(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 010 652 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.06.2000 Bulletin 2000/25

(51) Int. Cl.[7]: **B65H 15/00**, B65H 29/00, B65H 5/28

(21) Application number: **98403157.5**

(22) Date of filing: **15.12.1998**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

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(54) Receipt printing, storage and discharging mechanism

(57) The device (10) allows for the storage of various media, such as receipts, slips, forms, labels, tickets, tags, etc. The receipts are introduced into the device by an adjacently disposed printer (9). The web (8) of the receipt enters the storage and presenting device and is stored within a rib-cage mandrel in an overflow bucket (11). The device (10) is able to store various lengths of the media up to about twenty feet. The device (10) is then caused to rotate through an angle transverse of the printer discharge direction, which angle is preferably ninety degrees.

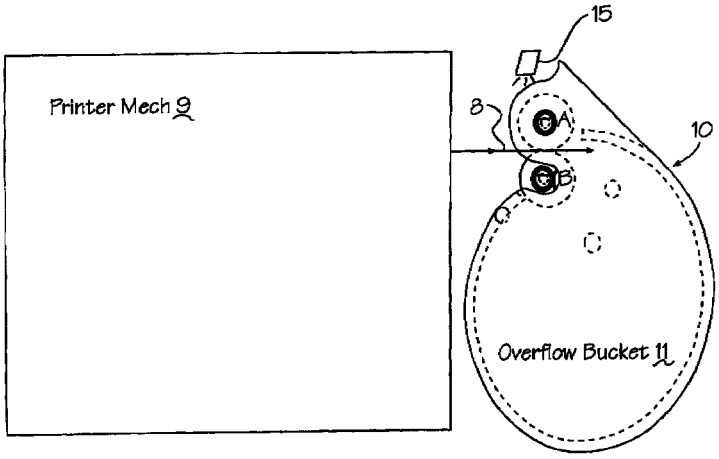

Figure 2A

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Description

Field of the Invention:

[0001] This invention relates to receipt printing and handling devices and, more particularly, to a receipt printing, storage and presenting mechanism for printing a plurality of transactions upon a continuous web, temporarily storing the receipt web, and thereafter discharging the receipt web at an angle to the normal discharge direction.

BACKGROUND OF THE INVENTION

[0002] Retail establishments usually print receipts of the sales transactions upon a supply roll of paper. Very often, a plurality of transactions causes the printing of a lengthy receipt document. The long document presents an unwieldy and unmanageable web that is both unsightly and cumbersome to handle. The lengthy receipt web often drapes awkwardly from the print register, interfering with the entering of additional transactions and summing of the final receipt total.

[0003] It would be desirable to provide a means by which the lengthy web can be temporarily contained until the completion of printing and cutting of the receipt.

[0004] It would also be advantageous to provide a device in which a long receipt, multiple tickets, labels, forms, etc., can be confined or contained (i.e., "buffered") before presentation.

[0005] It would additionally be a benefit to provide a mechanism wherein a lengthy receipt can be temporarily stored and thereafter discharged at a right angle to the normal discharge direction, so as not to interfere with the keyboard or face (display) of the register.

[0006] The present invention seeks to provide a device that captures and temporarily stores a lengthy receipt web, as the transactions are printed and totalled, and the web is cut. The device then rotates through an angle of between approximately 0 to 90 degrees (preferably 90 degrees) from the normal web discharge direction, and issues the receipt. The apparatus may be oriented to allow rotation to the left or to the right, providing a presentation field of 180 degrees. In this manner, the front of a register is not encumbered by a long, suspended, receipt web.

SUMMARY OF THE INVENTION

[0007] In accordance with the present invention, there is provided a presenting mechanism that stores and then discharges a printed receipt, label, ticket, or form at an angle to the issuing direction. The mechanism comprises an overflow bucket, of generally oval shape, that is disposed adjacent the exit slot of a receipt printer. The overflow bucket is mounted upon a rotatable assembly. The receipt is dispersed as a continuous web from the exit slot of the receipt printer. It then enters the overflow bucket through an entrance guide. A sensor disposed adjacent the entrance guide senses the web of paper and triggers a motor that drives a pair of teed rollers connected thereto by a gear train. The same sensor is used to detect the trailing edge of the receipt, in order to detect jams as well as to determine that the receipt has been successfully discharged. The feed rollers push the paper web onto a rib-cage mandrel disposed in the overflow bucket. The rib-cage mandrel supports the paper as it is stored within the bucket, and allows the web to flow smoothly thereupon. Upon discharge from the overflow bucket, the feed rollers reverse direction and push the paper back out through the entrance guide. The feed rollers are mounted on a gear plate that rotates and causes the discharge of the paper at a second position, disposed above the entrance position. In addition, the rotatable assembly housing the overflow bucket is itself caused to be rotated at right angles to the direction in which the receipt is discharged from the printer. In this manner, the receipt web is discharged at a high position and at right angles to the entrance position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] A complete understanding of the present invention may be obtained by reference to the accompanying drawings, when considered in conjunction with the subsequent detailed description, in which:

FIGURE 1 is a perspective view of the receipt storage and presenter device of the present invention and a printer associated therewith:

FIGURE 2a illustrates a schematic side view of the receipt storage and presenter device of the invention receiving a receipt web from a typical printing mechanism at a first receipt receiving position;

FIGURE 2b depicts the schematic side view of the receipt storage and presenter device of FIGURE 2a, with the drive rollers reversed, and the receipt web being presented from the storage and presenter device at a second position disposed above the first receiving position;

FIGURE 3 shows a right side view of the gear drive of the storage and presenter device in said first position, as depicted in FIGURE 2a;

FIGURE 4 illustrates a right side view of the gear drive of the storage and presenter device in said second position, as depicted in FIGURE 2b;

FIGURE 5a depicts an enlarged view of the storage and presenter device of FIGURE 1;

FIGURE 5b is an isolated, perspective view of the

rib-cage mandrel assembly depicted in FIGURES 1 and 5; and

FIGURE 6 illustrates another perspective view of the storage and presenter device of FIGURE 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0009] Generally speaking, the invention features a receipt storage and presenting device. The device allows for the storage of various media, such as receipts, slips, forms, labels, tickets, tags, etc. The receipts are introduced into the device by an adjacently disposed printer. The web of the receipt enters the storage and presenting device and is stored within a rib-cage mandrel. The device can store various lengths of the media up to about twenty feet. The device is then caused to rotate through an angle transverse of the printer discharge direction, which angle is preferably ninety degrees. For the purposes of brevity and clarity, like elements and components will bear the same numbering and designation throughout the figures.

