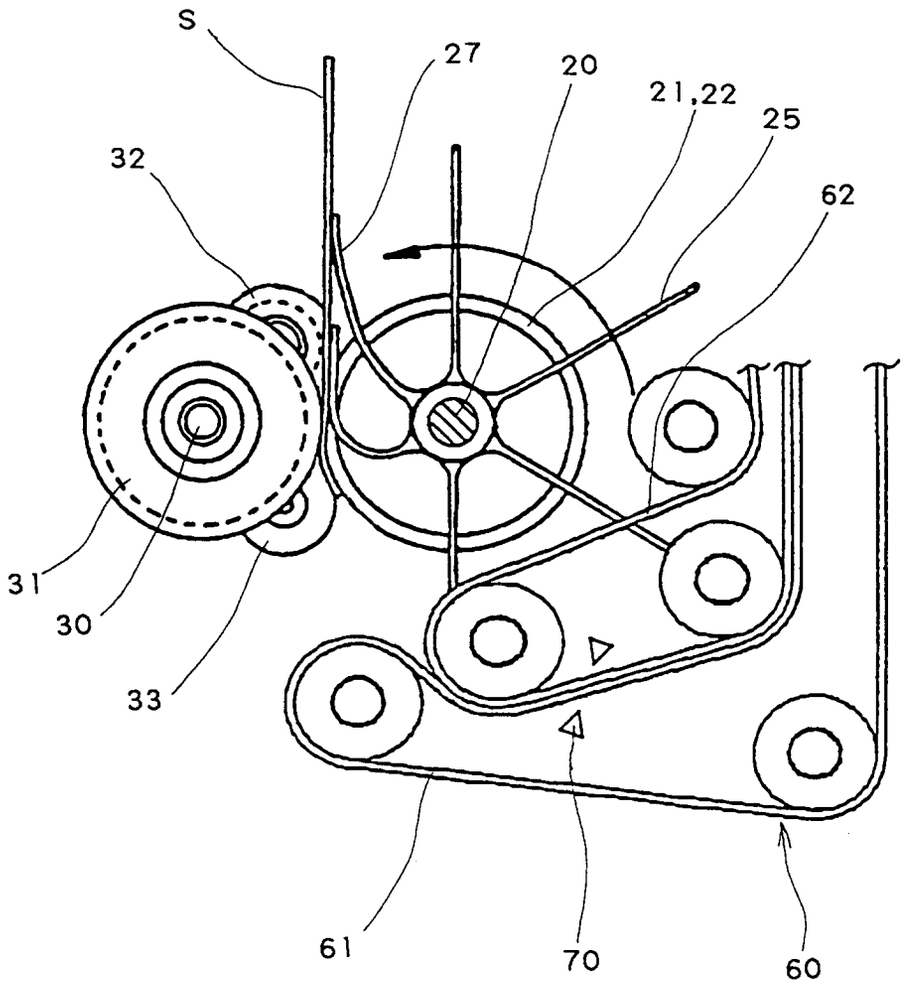
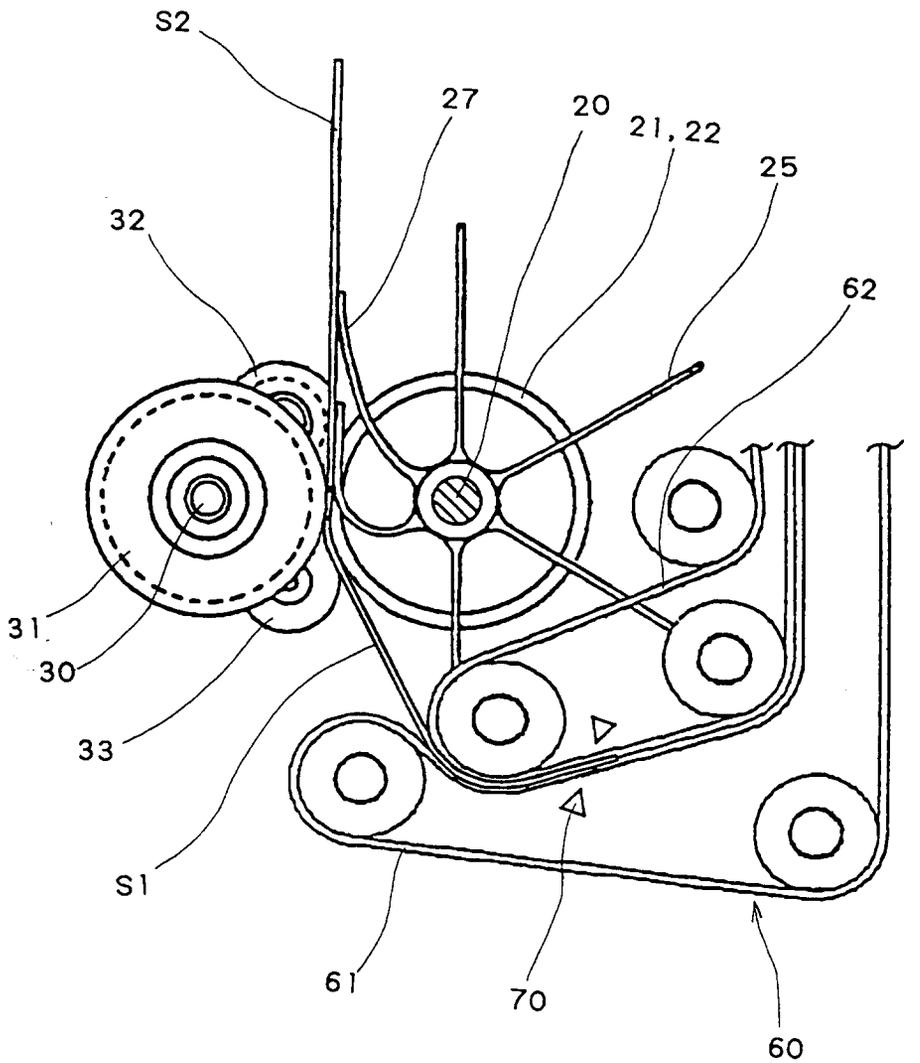


FIG.5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP95/00345

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl^6 B65H3/06, 3/52

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int. Cl^6 B65H3/06, 3/52

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1926 - 1994
Kokai Jitsuyo Shinan Koho 1971 - 1994

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP, U, 60-142242 (Fuji Xerox Co., Ltd.), September 20, 1985 (20. 09. 85),	1 - 2
A	JP, U, 60-177130 (Omron Corp.), November 25, 1985 (25. 11. 85)	1 - 2
A	JP, U, 57-184833 (Ricoh Co., Ltd.), November 24, 1982 (24. 11. 82)	1 - 5
X		6

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
April 4, 1995 (04. 04. 95)	April 18, 1995 (18. 04. 95)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)