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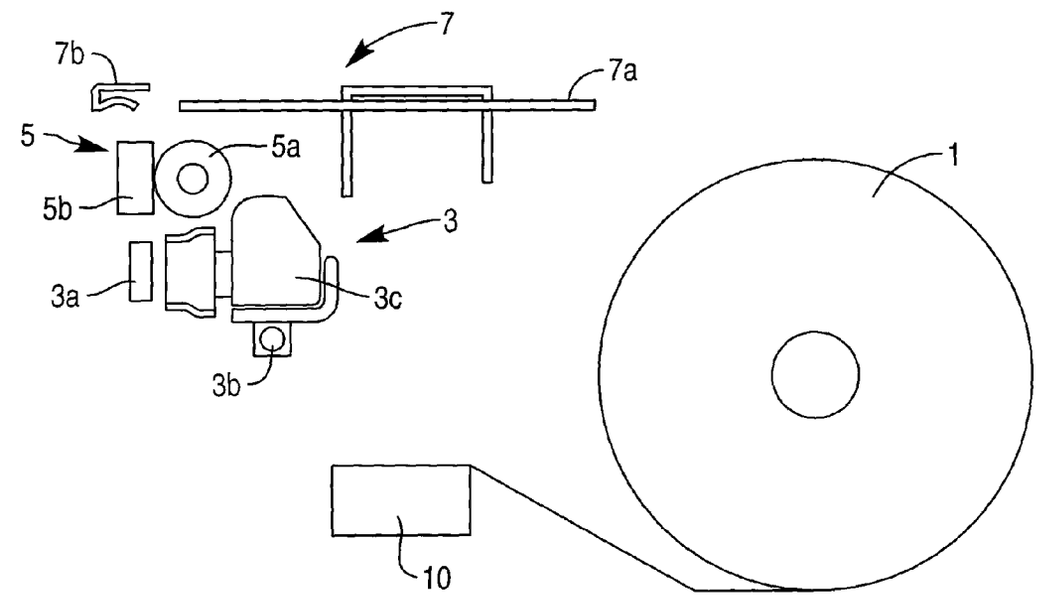
(54) Cash register with receipt printing

(57) This invention provides a cash register capable of fully exploiting the space available on a strip of paper delivered as a receipt, thereby ensuring effective use of a roll of sheet paper used for printing of receipts and avoiding the wasteful use thereof.

A cash register provided by this invention includes a sheet feed unit arranged to pull a strip of paper from a roll of sheet paper 1 stored in a paper storage section, first and second printing apparatuses (3,5) arranged respectively to print data on the front and rear sides of the strip of paper fed thereto, a control means (30) arranged to control the printing of data by respective printing apparatuses (3,5), and a cutting unit (7) arranged to cut the strip of paper having data printed thereupon from the remainder of the roll.

FIG. 1



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Description

[0001] This invention relates to a cash register.

[0002] A cash register conventionally used in retail shops incorporates a printing apparatus to print various kinds of information on a receipt to be delivered at every purchase. The type of printing mode used in such a printing apparatus includes dot-impact printing, line-thermal printing and ink-jet printing. A conventional cash register, on delivery of a receipt in respect of a purchase, records, on one side only of the receipt, sales data and data including advertisement of the shop in the form of characters and graphics. With a conventional machine, the printing apparatus, being housed in the register body at a position permitting easy replacement, prints on paper in the form of a roll sheet fed by a paper feed unit. The sheet of paper, on completion of printing, is cut at a position chosen as appropriate, and the resulting strip of paper is dispensed from the cash register to be handed to the customer as a receipt.

[0003] There has recently been a trend towards making use of the rear side of a receipt as an advertising medium by printing in advance data such as advertising material on the rear side ofa roll of sheet paper. Advertising data used for this purpose is printed in lines with a specific interval inserted between adjacent lines to enhance advertising effects, and the cutting position is arranged to occur at a multiple of that line interval so that an advertisement on the rear side is not interrupted midway through the advertisement. Alternatively, the interval between adjacent printing lines representing an advertisement is arranged to be equal to or less than half the minimum length of a receipt strip, so that, at whatever position a roll of sheet paper may be cut, one advertisement always remain intact on the receipt strip.

[0004] With a conventional cash register, when a customer purchases a large number of goods, the merchandise data increases and the register must produce a long receipt strip in proportion to the quantity of merchandise data to be printed. This causes the time required for delivery of the receipt to be increased, and the customer to receive a receipt strip too long to be handled conveniently, which may lead to lowering of services. Delivery of long strips of receipt paper may also lead to the increased consumption of rolls of sheet paper, increase of the running cost (cost required from paper consumption), and wasteful use of natural resources.