[0010] Now referring to FIGURE 1, a perspective view of the receipt storage and presenter device 10 and associated printer 9 are shown.

[0011] Now referring to FIGURE 2a, a schematic side view of a printer mechanism 9 is illustrated. The printer 9 is shown discharging a receipt (arrows 8) to the storage and presenting device 10 of this invention. The device 10 has an overflow bucket 11, which contains two feed rollers "A" and "B", respectively, that drive the receipt 8 into the overflow bucket 11. The feed rollers "A" and "B" are in pressure contact with each other, and are driven by a gear train 20 and motor 30, described in greater detail hereinbelow with respect to FIGURES 3 through 6. The slip or web representing the receipt 8 is discharged by printer 9 into the nip of rollers "A" and "B", and is then wound within a rib-cage mandrel 22 disposed within the overflow bucket 11, as shown in FIGURES 1, 5a and 6. Rib-cage mandrel 22 is shown in greater detail in FIGURE 5b. A sensor 15, disposed in front of rollers "A" and "B", senses the presence of the receipt 8 as it enters device 10, and generates a signal to actuate motor 30 into driving gear train 20, and hence rollers "A" and "B".

[0012] Referring to FIGURE 2b, the receipt 8 is shown being presented (discharged) from the storage and presenting device 10 after having been stored therein. It will be observed that rollers "A" and "B" have switched positions. That is, roller "B" is now disposed over roller "A".

[0013] Rollers "A" and "B", respectively, are attached to, and driven by, corresponding gears "A" and "B" (FIGURES 3 and 4). Gears "A" and "B" are mounted for rotation about shafts 12a and 12b, respectively. The gears "A" and "B" are also mounted on gear plate 14 for revolution about each other, wherein gear "B", and hence roller "B", are driven clockwise about gear "A" and roller "A", respectively, placing gear "B" above gear "A" for the discharge operation; and gear "B" rotates counter-clockwise to its home position to accept the next receipt. The purpose of this revolution is to present the receipt 8 at a greater height than that of the discharge height of printer 9. The higher discharge level from device 10 prevents accidental feeding of the receipt 8 back into printer 9. It will be observed that sensor 15 also shifts its position when gears "A" and "B" reverse positions. This is accomplished by mounting the sensor 15 upon the entrance/exit guide platform 18 (FIGURE 6), which is rotatively slaved to the rollers "A" and "B". Thus, sensor 15 can be used, first, to detect the leading edge of the receipt 8 and then to detect the trailing edge thereof.

[0014] Referring to FIGURE 3, gear plate 14 is shown in the storage position "C", with gear "A" disposed above adjacent gear "B". In this position, the receipt 8 is caused to be fed into the overflow bucket 11.

[0015] Referring to FIGURE 4, gear plate 14 is depicted in the presenting position "D", with gear "B" disposed above gear "A".

[0016] The gears "A" and "B" of gear train 20 are rotatively driven by adjacent driving gear 16, when gear train 20 is in the storage position "C". The driving gear 16 directly engages with gear "B" to drive rollers "A" and "B", respectively, as shown in FIGURE 3. In the presenting position "D", as depicted in FIGURE 4, the driving gear 16 reverses direction, and also drives gear plate 14, via a slip clutch 19 and intermediate gears 23 and 24. The reversal of the driving gear 16 is accomplished by reversing the driving direction of motor 30.

[0017] Reversal of the motor 30 and the engagement of the slip clutch 19 is triggered by sensor 15, which senses the leading and trailing edges of receipt 8. The receipt 8 is sensed by sensor 15 as it enters the overflow bucket 11. Sensor 15 can be a photosensor that senses the leading edge of the incoming receipt 8, and causes motor 30 to be actuated into driving the gear 16. The motor 30 can be made to reverse its driving direction, when the sensor 15 senses the trailing edge of the receipt web 8. Detecting the trailing edge of receipt 8 is useful for detecting a paper jam or as a signal that the receipt has been discharged to the operator. The sensor 15 sends a signal to reverse the motor 30 and to engage the slip clutch 19 with the intermediate gear drive (gears 23 and 24). Engaging the slip clutch 19 causes the gear plate 14 to rotate, thus reversing the position of the gears "A" and "B". These gears "A" and "B" now revolve to the presenting position "D", as shown in FIGURES 2b and 4.

[0018] A door, not shown, could be actuated when the entrance guide is rotated to discharge the receipt form, ticket, etc. This door would be closed until the time of receipt discharge, in order to block the fascia entrance to the presenter, preventing foreign objects from being inserted into the presenter.

[0019] Referring to FIGURE 6, the overflow bin area

28 of storage and presenting device 10 is shown. The overflow bin area 28 allows for multiple presentations. In fact, it should be understood that multiple receipt exit points can be provided, depending on the mounting orientation of the presenter in relation to the print mechanism. For example, the presenter may be assembled in such a manner so as not to include means to store the receipt or web. The receipt, if not taken by operator, could be retracted and fed in a downward direction into a bin or bucket. This would purge the presenter of any web material and allow for the next receipt. A trash bin area can be provided below for receipts that are rejected.

[0020] The rollers "A" and "B", the entrance guide 18, and the gear train 20 are all supported upon a rotatable frame 32. Frame 32 is pivotally supported about shaft 34. The shaft 34 is connected to sectional gear 33, which is driven by spur gear 35. The spur gear 35 is rotatively driven by a drive motor 37 via a connecting shaft 36. Pivoting the frame 32 allows receipt 8 to be discharged at an angle with respect to the incoming receipt direction, as shown in FIGURE 2a. The preferred angle is ninety degrees, but the frame 32 can be pivotally directed about any angle from zero to ninety degrees. Moreover, when the apparatus is adapted to rotate up to 90 degrees to the left and up to 90 degrees to the right, a presentation field of 180 degrees is obtained. The sensor 15 actuates motor 37, when the trailing edge of the web is sensed.

