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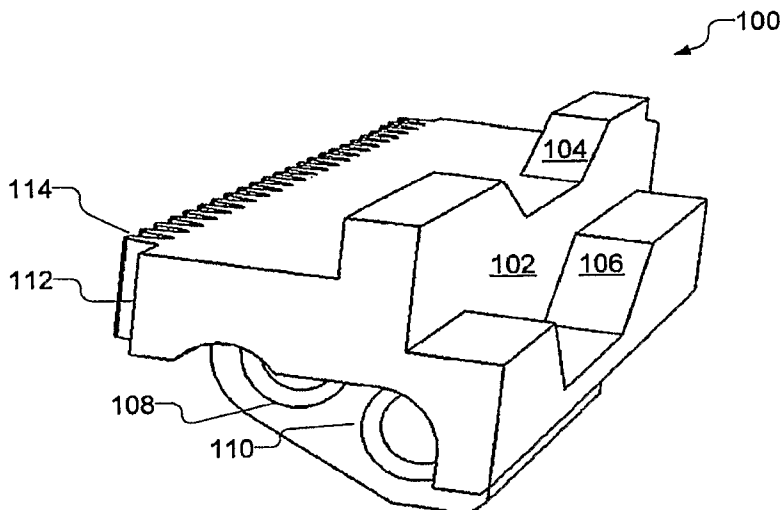
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(54) Title: **LINEAR CAM FOR POSITIONING CONTROL IN A PRINTER**



(57) Abstract: A linear cam for a multimedia printer which is used for positioning control of a print head and/or an eraser bar to accommodate varying thicknesses in rewritable cards, and to come into contact or prevent contact with a rewritable card whereby the linear cam may raise or lower a print head and/or eraser bar. The linear cam may be coupled to a control motor which may be utilized to drive the linear cam into one or a plurality of predefined card positions, each predefined card position being utilized to correctly adjust and position the print head, eraser bar, or combination of such.

LINEAR CAM FOR POSITIONING CONTROL IN A PRINTER

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 60/815,663 filed June 22, 2006, the contents of which are hereby incorporated by reference as if fully stated herein.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] This invention relates to printers that print financial transaction records such as gaming vouchers, promotional coupons, and gift cards, more specifically to a linear cam in such a printer which is utilized for positioning control of a print head and/or eraser bar within the printer whereby the linear cam raises and lowers the print head, eraser bar, or combination of such to accommodate varying thicknesses of a rewritable card within the printer, and to come into contact or prevent contact with a rewritable card.

Background

[0003] There currently exists a variety of printers that accept different types of rewritable media for reading, printing, encoding, and/or erasing. A problem with some of these printers is if an incorrect type of media is inserted into the printer, damage to the print head and/or eraser bar may occur. Another problem with some of these printers is that they are restricted to accept only a certain thickness of a rewritable card.

[0004] This invention offers a solution to these problems by providing a linear cam which is used to adjust and position the print head and/or eraser bar to prevent such from contact with a rewritable card and to accommodate varying thicknesses of a rewritable card within the printer.

DEFINITIONS

[0005] For the purposes of this document the following definitions apply:

[0006] "Rewritable Card" – media for reading and/or writing such as media with a magnetic stripe, media with a layer of writable and erasable thermally sensitive film, media

containing radio frequency active, passive, or both elements, a smart card, thermal reversible media, RF fiber media, or write once media.

[0007] “Multi-media Printer” – a device used to print and/or encode a rewritable card and erase a rewritable card.

[0008] “Host System” – any collection of components that work together to perform a task. One example is a gaming system such as a slot machine in a casino. Other examples include a computer network, a server or multiple servers, a computer connected to a network, a stand-alone computer, a handheld device, or a wireless device used for application and data storage, data processing, and file transfers.

[0009] “Printer Controller” – a device internal or external to a printer which controls print jobs and receives and/or transmits data, among other functions.

SUMMARY OF THE INVENTION

[0010] A linear cam for a multi-media printer which is used for positioning control of a print head and/or an eraser bar to accommodate varying thicknesses in rewritable cards, and to come into contact or prevent contact with a rewritable card whereby the linear cam may raise or lower a print head and/or eraser bar is provided. The linear cam may be coupled to a control motor which may be utilized to drive the linear cam into one or a plurality of predefined card positions, each predefined card position being utilized to correctly adjust and position the print head, eraser bar, or combination of such. The card positions may be determined from linear position sensors (not shown) that measure the linear position of the linear cam, by rotary encoders on the control motor or gears, or the like.