[0005] In another aspect, with a conventional cash register, when a roll of sheet paper in which advertising data has been printed on its rear side is used for printing of receipts, there are problems as described below.

[0006] If, according to the scheme as described above, advertising data is printed in lines with a specific interval between adjacent lines, and a strip of receipt paper is cut at a multiple of that interval, the receipt paper may become unnecessarily long as compared with the merchandise data printed on the front side, which may cause the increase of running cost as a result of increased paper consumption. Conversely, if a strip of receipt paper is cut at a position solely dependent on the data quantity on the front side, regardless of the interval of adjacent lines in which advertising data is printed on the rear side, the advertisement data on the rear side may be interrupted midway, which may reduce the advertising effect of this data. As a result, the purchaser may become uninterested in data on the rear side, and thus this data will not function as an advertisement. According to the other scheme described above in which the interval between adjacent lines in which advertising data is printed is made equal to or less than half the minimum length of a receipt strip, only advertisement data with a limited quantity is permitted for printing.

[0007] In addition, because, as mentioned above, advertising data printed on the rear side of a paper roll has been printed in a factory where rolls of sheet paper are produced, it must carry data current at a time preceding by several weeks or several months the date when the purchaser will receive the data via a receipt, and thus the paper roll could not carry the newest data relative to the date when the receipt is printed. Furthermore, because data printed on the rear side can not be altered according to the time and date of purchase, the type of customer (e.g. age and sex), and the purchased goods, the rear side of a receipt strip can carry only general information applicable to all customers. Still further, if data is outdated, for example, if data is related to a campaign lasting for a limited period, or with withdrawal of sale of certain goods, the rolls of sheet paper carrying such data will become useless after the lapse of a certain period, which may lead to wasting of paper.

[0008] It is an object of the present invention to provide a cash register which alleviates the problems and disadvantages of known cash registers as described above.

[0009] According to the invention, there is provided a cash register including:

sheet feed means arranged to feed paper from a roll of paper stored in a paper storage section, characterized by first and second printing apparatuses, arranged to print respectively on the front and rear sides of paper fed thereto,
control means arranged to control operation of the printing apparatuses and cutting means arranged to separate a strip printed on both sides from the remainder of the roll of paper.

[0010] Embodiments of the invention will now be described by way of example with reference to the accompanying drawings, in which:-

Fig. 1 shows a first embodiment of this invention and is a side view of the printing area of a first cash register;
Fig. 2 is a perspective view of the printing area as

depicted in Fig. 1;
Fig. 3 is a block diagram of control means for controlling the operation of the cash register;
Fig. 4 shows a second embodiment of this invention and is a side view of the printing area of a second cash register;
Fig. 5 is a perspective view of the printing area as depicted in Fig. 4;
Fig. 6 shows a third embodiment of this invention and is a side view of the printing area ofa third cash register; and
Fig. 7 is a perspective view of the printing area as depicted in Fig. 6.

[0011] As described earlier, the cash register of this invention is characterized by incorporating two printing apparatuses capable of printing on the front and back sides of a roll of sheet paper which is used for printing of receipts. With this machine, the printing apparatuses installed may take any combinations of printing modes as appropriate. The attached drawings are exclusively concerned with the printing area of the cash register in question, that is to say with the mechanisms concerned with printing data on the front and rear sides of a roll of sheet paper and with dispensing the paper. The drawings omit the details of the remaining known parts of the cash register.

[0012] Referring to Figs. 1 and 2, on the downstream side of a roll of sheet paper 1 stored in a paper storage section there are positioned a platen 3a and, opposite to the platen, an ink-jet printing apparatus 3 (first printing apparatus) equipped with an ink-jet head 3c which slides along a guide rail 3b and which is driven by a driving means (not shown). A paper strip pulled from the roll of sheet paper 1 is fed in a vertical direction by roller means 25 (Fig.3), and passes between the platen 3a and the head 3c, so as to have one side printed thereon.

[0013] Positioned above and on the downstream side of the printing apparatus 3 are a feed roller 5a and, opposite to the roller 5a, a printing apparatus 5 (second printing apparatus) equipped with a thermal transfer head 5b. The strip of paper, having one side printed on by the first printing apparatus 3, has the other side printed on by this printing apparatus 5.

[0014] On the downstream side of second printing apparatus 5, there is positioned a cutting unit having a cutter assembly 7a and a cutter stopper 7b, this cutting unit serving to separate the strip ofpaper having both sides printed from the remainder ofthe roll of paper. The resulting cut strip of paper is dispensed from the cash register and serves as a receipt.