[0021] It should be understood that the presenter can be constructed in such a manner as to allow for varying widths of media. This can be done with a modular, building block approach, by which some parts and assemblies are used to build various width presenters. One presenter could also be constructed and used with two different print mechanisms, or two similar mechanisms to alternately present different media, (e.g., two color receipts from one unit and tickets or coupons from the other).

[0022] Since other modifications and changes varied to fit particular operating requirements and environments will be apparent to those skilled in the art, the invention is not considered limited to the example chosen for purposes of disclosure, and covers all changes and modifications which do not constitute departures from the true spirit and scope of this invention.

[0023] Having thus described the invention, what is desired to be protected by Letters Patent is presented in the subsequently appended claims.

Claims

1. A media storage and presenting device, comprising:

support means for receiving media material;

a pair of feed rollers for feeding the media material along a feed direction to said support means;

rotative drive means for driving said pair of feed rollers;

a gear train disposed between said pair of feed rollers and said rotative drive means for rotatively moving said feed rollers from a media receiving position to a media presenting position; and

pivotable drive means attached to said support means for pivoting said pair of feed rollers at an angle with respect to said feed direction.

2. The media storage and presenting device in accordance with claim 1, further comprising a sensor disposed adjacent said pair of feed rollers for sensing a leading and trailing edge of said media material in order to actuate both said rotative and pivotable drive means.

3. The media storage and presenting device in accordance with claim 2, further comprising entrance guide means disposed adjacent said pair of feed rollers for supporting said sensor.

4. The media storage and presenting device in accordance with claim 1, wherein said support means comprises a rib-cage mandrel.

5. The media storage and presenting device in accordance with claim 1, wherein said gear train further comprises a gear plate for supporting said pair of rollers for revolving motion and a slip clutch for engaging said gear plate with said rotative drive means for changing a height position of said pair of feed rollers.

6. The media storage and presenting device in accordance with claim 1, wherein said pivotable drive means can pivot said support means from approximately zero to ninety degrees with respect to said feed direction.

7. A media storage and presenting device, comprising:

support means for receiving media material;

at least one feed roller for feeding the media material along a feed direction to said support means;

a gear train for rotatively moving said at least one feed roller from a media receiving position to a media presenting position; and

media buffer means for temporarily containing said media prior to the discharging thereof.

8. The media storage and presenting device in accordance with claim 7, wherein said media buffer means comprises a rib-cage mandrel in which said media is wrapped and stored.

9. The media storage and presenting device in accordance with claim 7, further comprising entrance guide means disposed adjacent said at least one feed roller for supporting a sensor, said sensor being capable of sensing an edge of said media material.

10. The media storage and presenting device in accordance with claim 7, wherein said gear train further comprises a gear plate for supporting said pair of rollers for revolving motion and a slip clutch for engaging said gear plate with said rotative drive means for changing a height position of said at least one feed roller.

11. The media storage and presenting device in accordance with claim 7, further comprising pivotable drive means operatively connected to said support means for pivoting said support means from approximately 0 to 180 degrees with respect to said feed direction.

12. A media storage and presenting device, comprising:

support means for receiving media material;

a pair of feed rollers for feeding the media material along a feed direction to said support means;

rotative drive means for driving said pair of feed rollers;

a gear train disposed between said pair of feed rollers and said rotative drive means for rotatively moving said feed rollers from a media receiving position to a media presenting position;

pivotable drive means attached to said support means for pivoting said pair of feed rollers at an angle with respect to said feed direction; and

sensing means for sensing a leading and trailing edge of said media material in order to actuate both said rotative and pivotable drive means.

13. The media storage and presenting device in accordance with claim 12, further comprising entrance guide means for supporting said sensing means.

14. The media storage and presenting device in accordance with claim 12, wherein said support means comprises a rib-cage mandrel.

15. The media storage and presenting device in accordance with claim 14, wherein said media is wrapped within said rib-cage mandrel prior to the discharge thereof.

16. The media storage and presenting device in accordance with claim 12, wherein said gear train further comprises a gear plate for supporting said pair of rollers for revolving motion and a slip clutch for engaging said gear plate with said rotative drive means for changing a height position of said pair of feed rollers.

17. The media storage and presenting device in accordance with claim 12, further comprising a motor for pivotally driving said pivotable drive means.

18. The media storage and presenting device in accordance with claim 1, in combination with printing means, wherein said media is discharged from said printing means and introduced into said media storage and presenting device.

19. The media storage and presenting device in accordance with claim 12, in combination with printing means, wherein said media is discharged from said printing means and introduced into said media storage and presenting device.

20. A media storage and presenting device, comprising:

support means for receiving media material;

at least one feed roller for feeding the media material along a first feed direction to said support means;

means for rotatively moving said at least one feed roller from a media receiving position to a media presenting position; and

drive means for driving said at least one feed roller and for pivoting said at least one feed roller at an angle with respect to said first feed direction, so that said media material can be discharged in a second feed direction different from said first feed direction.