[0011] In one aspect of the invention, a linear cam for a multi-media printer may be removably and slidably coupled to one or a plurality of supporting shafts, each shaft may be removably and slidably coupled to one or a plurality of mounting tabs, each mounting tab may be coupled to the printer lid, the printer lid may be coupled to the print mechanism casing.

[0012] In another aspect of the invention, a linear cam for a multi-media printer may be coupled to a control motor by way of one or a plurality of gears.

[0013] In another aspect of the invention, a linear cam for a multi-media printer may be coupled to a print head whereby the linear cam may adjust and position a print head to accommodate varying thicknesses of rewritable cards, depending on the thickness of the

rewritable card, to come into contact with a rewritable card, and/or prevent the print head from contact with the rewritable card.

[0014] In another aspect of the invention, a linear cam for a multi-media printer may be coupled to an eraser bar whereby the linear cam may adjust and position an eraser bar to accommodate varying thicknesses of rewritable cards, depending on the thickness of the rewritable card, to come into contact with a rewritable card, and/or prevent the eraser bar from contact with the rewritable card.

[0015] In another aspect of the invention, a linear cam for a multi-media printer, the linear cam may be coupled mechanically, removably, slidably, or by a combination of any or all.

[0016] In another aspect of the invention, a plurality of linear cams for a multi-media printer, each linear cam may be coupled to an eraser bar and to each print head in the printer when the printer includes a plurality of print heads.

[0017] In another aspect of the invention, a linear cam for a multi-media printer may be coupled to one or a plurality of predefined card positions.

[0018] In another aspect of the invention, a multi-media printer may include a multi-media printer module, one or a plurality of linear cams, one or a plurality of print heads, an eraser bar, one or a plurality of control motors, one or a plurality of gears, a printer controller, a scanning mechanism, memory, procedures, and program instructions, among others.

[0019] In another aspect of the invention, procedures, programming instructions, memory, a control motor, a combination of such, or a combination of any may be used to determine card positions within the multi-media printer.

[0020] In another aspect of the invention, procedures, programming instructions, memory, a control motor, a combination of such, or a combination of any may be used to actuate a linear cam into one or a plurality of predefined card positions to adjust and position one or a plurality of print heads to come into contact with a rewritable card, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0021] In another aspect of the invention, procedures, programming instructions, memory, a control motor, a combination of such, or a combination of any may be used to actuate a linear cam into one or a plurality of predefined card positions to adjust and position

an eraser bar to come into contact with a rewritable card, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0022] In another aspect of the invention, procedures, programming instructions, memory, a control motor, a combination of such, or a combination of any may be used to actuate a linear cam into one or a plurality of predefined card positions to simultaneously adjust and position one or a plurality of print heads and an eraser bar to come into contact with a rewritable card, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0023] In another aspect of the invention, procedures, memory, and programming instructions may be used as a timing mechanism to actuate a linear cam to adjust and position one or a plurality of print heads to come into contact with a rewritable card, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0024] In another aspect of the invention, procedures, memory, and programming instructions may be used as a timing mechanism to actuate a linear cam to adjust and position an eraser bar to come into contact with a rewritable card, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0025] In another aspect of the invention, procedures, memory, and programming instructions may be used as a timing mechanism to actuate a linear cam to simultaneously adjust and position one or a plurality of print heads and an eraser bar to come into contact with a rewritable card within a printer, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0026] In another aspect of the invention, a linear cam may be coupled to a magnetic head, the magnetic head may encode, read and/or write a magnetic stripe of a rewritable card wherein the magnetic stripe allows information to be written and read electronically, the information used either alone or in combination with other information, such as that from an RFID chip or tag, or thermally sensitive film, among others.

[0027] In another aspect of the invention, a linear cam may be coupled to a thermal print head, the thermal print head may print the thermally sensitive film of a rewritable card wherein the thermally sensitive film allows information to be written and read electronically and/or visually read, the information used either alone or in combination with other information, such as that from a magnetic stripe or RFID chip or tag, among others.

[0028] In another aspect of the invention, a linear cam may be coupled to a RFID print head, the RFID print head may encode, read and/or write an RFID chip, tag, or other radio frequency technology of a rewritable card wherein the RFID allows information to be written and read electronically, the information used either alone or in combination with other information, such as that from a magnetic stripe of a rewritable card or thermally sensitive film, among others.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description and accompanying drawings where:

[0030] FIG. 1 is an isometric view of a linear cam in accordance with an exemplary embodiment of the present invention;

[0031] FIG. 2 is a perspective drawing of a linear cam and a plurality of shafts in accordance with an exemplary embodiment of the present invention;

[0032] FIG. 3 is a top and side perspective view of a linear cam and other components in a multi-media printer in accordance with an exemplary embodiment of the present invention;

[0033] FIG. 4 is a block diagram of a multi-media printer in accordance with an exemplary embodiment of the present invention; and

[0034] FIG. 5 is a process diagram describing the adjustment to print head and eraser bar process in accordance with an exemplary embodiment of the present invention.