[0015] An electro-stamp 10 may be inserted between the paper storage section and the first printing apparatus 3, so that a predetermined message (for example, a logo of the shop or greeting from the shop, etc.) can be printed on part of receipt to be dispensed.

[0016] Referring to Fig. 3, operation of the printing apparatuses 3 and 5 is controlled by a CPU 30. To the CPU 30 are connected a ROM 11 for storing calculation programs and numerical data, and a RAM 12 for temporarily storing data related, for example, to advertisements. To the CPU 30 are further connected, through an interface 15, a first head controller 21 arranged to activate the head 3c of the first printing apparatus 3, and a second head controller 22 arranged to activate the head 5b of the second printing apparatus 5. Also connected to the CPU 30, through a receipt printer controller 28, are the electro-stamp 10, sheet conveying roller means 25 for feeding paper pulled from the roll of paper stored in the paper storage section, and the cutting unit 7. These various elements controlled by the CPU 30 constitute a receipt printer 20 for printing data on a roll of sheet paper.

[0017] To the CPU 30 are also connected, through the interface 15, an input feeding unit 31 for entering necessary data via key operation, or by a barcode scanner, etc., a display unit 32 for displaying calculation results or the like, and a journal printer controller 33 connected to a journal printer.

[0018] A series of operations performed by the cash register described above will be described below.

[0019] Firstly, merchandise data (i.e. data specifically relating to purchased goods, typically price and description thereof) is entered via the input feeding unit 31; prices of purchased goods are calculated in accordance with a program stored in ROM 11, and the results are displayed, in order, on the display unit 32. In parallel with this operation, a roll of sheet paper is moved to receive printed information under the control of the receipt printer controller 28. A strip of paper fed from the roll of paper 1 has merchandise data printed under the control of the first head controller 21 on one side, and has printed on the other side data other than merchandise data (advertisement data or the like) which has been obtained from the RAM 12 under the control of the second head controller 22. After having undergone these printing operations, the strip of paper is separated from the remainder of the roll by the cutting unit 7 which is operated under control of a timing signal signifying the end of printing, and the cut strip is dispensed to serve as a receipt.

[0020] With the machine described above, it is possible to store in advance plural clusters of data having different printing lengths in the RAM 12, and to allow the CPU 30 to select, in accordance with the length of merchandise data printed by the first printing apparatus 3, a cluster of data of appropriate length printed by the second printing apparatus 5. Alternatively, the CPU 30 may select an appropriate cluster of data in terms of its content according to the purchaser, time of purchase, goods purchased, and instruct the second printing apparatus to print it. In the latter case, selection of a most appropriate cluster of data may take place based on information obtained from the sold goods, or on information deliberately fed via the input feeding unit 31.

[0021] The machine described above has the following advantages.

[0022] Because it incorporates two printing apparatuses, the machine can record data on both sides of receipt paper which ensures full exploitation ofthe space available on the paper. The machine can print on the rear side of receipt paper data most appropriate in accordance with the merchandise data on the front side of the paper, which enhances the advertising effect of rear-side data. With this machine, it is also possible to provide the CPU 30 with a function to compress/extend data in the feed direction of the roll of paper when data related to advertising is printed on the rear side. This arrangement would make it possible to print any given cluster of data including advertising material fully in an available space of receipt paper, so as to effectively print data in a limited space.

[0023] In another aspect, with this machine, because the RAM 12 can store various types of data having different lengths such as periods, dates, types of purchasers, etc., it is possible to print, non-merchandise data after the length of merchandise data on the front side is determined, thereby enabling the printing of advertising data with an appropriate length in accordance with the length of receipt paper without any interruptions intervened. As a result, it is possible to fully exploit the rear space of receipt paper.

[0024] In a still further aspect, with this machine, the previous printing of advertising data on the rolls of sheet paper becomes unnecessary, which will, besides reducing the cost, permit continuous supply of most recent information, which will dispense with the need for disposal of outdated rolls of sheet paper and in turn contribute to the lowering of cost.