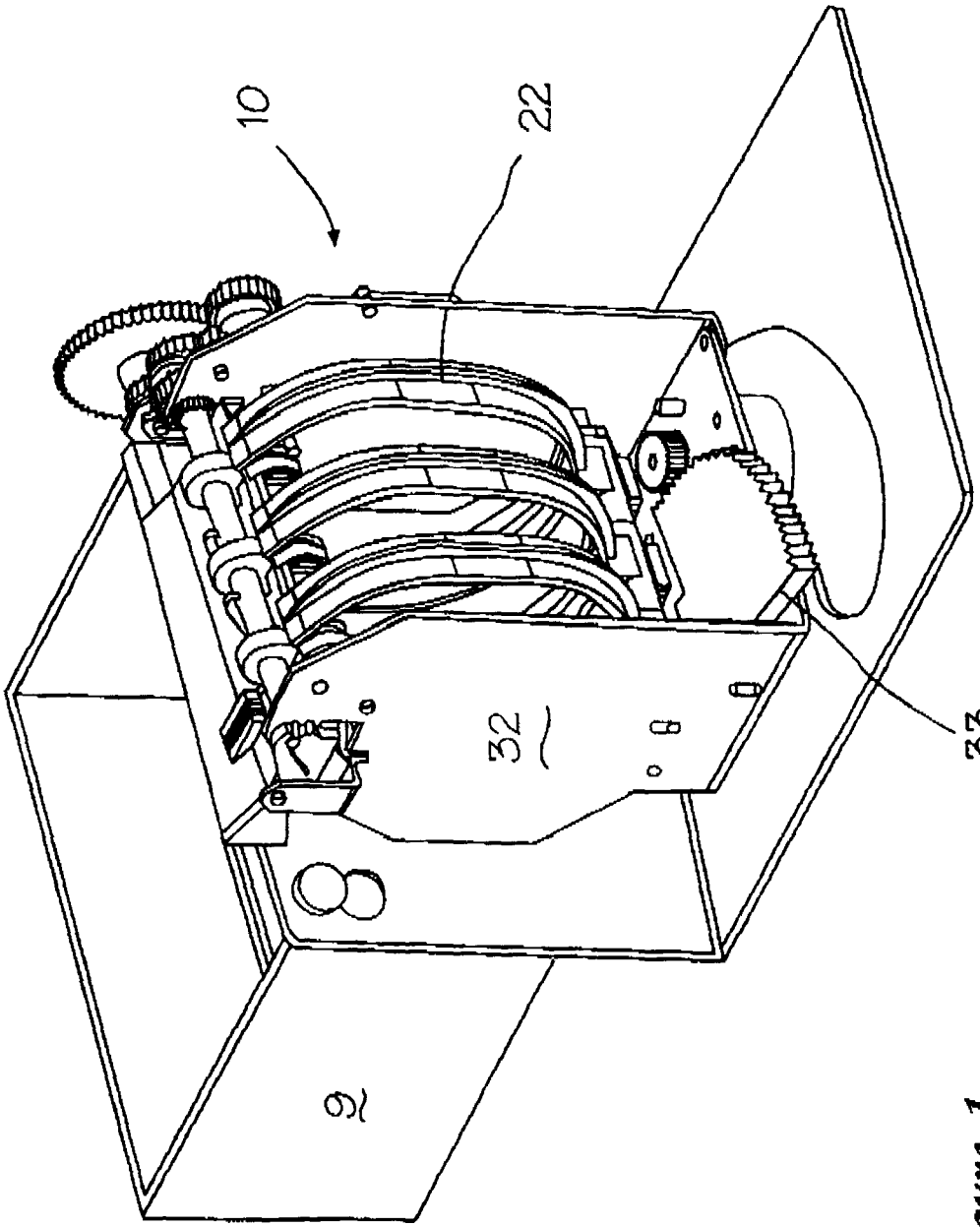

Figure 1

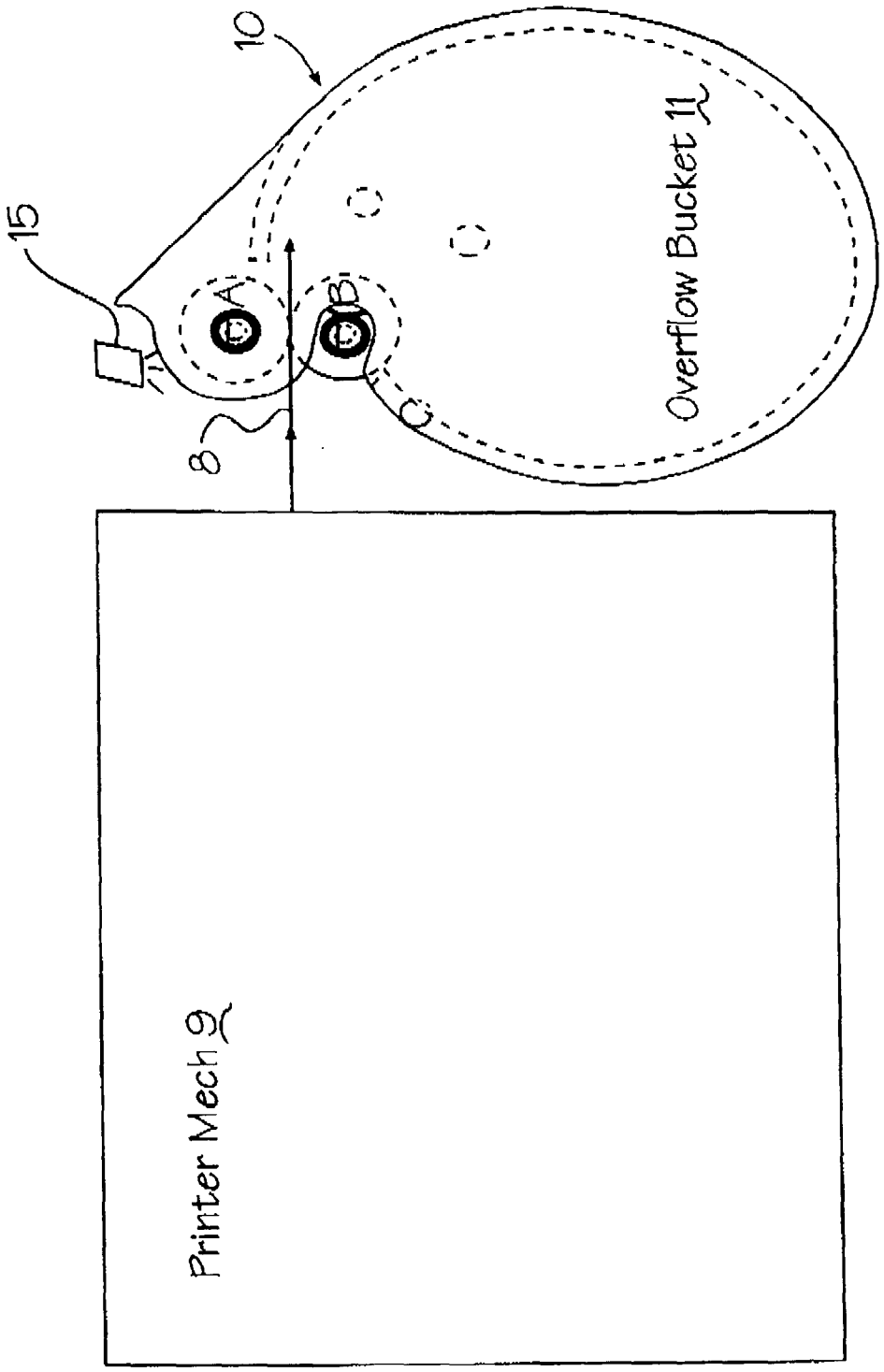

Figure 2A

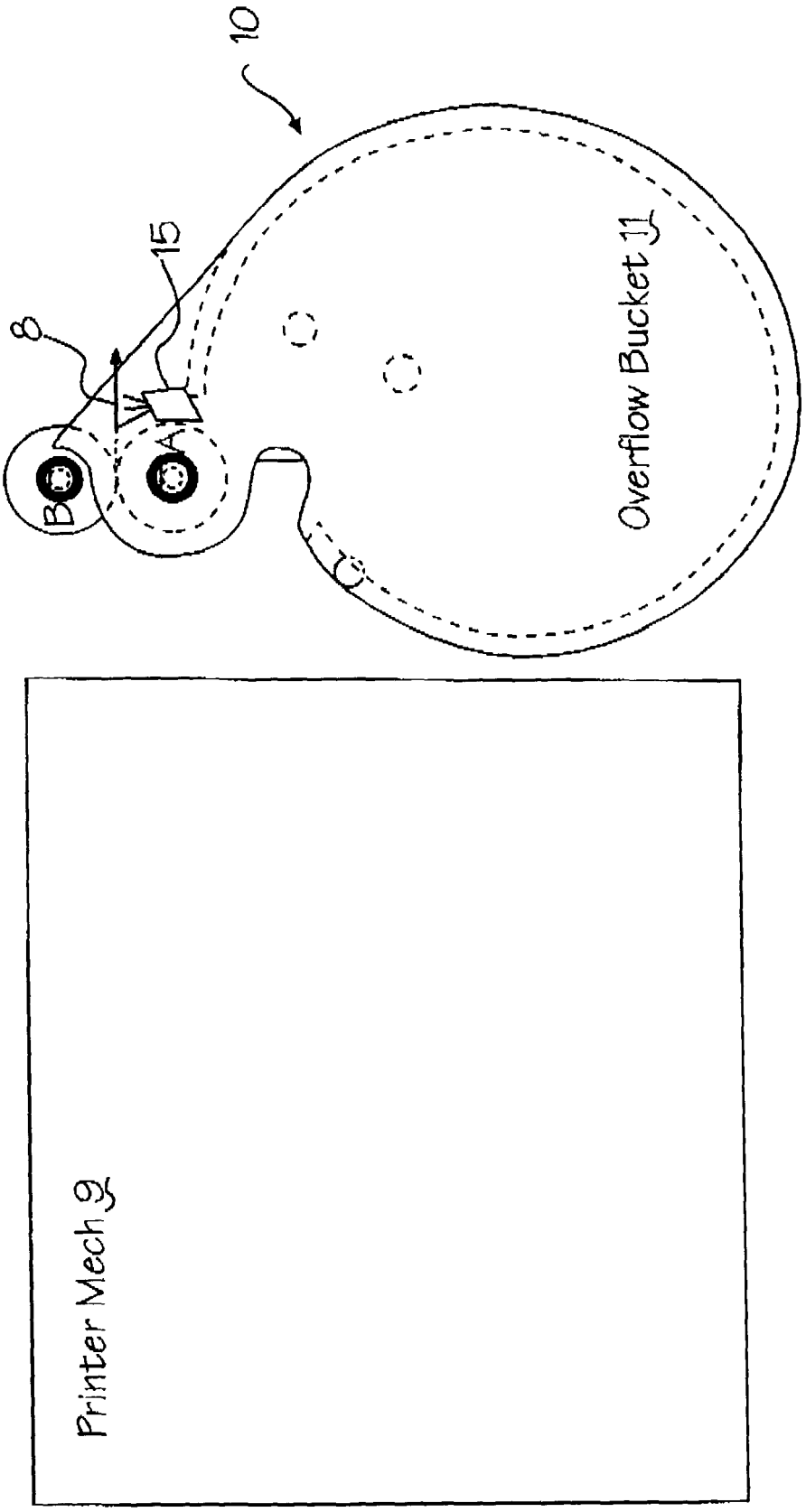

Figure 2B