DETAILED DESCRIPTION

[0035] Referring now to both Fig. 1 and FIG. 2 where FIG. 1 is an isometric view of a linear cam in accordance with an exemplary embodiment of the present invention and FIG. 2 is a perspective drawing of the linear cam mounted on a plurality of shafts in accordance with an exemplary embodiment of the present invention. A first side 102 of a linear cam 100 includes a plurality of cam profiles, such as cam profiles 104 and 106. The cam profiles are used for positioning control of respective print heads (not shown) and eraser bars (not shown) as later described in detail in FIG. 3.

[0036] The linear cam 100 further includes a plurality of apertures, such as apertures 108 and 110, extending through the body of the linear cam 100. One or more of the apertures

receives a shaft, such as shaft 200 or 202, that is removably and slidably coupled to the linear cam 100. Each shaft end may be coupled to a mounting tab as later disclosed in detail in FIG. 3.

3. A second side 112 of the linear cam 100 includes a plurality of teeth creating a rack or linear gear 114 by which the linear cam 100 is coupled to a rotary gear (not shown) as later described in detail in FIG. 3.

[0037] Having described a linear cam 100 removably and slidably coupled to one or more shafts 200 and 202, the operation of the linear cam 100 will now be described in reference to FIG. 3 which is a top and side perspective view of a linear cam and other components in a multi-media printer module in accordance with an exemplary embodiment of the present invention.

[0038] The multi-media printer module 300 includes a print head 302, a print head bracket 304, an eraser bar 306, an eraser bar bracket 308, a control motor 310, a plurality of rotary gears 312, 314 and 316, a linear cam 100, a plurality of shafts, such as shafts 200 and 202, a plurality of mounting tabs, such as mounting tabs 324 and 326, and a plurality of rollers, such as rollers 328, 329 and 330, for use in moving a rewritable card 332 in the multi-media printer module 300.

[0039] The print head 302 is used by the multi-media printer module 300 to print and/or encode the rewritable card 332 depending on the type of media of the rewritable card 332. For example, when the print head 302 is a magnetic head and the rewritable card 332 that enters the printer is determined to have thermally sensitive film and not a magnetic stripe, the linear cam 100 may be used to adjust and position the print head 302 up to prevent contact with the rewritable card 332. In other words, when the print head 302 and rewritable card 332 are incompatible, the linear cam 100 may be used by the multi-media printer module 300 to prevent contact between the print head 302 and the rewritable card 332.

[0040] The print head bracket 304 moveably connects the print head 302 to the linear cam 100 via roller or bearing 334 for positioning control of the print head 304.

[0041] The eraser bar 306 is used by the multi-media printer module 300 to erase a rewritable card 332 or the contents thereof.

[0042] The eraser bar bracket 308 movably connects the eraser bar 306 to the linear cam 100 via roller or bearing 334 for positioning control of the eraser bar 308.

[0043] The linear cam 100 is slidably connected to the shafts 200 and 202 along which the linear cam 100 may be actuated to adjust and reposition the print head 302 and eraser bar

306. Each mounting tab 324 and 326 is coupled to a printer lid (not shown) and supports respective ends of the shafts 200 and 202.

The control motor 310 actuates the linear cam 100 for positioning control of the print head 302 and eraser bar 306 via gears 312, 314 and 316. Each gear 312, 314 and 316 forms part of a gear drive chain, by which the linear cam 100 is coupled to the control motor 310 through linear gear 114. The linear cam 100 is coupled to the control motor 310 which is utilized to drive the linear cam 100 into one or a plurality of predefined card positions, each predefined card position being utilized to correctly adjust and position the print head 302, eraser bar 306, or combination of such.

[0044] The linear cam 100 is used by the multi-media printer module to adjust and position the print head 302 and eraser bar 306, either to contact the rewritable card 332 or prevent contact with the rewritable card 332. Additionally, the linear cam 100 may adjust and position the print head 302 and/or eraser bar 306 to accommodate varying thicknesses of various rewritable cards.

[0045] The multi-media printer module 300 prints and/or encodes the rewritable card 332 with data generated by a multi-media printer (not shown) including the multi-media printer module 300. Additionally, data on the rewritable card 332 may be erased by the multi-media printer using the multi-media printer module 300.

[0046] The rollers 328, 329 and 330 are used to guide or feed the rewritable card 332 as the rewritable card 332 passes through the multi-media printer module 300 of the multi-media printer (not shown).