[0025] The machine may have different configurations from that described above. For example, the second printing apparatus responsible for printing on the rear side of the paper may print part of the merchandise data to be printed by the first printing apparatus 3. Namely, the first printing apparatus 3 may print, on the front side of the paper, half the merchandise data including a detailed specification of the purchased items, and the second printing apparatus 5 may print the remaining half of the merchandise data on the rear side of the paper. With this modification, it is possible to reduce the consumption of paper necessary for printing data of a transaction to about half, which will reduce the cost involved in paper consumption, and will contribute to the preservation of the environment because of reduced consumption of paper resources. In a further aspect, because the length of the receipt paper is half that of a conventional receipt, handling of the receipt becomes easier which will lead to the improvement of services. In a still further aspect, because time required for printing of a receipt is reduced, the operation time required for the purchase of each customer will be reduced which will contribute to the lowering of personnel cost and to the improvement of services.

[0026] Other embodiments of this invention will now be described. With regard to the embodiments given below, the same reference numerals will be used for the parts corresponding with those of the first embodiment, and their detailed description will be omitted.

[0027] With the embodiment shown in Figs. 4 and 5, the head 5b of the second printing apparatus 5 (thermal head printing apparatus) of the first embodiment is moved to a position opposite to that of the first embodiment, and a first printing apparatus (represented by numeral 9) placed upstream of the second printing apparatus 5 operates in dot-impact mode. The first printing apparatus 9 comprises a platen 9a, and a dot-matrix head 9c which, placed opposite to the former, will slide along a guide rail 9b driven by a driving means (not shown), so that the head 9c prints on the side opposite to the one on which the head 5b of the second printing apparatus prints. Of course, printing ofmerchandise data may be performed by either one of the two printing apparatuses. This machine will have the same advantages as obtained from the above embodiment.

[0028] With the embodiment shown in Figs. 5, 6 and 7, the second printing apparatus 3 operates in ink-jet mode. With this embodiment, as no thermal head is employed for either of the two printing apparatuses, it is preferred to place a feed roller assembly 50, for example, downstream of the second printing apparatus 3 so that precise transportation of paper may take place. The machine of this embodiment has the same advantages as are obtained from the first two embodiments.

[0029] While three embodiments of this invention have been described above, it should be understood that further modifications may be made. For example, the two printing apparatuses may be spaced apart horizontally rather than vertically. Also, although with the first embodiment described the first printing apparatus 3 prints merchandise data on the front side of the paper while the second printing apparatus 5 prints advertising data on the reverse side, the roles of the first and second printing apparatuses 3 and 5 may be exchanged.

[0030] As seen from the above discussion, the present invention provides a cash register which incorporates two printing apparatuses arranged to print on both sides ofa paper receipt making it possibly to fully exploit the space available on the receipt. In another aspect, because the machine makes it unnecessary to previously print data on a roll of sheet paper to be used for receipts, effective use of a roll of sheet paper becomes possible.

Claims

1. A cash register including:

sheet feed means (25) arranged to feed paper from a roll of paper stored in a paper storage section, characterized by

first and second printing apparatuses (3,5) arranged to print respectively on the front and

rear sides of paper fed thereto,
control means (30) arranged to control operation of the printing apparatuses (3,5), and
cutting means (7) arranged to separate a strip printed on both sides from the remainder of the roll of paper 1.

2. A cash register according to claim 1, characterized in that under the control of said control means (30) said one printing apparatus (3) is arranged to print merchandise data, and said other printing apparatus (5) is arranged to print data other than merchandise data.

3. A cash register according to claim 2, characterized in that under the control of said control means (30) said other printing apparatus (5) is arranged to print an appropriate length of data in dependence on the length of merchandise data printed by said one printing apparatus (31).

4. A cash register according to claim 1, characterized in that under the control of said control means (30) said one printing apparatus (5) is arranged to print part ofthe merchandise data, and said other printing apparatus(5) is arranged to print the remaining part of the merchandise data.