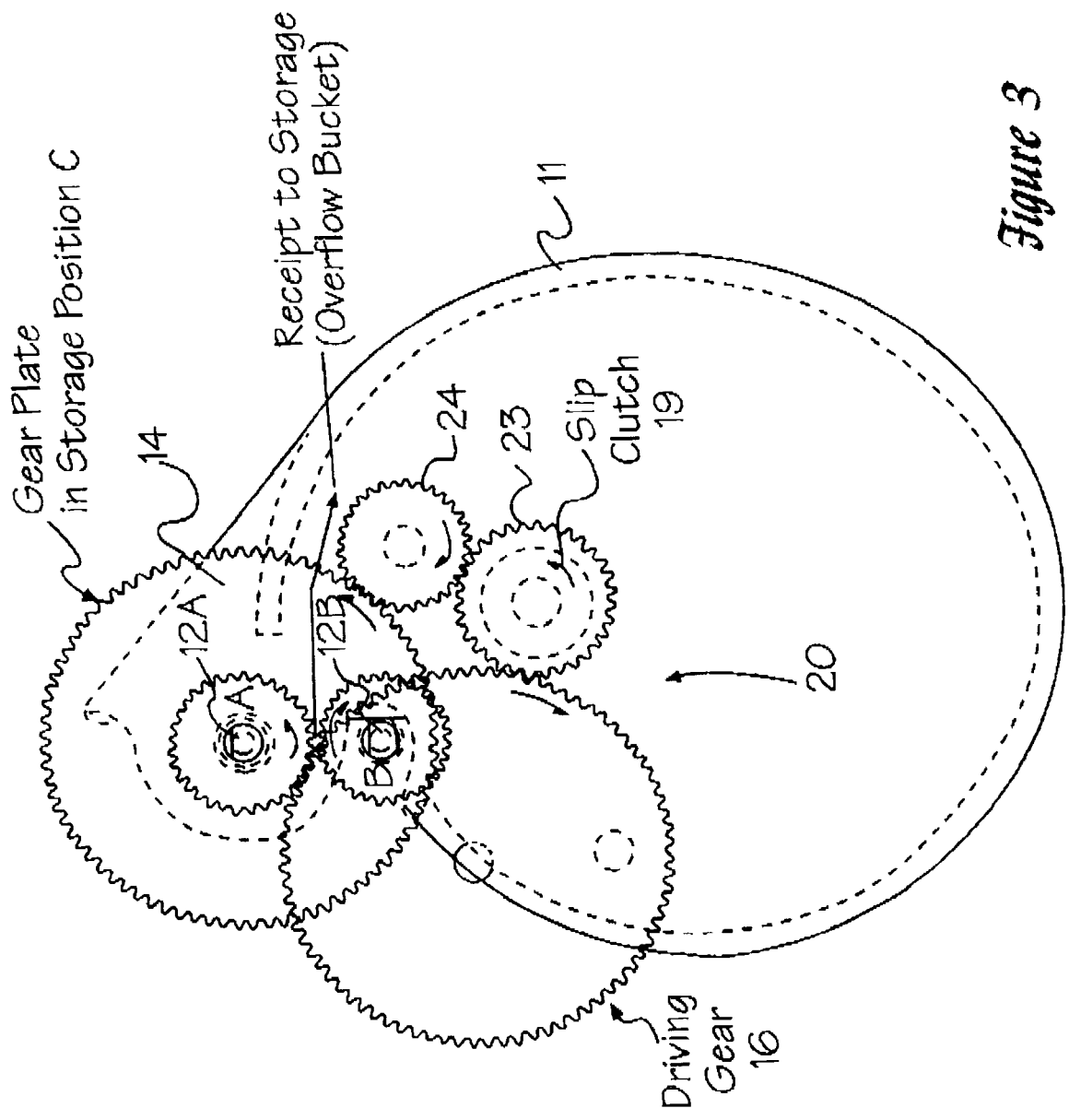
Gear Plate
in Storage Position C
14
Receipt to Storage
(Overflow Bucket)
11
24
23
Slip
Clutch
19
12A
12B
A
B
C
20
Driving
Gear
16