[0047] In operation, as the rewritable card 332 enters the multi-media printer module 300 through the front of the multi-media printer module 300, preferably through a slot in the multi-media printer (not shown), the rollers 328, 329 and 330 guide the rewritable card through the multi-media printer module 300. When the rewritable card 332 is within proximity to the print head 302, the linear cam 100 is actuated to adjust and position the print head 302 and then the eraser bar 306. For example, to print, read, write, and/or encode a rewritable card, the linear cam 100 may be used to adjust and position the print head 302 to contact the rewritable card 332. To erase a rewritable card, the linear cam 100 may be used to adjust and position the eraser bar 306 to contact the rewritable card 332. To accommodate the thickness of the rewritable card 332, the linear cam 100 may adjust and position a print head

302 and/or eraser bar 306. To prevent contact with the rewritable card 332, the linear cam 100 may retract the print head 302 or eraser bar 306.

[0048] Similarly, as the rewritable card 300 exits a magazine card drive (not shown and as later described in FIG. 4) and enters the multi-media printer module 300, the rollers guide the rewritable card 332 through the multi-media printer module 300. When the rewritable card 332 is within proximity to the eraser bar 306, the linear cam 300 actuates to adjust and position the eraser bar 306 and then the print head 302 up.

[0049] The movement of the linear cam 300 may be accomplished using processor-executable procedures, programming instructions, memory, a control motor, a combination of such, or a combination of any.

[0050] In one multi-media printer in accordance with an exemplary embodiment of the invention, a linear cam may simultaneously adjust and position a print head and eraser bar.

[0051] In one multi-media printer in accordance with an exemplary embodiment of the invention, a multi-media printer includes a plurality of print heads with each print head movably connected to a separate linear cam. For example, one print head may be a thermal print head and another print head is a magnetic head. When a rewritable card enters the printer and the rewritable card is determined to have thermally sensitive film and not a magnetic stripe, the linear cam for the thermal print head may adjust to allow the thermal print head to contact the rewritable card while the linear cam for the magnetic head may raise the magnetic head up to prevent contact with the rewritable card to reduce wear on the magnetic head and reduce the number of cycles that the rewritable card may contact the magnetic head.

[0052] In a multi-media printer in accordance with an exemplary embodiment of the invention, the linear cam may be coupled to a plurality of print heads.

[0053] In a multi-media printer in accordance with an exemplary embodiment of the invention, the mechanism for positioning control of a print head or eraser bar may take other forms. For example, the mechanism may incorporate a solenoid and spring or the like to extend and retract a print head or eraser bar or combination of such.

[0054] In a multi-media printer in accordance with an exemplary embodiment of the invention, a linear cam for a multi-media printer may be coupled to an eraser bar whereby the linear cam may adjust and position an eraser bar to accommodate varying thicknesses of

rewritable cards, depending on the thickness of the rewritable card, to come into contact with a rewritable card, and/or prevent the eraser bar from contact with the rewritable card.

[0055] In a multi-media printer in accordance with an exemplary embodiment of the invention, the linear cam may be coupled mechanically, removably, slidably, or by a combination of any or all.

[0056] In a multi-media printer in accordance with an exemplary embodiment of the invention, a plurality of linear cams for a multi-media printer, each linear cam may be coupled to an eraser bar and to each print head in the printer when the printer includes a plurality of print heads.

[0057] In a multi-media printer in accordance with an exemplary embodiment of the invention, a linear cam for a multi-media printer may be coupled to one or a plurality of predefined card positions.

[0058] In a multi-media printer in accordance with an exemplary embodiment of the invention, a multi-media printer may include a multi-media printer module, one or a plurality of linear cams, one or a plurality of print heads, an eraser bar, one or a plurality of control motors, one or a plurality of gears, a printer controller, a scanning mechanism, memory, procedures, and program instructions, among others.

[0059] In a multi-media printer in accordance with an exemplary embodiment of the invention, procedures, programming instructions, memory, a control motor, a combination of such, or a combination of any may be used to determine card positions within the multi-media printer.