FIG. 1

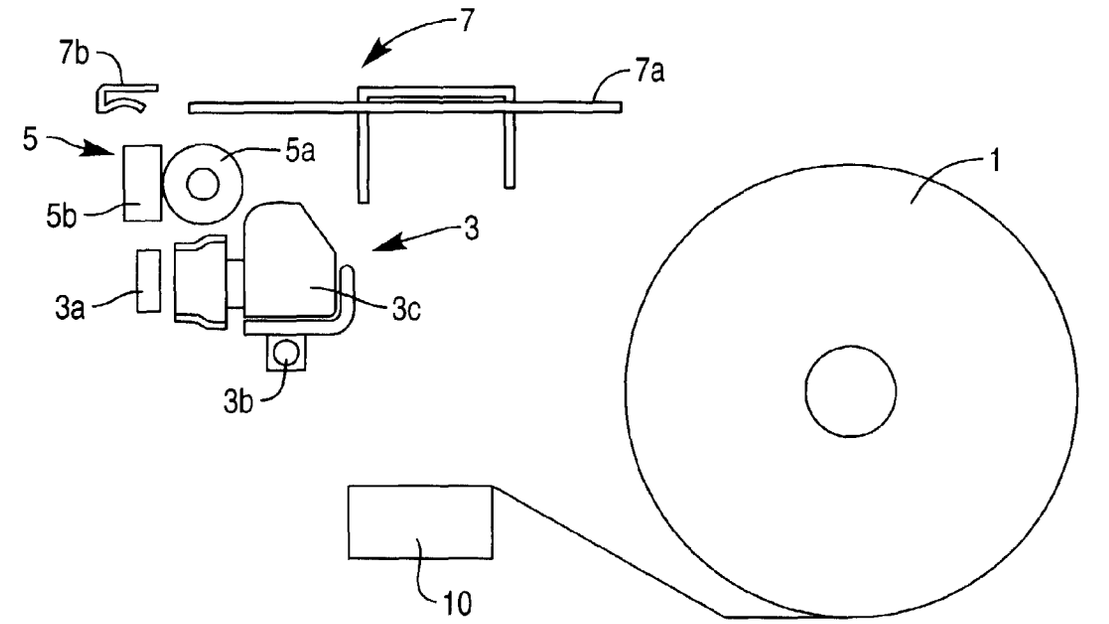

FIG. 4

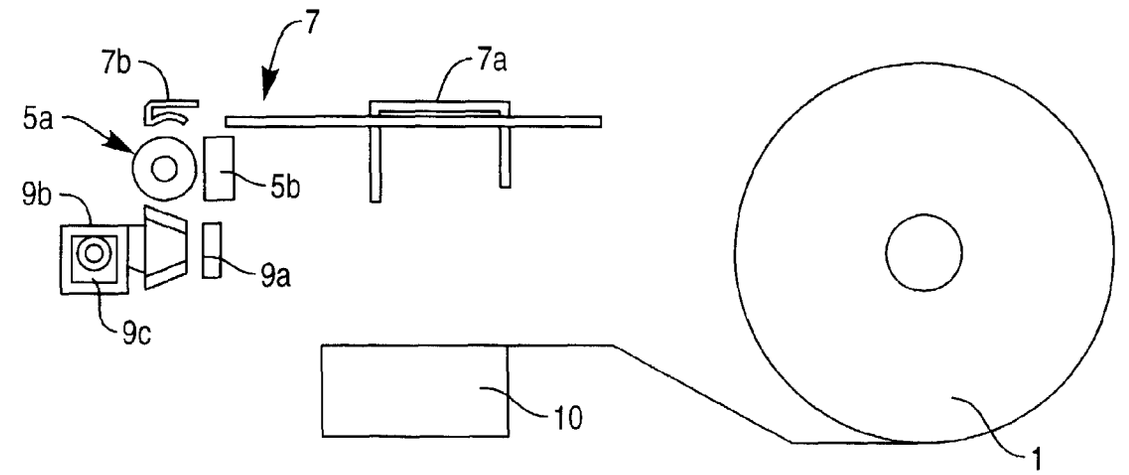

FIG. 2

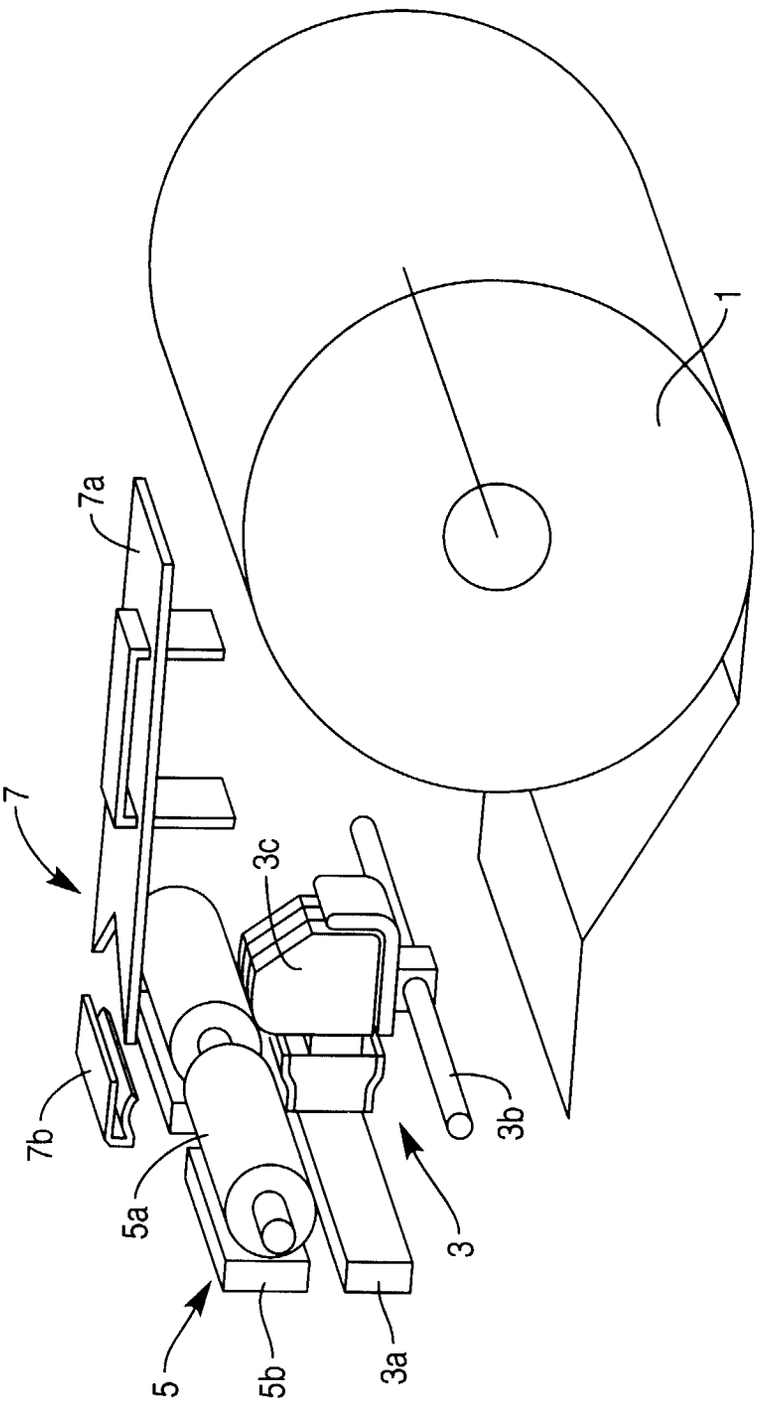

FIG. 3