Figure 3

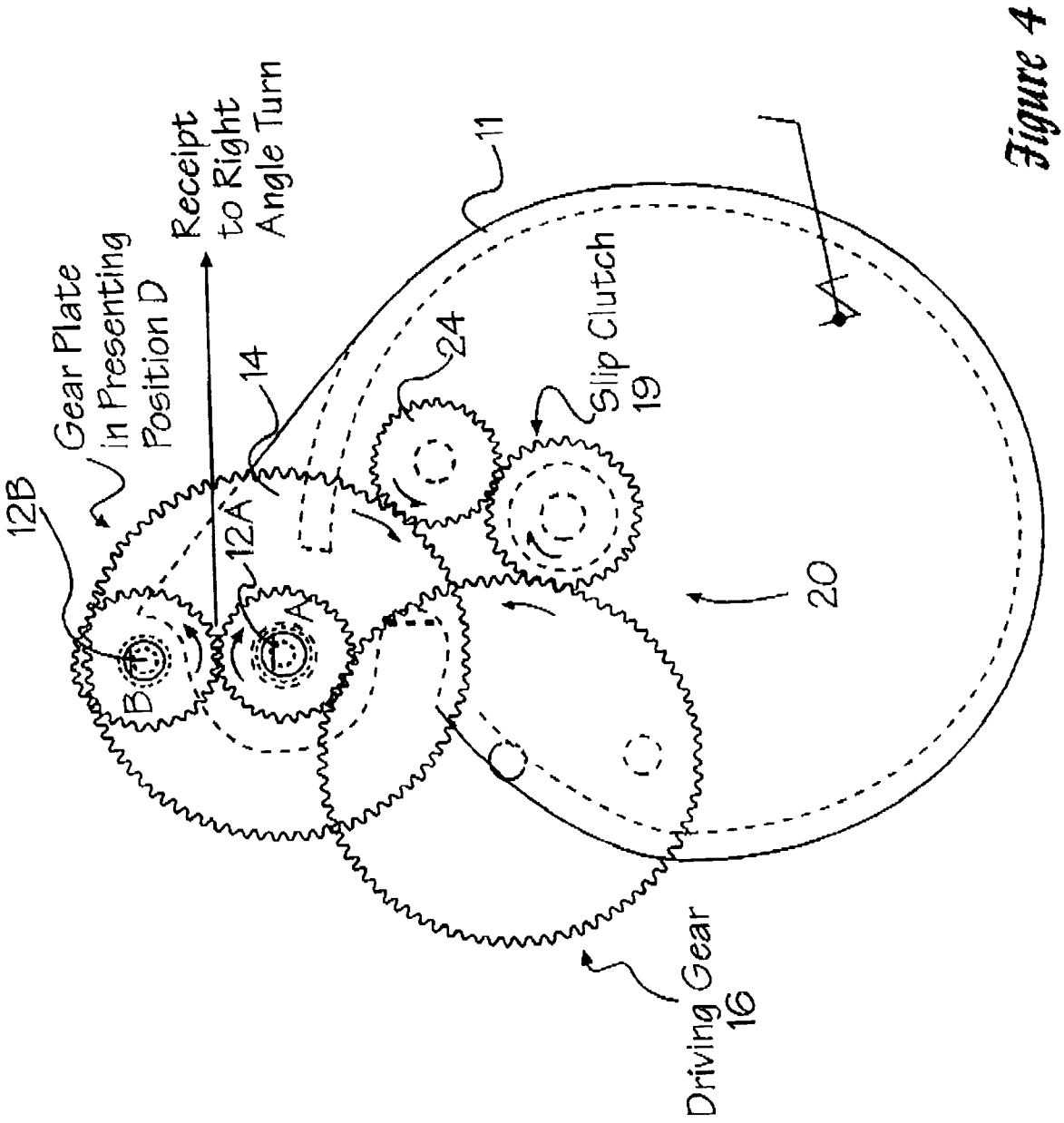
Gear Plate
in Presenting
Position D
Receipt
to Right
Angle Turn
14
11
24
Slip Clutch
19
12B
12A
B
A
20
Driving Gear
16