[0060] In a multi-media printer in accordance with an exemplary embodiment of the invention, procedures, programming instructions, memory, a control motor, a combination of such, or a combination of any may be used to actuate a linear cam into one or a plurality of predefined card positions to adjust and position one or a plurality of print heads to come into contact with a rewritable card, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0061] In a multi-media printer in accordance with an exemplary embodiment of the invention, procedures, programming instructions, memory, a control motor, a combination of such, or a combination of any may be used to actuate a linear cam into one or a plurality of predefined card positions to adjust and position an eraser bar to come into contact with a

rewritable card, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0062] In a multi-media printer in accordance with an exemplary embodiment of the invention, procedures, programming instructions, memory, a control motor, a combination of such, or a combination of any may be used to actuate a linear cam into one or a plurality of predefined card positions to simultaneously adjust and position one or a plurality of print heads and an eraser bar to come into contact with a rewritable card, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0063] In a multi-media printer in accordance with an exemplary embodiment of the invention, procedures, memory, and programming instructions may be used as a timing mechanism to actuate a linear cam to adjust and position one or a plurality of print heads to come into contact with a rewritable card, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0064] In a multi-media printer in accordance with an exemplary embodiment of the invention, procedures, memory, and programming instructions may be used as a timing mechanism to actuate a linear cam to adjust and position an eraser bar to come into contact with a rewritable card, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0065] In a multi-media printer in accordance with an exemplary embodiment of the invention, procedures, memory, and programming instructions may be used as a timing mechanism to actuate a linear cam to simultaneously adjust and position one or a plurality of print heads and an eraser bar to come into contact with a rewritable card within a printer, prevent contact with a rewritable card, and/or accommodate varying thicknesses of a rewritable card.

[0066] In a multi-media printer in accordance with an exemplary embodiment of the invention, a linear cam may be coupled to a magnetic head, the magnetic head may encode, read and/or write a magnetic stripe of a rewritable card wherein the magnetic stripe allows information to be written and read electronically, the information used either alone or in combination with other information, such as that from an RFID chip or tag, or thermally sensitive film, among others.

[0067] In a multi-media printer in accordance with an exemplary embodiment of the invention, a linear cam may be coupled to a thermal print head, the thermal print head may

print the thermally sensitive film of a rewritable card wherein the thermally sensitive film allows information to be written and read electronically and/or visually read, the information used either alone or in combination with other information, such as that from a magnetic stripe or RFID chip or tag, among others.

[0068] In a multi-media printer in accordance with an exemplary embodiment of the invention, a linear cam may be coupled to a RFID print head, the RFID print head may encode, read and/or write an RFID chip, tag, or other radio frequency technology of a rewritable card wherein the RFID allows information to be written and read electronically, the information used either alone or in combination with other information, such as that from a magnetic stripe of a rewritable card or thermally sensitive film, among others.

[0069] FIG. 4 is a block diagram of a multi-media printer in accordance with an exemplary embodiment of the present invention. A multi-media printer 400 may include a printer controller 401, a multi-media printer module 402, and one or more card magazines, such as card magazines 403 and 404. Any of these components may be optional.

[0070] The multi-media printer module 402 may include a print card drive 405 that moves cards through the multi-media printer module 402. The print card drive 405 is reversible such that a card may be fed through the multi-media printer module 402 in more than one direction by the print card drive 405. The print card drive may include a card motion sensor 406 for sensing card movement within the print card drive. A more detailed discussion of printer media motion detection within a printer is presented in U.S. Patent Application No. 10/640,495 filed August 12, 2003, the contents of which are hereby incorporated by reference as if stated herein in full. The print card drive may further include an embossing detector 408 that may be used to sense when an embossed item, such as a conventional credit card, is inserted into the multi-media printer module. The embossing detector may be a mechanical device, such as a limit switch, that contacts an inserted card and detects any embossing. If an embossed card is inserted into the multi-media printer, the multi-media printer may not attempt to write to the card, only read the card.

[0071] The multi-media printer module may further include a security feature reading device 410 for reading any security features included in a card. The multi-media printer module may further include a print head 412 for writing indicia to a rewritable card and an erase head 414 for erasing the indicia from the rewritable card. The multi-media printer module may further include an optical scanning device 416 for scanning the indicia printed

onto a rewritable card. The multi-media printer module may further include a magnetic strip read/write head 418 used to read and write from and to a rewritable card's magnetic strip. The multi-media printer module may be removably and electronically coupled to the printer controller and removably and mechanically coupled to the card magazine.

[0072] In operation, the multi-media printer module receives printer control signals from the printer controller. In response to the printer control signals, the multi-media printer module scans rewritable cards for the presence and value of any security feature in the rewritable card. As the multi-media printer module scans the rewritable card, the security feature reading device generates a security signature signal that is transmitted to the printer controller. In addition, the multi-media printer module thermally prints on the rewritable cards, and thermally erases the rewritable cards, under the control of the printer controller. The multi-media printer module may also receive a rewritable card from a player and transmit a rewritable card detection signal to the printer controller.

[0073] The multi-media printer module may also include a static memory read/write connector 420 for coupling to a "smart" card having a readable/writable static memory. The printer controller transmits static memory write signals and receives static memory read signals to and from the static memory read/write head.