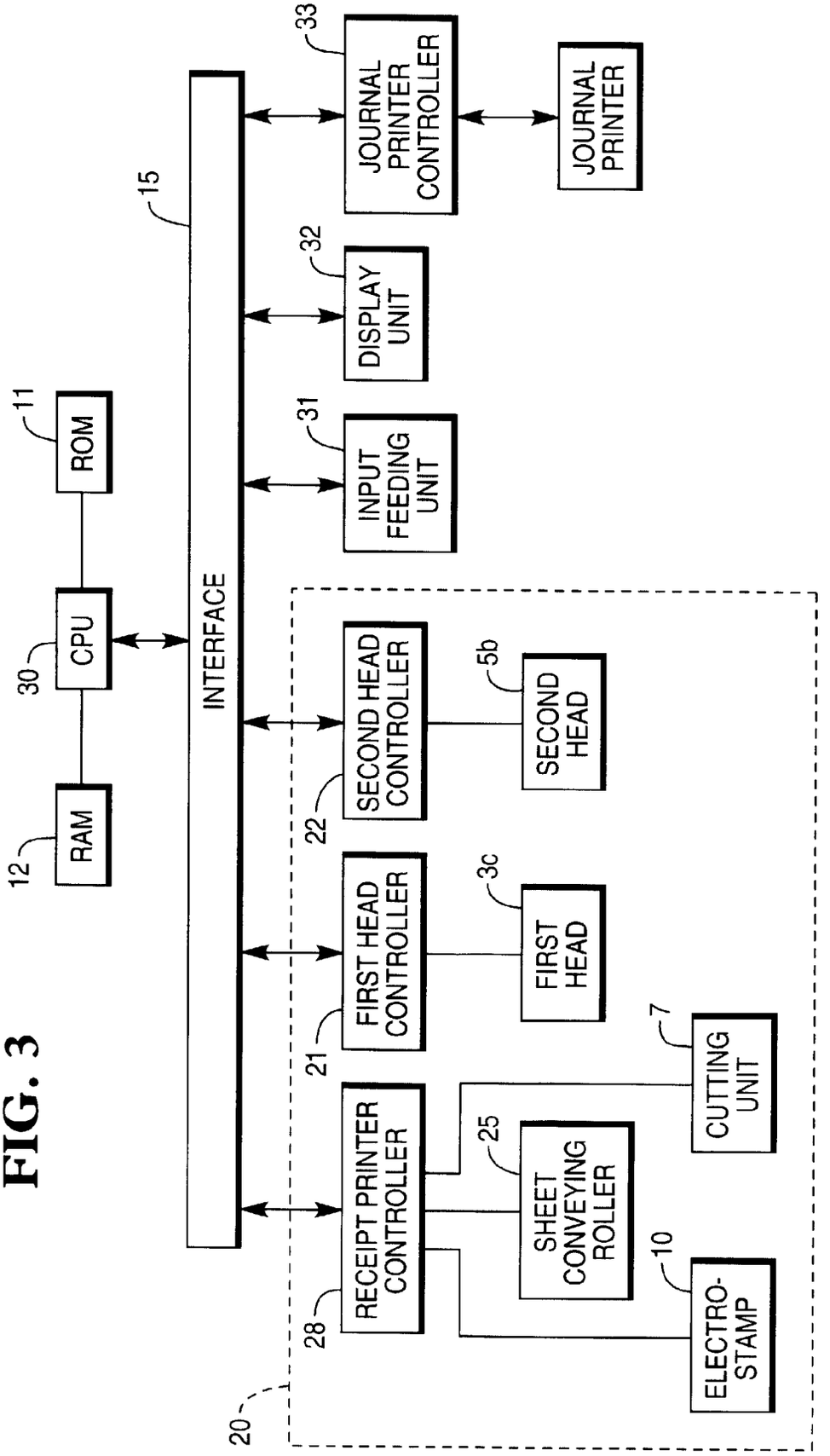
ROM
11
CPU
30
RAM
12
INTERFACE
15
JOURNAL PRINTER CONTROLLER
33
JOURNAL PRINTER
DISPLAY UNIT
32
INPUT FEEDING UNIT
31
SECOND HEAD CONTROLLER
22
SECOND HEAD
5b
FIRST HEAD CONTROLLER
21
FIRST HEAD
3c
RECEIPT PRINTER CONTROLLER
28
SHEET CONVEYING ROLLER
25
CUTTING UNIT
7
ELECTRO-STAMP
10
20