Figure 4

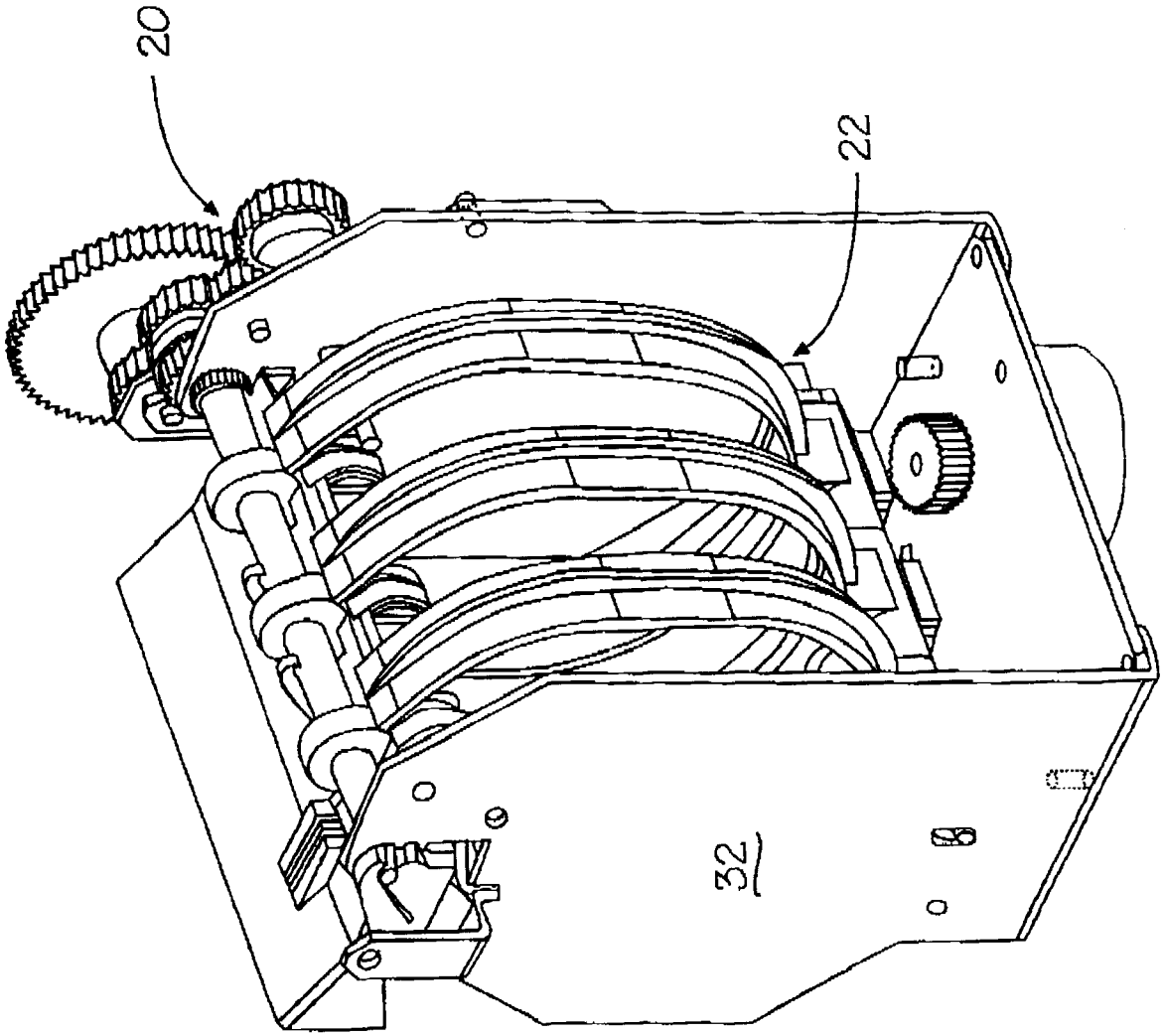

Figure 5A

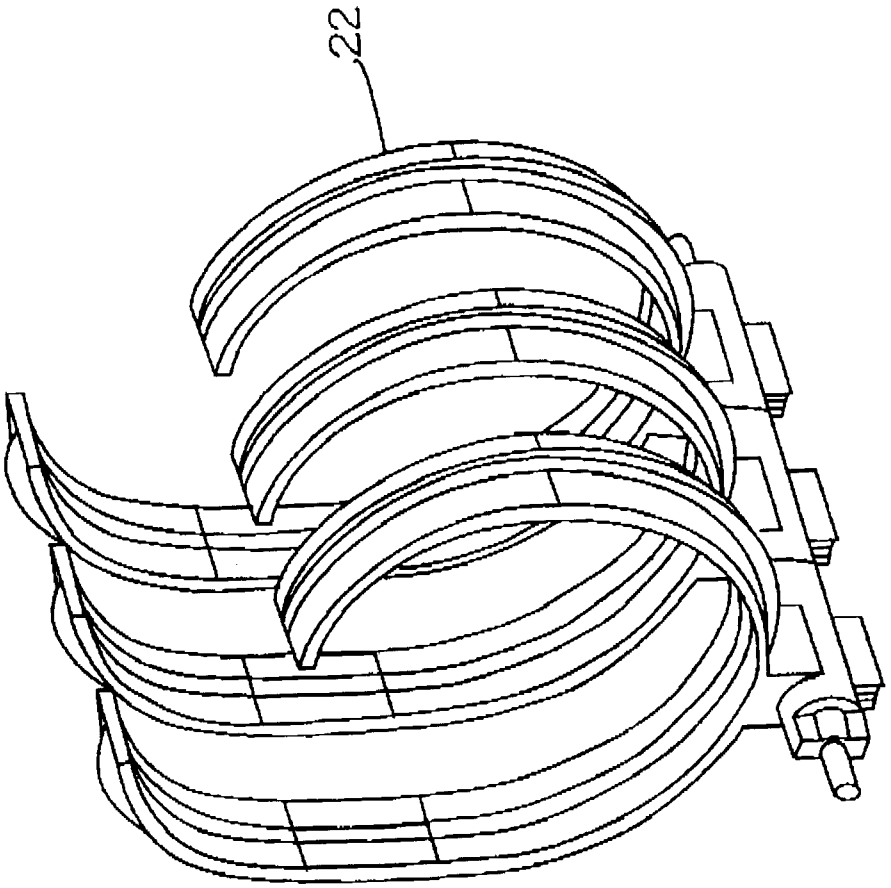

Figure 5B

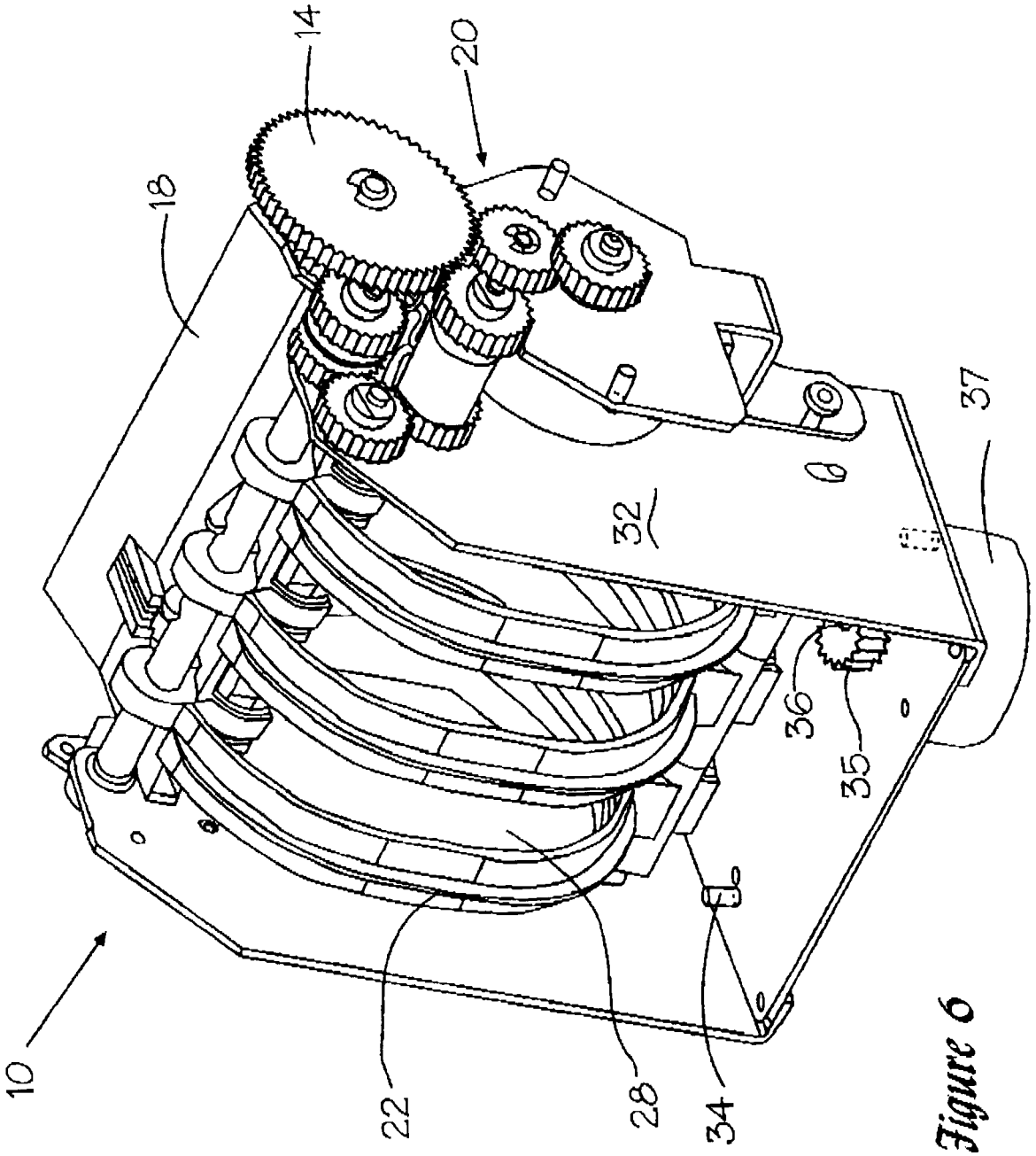

Figure 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 40 3157

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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X	FR 2 751 315 A (CANON KK) 23 January 1998 * page 28, line 4 - line 11; figure 8A * * page 39, line 8 - page 40, line 6; figure 18 *	1-3,12, 13,17-20	
A	* page 42, line 4 - line 13 *	7	
A	PATENT ABSTRACTS OF JAPAN vol. 009, no. 114 (M-380), 18 May 1985 & JP 60 002549 A (TOYO GOMU KOGYO KK), 8 January 1985 * abstract; figures *	1,7,12, 20	
A	US 5 201 517 A (STEMMLE DENIS J) 13 April 1993 * column 8, line 56 - column 9, line 16 *	1,7,12, 20	
A	EP 0 409 809 A (INTER INNOVATION AB) 23 January 1991		TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 May 1999	Thibaut, E

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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