[0074] The one or more independently controlled card magazines 403 and 404 store rewritable cards and provide the rewritable cards to the multi-media printer module on command from the printer controller. Each card magazine may include one or more magazine card drives 422 for moving cards into and out of the magazine. Each card magazine may also include a card storage area 424 for storage of rewritable cards. In operation, the card magazine receives card magazine control signals from the printer controller. In response to the control signals, the card magazine feeds cards to the multi-media printer module from the card storage area using the magazine card drive. In response to the card magazine control signals, the card magazine may also receive rewritable cards from the multi-media printer module and store the rewritable cards in the card storage area.

[0075] The card magazine may also include one or more card sensors 426 used to detect the number of cards stored in the card storage area. The card sensors sense the quantity of cards stored in the card storage area and transmit card count signals to the printer controller for further processing. The card magazine may also include a read/write static memory 428 for semi-permanent storage of card information about cards stored in the card magazine.

[0076] The printer controller may include a processor 430 coupled to a main memory by a system bus 432. The printer controller may also include a storage memory 434 coupled to the processor by the bus. The storage memory stores programming instructions 436, executable by the processor to implement the features of a multi-media printer. The storage memory may also include printer and card information 438 stored and used by the processor. The printer and card information may include information received by the printer controller about the status of the multi-media printer module and card magazine and also about the status and identity of any cards stored in the card magazines or being operated on by the multi-media printer module. The types of status information may include an image of a last printed rewritable card as scanned by the optical scanning device and the current status, such as millimeters of advancement, of a card currently in the multi-media printer module.

[0077] The printer controller may also include an Input/Output (I/O) device 440 coupled to the processor by the system bus. The I/O device may be used by the printer controller to transmit control signals to the multi-media printer module and the card magazine. The I/O device may also be used by the printer controller to receive security feature and status signals from the multi-media printer module and card magazine.

[0078] The multi-media printer module further includes a linear cam control motor 441 for operation of a linear cam as previously described. The printer controller may also include procedures 442 which are used, for example, to determine card positions and to actuate one or a plurality of linear cams as to adjust and position one or a plurality of print heads and an eraser bar to the thickness of a rewritable card.

[0079] One or more communications devices 444 may be coupled to the system bus for use by the printer controller to communicate, for instance, with a cashless gaming system host or a game controller. The printer controller may use the communication devices to receive commands, program instructions, and card information from the external devices 446. In addition, the printer controller may use the communication devices to transmit printer status information to the external devices. Other communication devices may also be used by the printer controller to couple in a secure fashion over a local area network 448 for administrative or other purposes.

[0080] Additional communication devices and channels may be provided for communication with other peripheral devices as needed. For example, one communication device may be provided with a local communications port, accessible from an exterior of a

gaming machine hosting the multi-media printer that a technician may use to communicate with the printer controller during servicing using an external controller. The external controller may communicate with the printer controller using an infrared link, other short-range wireless communication link, or a hard link with an external connector in a secure manner.

[0081] The processor may be further coupled to an encryption/decryption module 450 that may be used to encrypt and decrypt messages encoded using an encryption standard. This enables the printer controller to engage in secure transactions with external devices. The processor may access the display device either as a component through the bus as shown or as an external device through a communications device using a high level communications protocol. In addition, the printer controller may also include program instructions to perform encryption/decryption services as well.

[0082] The processor may be further coupled to a display device 452 that may be used to display printer status information or card information. For example, the display may be used to display an "as-scanned" version of the most recently printed and scanned card. The processor may access the display device either as a component through the I/O device or as an external device through a communications device.

[0083] In operation, the processor loads the programming instructions into the main memory 453 and executes the programming instructions to implement the features of a multi-media printer as described herein.

[0084] As illustrated, the printer controller is shown as being coupled to the multi-media printer module and card magazine. The printer controller may be mounted in a variety of ways and may be incorporated into various components of either the multi-media printer or, for instance, a host system (such as a game) coupled to the multi-media printer. For example, the printer controller may be attached to and supported by the multi-media printer module, the card magazine, or the host game as may be required to mechanically integrate the multi-media printer into the host game.

[0085] The foregoing description of the controller in the multi-media printer is provided by way of example and not of limitation, it being understood that the controller could be implemented in a variety of ways without deviating from the spirit of the invention. For example, logic modules could be constructed from hardware such as hardwired circuits within the controller. Alternatively, logic modules could be implemented in the form of

software, such as computer-executable instructions stored on a computer-readable medium, and the controller could be a programmable controller with a processor and memory. Finally, the controller could also be constructed from a combination of hardware and software components.