FIG. 5

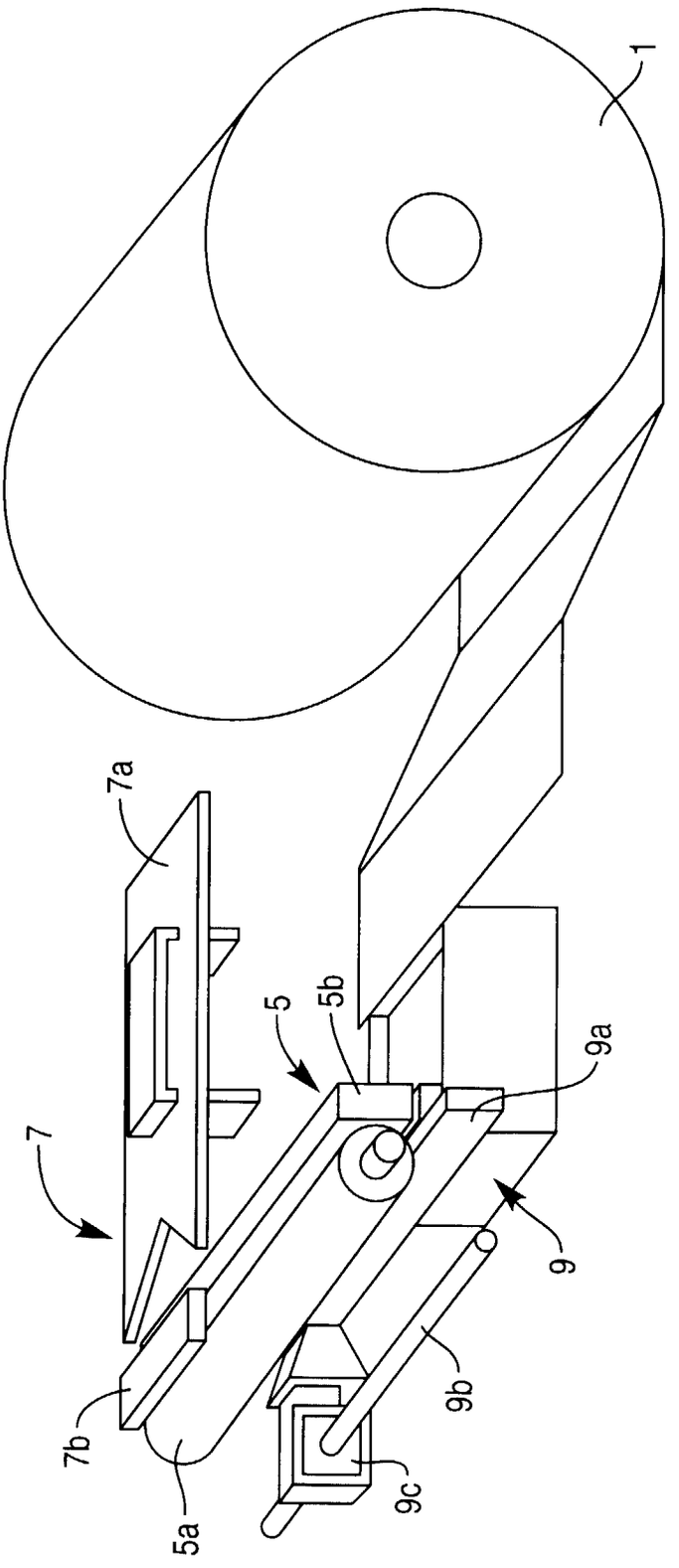

FIG. 6

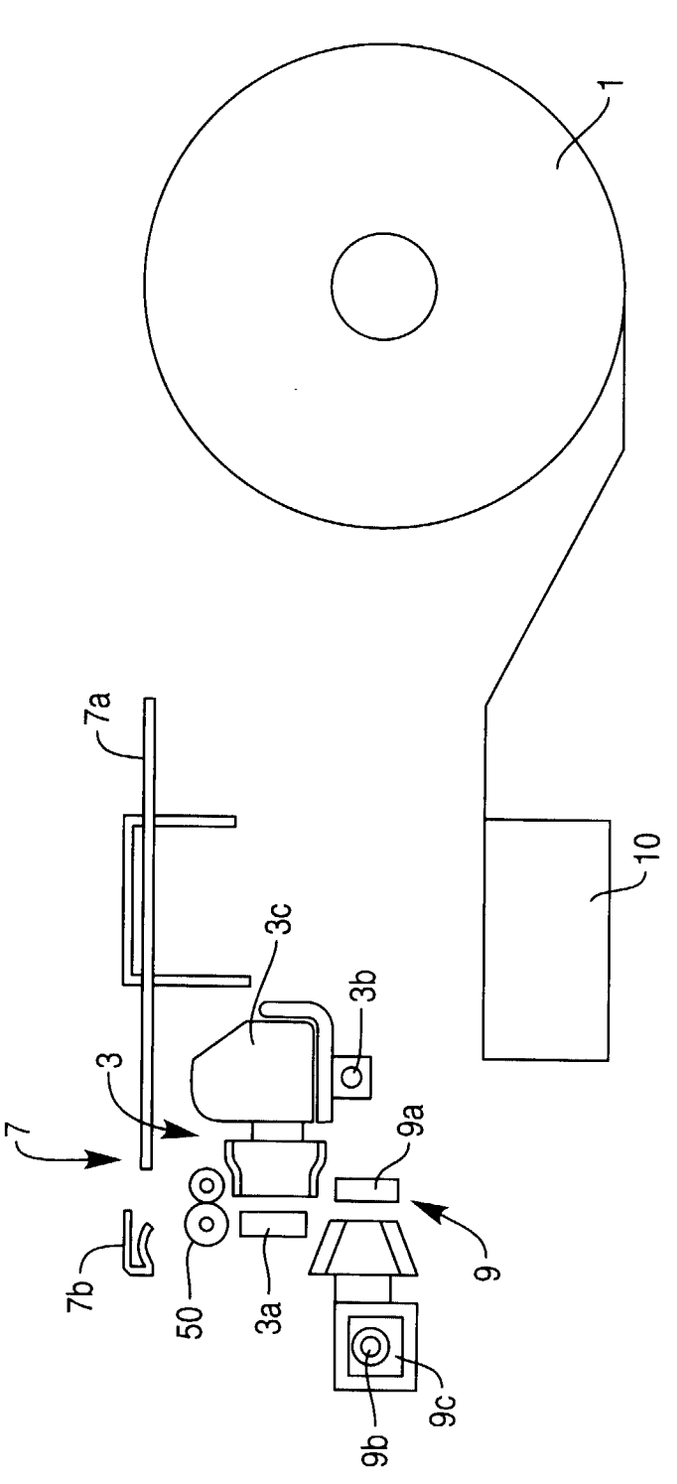

FIG. 7