[0086] FIG. 5 is a process diagram describing the adjustment to print head and eraser bar process in accordance with an exemplary embodiment of the present invention.

[0087] As illustrated, the process 500 begins (502) with a rewritable card being detected (504) in the multi-media printer module by the multi-media printer and components thereof after which a determination (506) is made should an adjustment in the position of a print head and/or eraser bar be needed. This determination may be made using procedures, programming instructions, memory, a control motor, or a combination of any.

[0088] If an adjustment is needed, the process continues with an adjustment (508) and position of the print head and/or eraser bar. If predefined positions are determined (510), the print head and/or eraser bar is moved (512) to the predefined position. This process loops back to detect card for the real-time monitoring of cards detected in the multi-media printer module.

[0089] In one print head and eraser bar process in accordance with an embodiment of the invention, if an adjustment is not needed, if a predefined position is not determined, or the print head and/or eraser bar is moved to the predefined position, the process may not loop back to detect card, but may end.

[0090] Although this invention has been described in certain specific embodiments, many additional modifications and variations would be apparent to those skilled in the art. It is therefore to be understood that this invention may be practiced otherwise than as specifically described. Thus, the present embodiments of the invention should be considered in all respects as illustrative and not restrictive.

WHAT IS CLAIMED IS:

1. A linear cam for a multi-media printer module, comprising:
a first side having a first cam profile for movably coupling to a print head and a second cam profile for movably coupling to an erase head;
a second side having a linear gear for coupling with a control motor via a rotary gear;
and
an aperture for slidably coupling the linear cam to a supporting shaft.
2. The linear cam of Claim 1, wherein the linear cam is positioned at determined card positions by the control motor.
3. The linear cam of Claim 1 where the linear cam adjusts and positions the print head to accommodate varying thicknesses of rewritable cards, to come into contact with a rewritable card, and/or prevent the print head from making contact with the rewritable card.
4. The linear cam of Claim 1 where the linear cam adjusts and positions the erase head to accommodate varying thicknesses of rewritable cards, to come into contact with a rewritable card, and/or prevent the erase head from making contact with the rewritable card.

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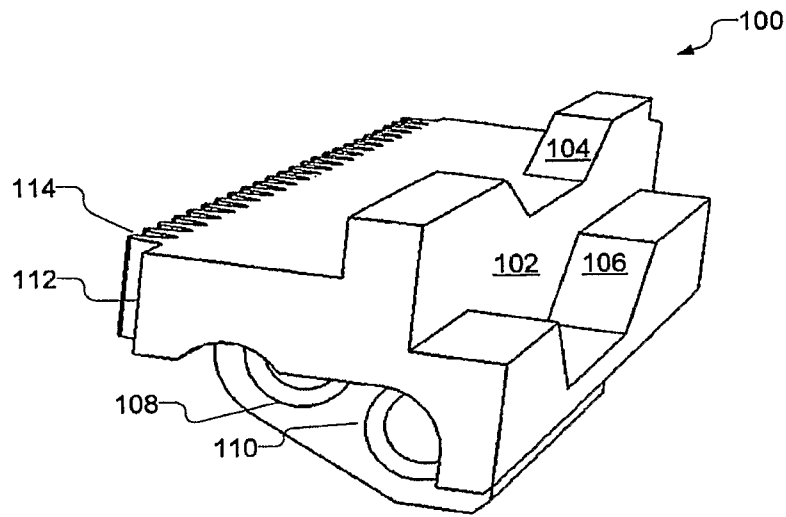


FIG. 1

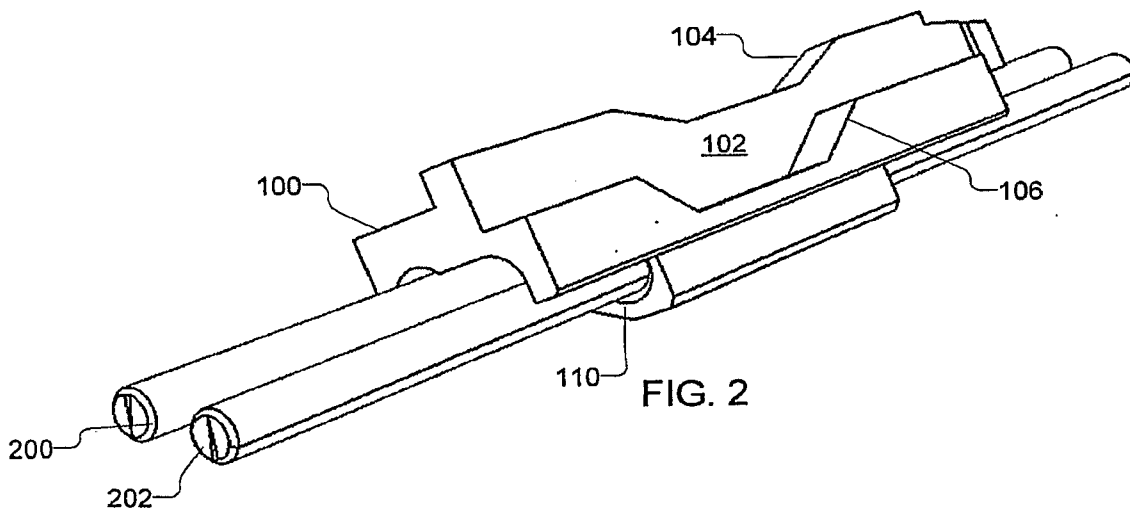
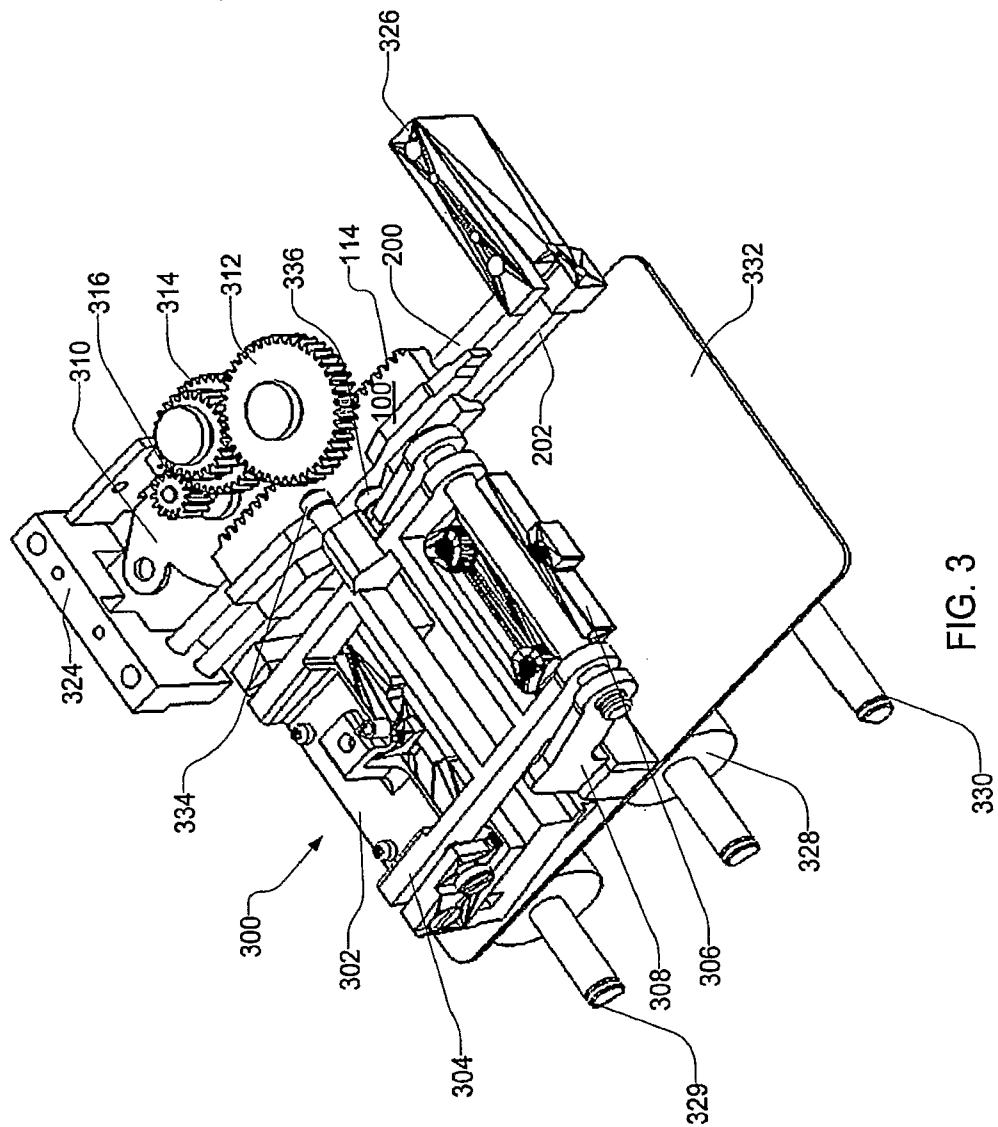


FIG. 2



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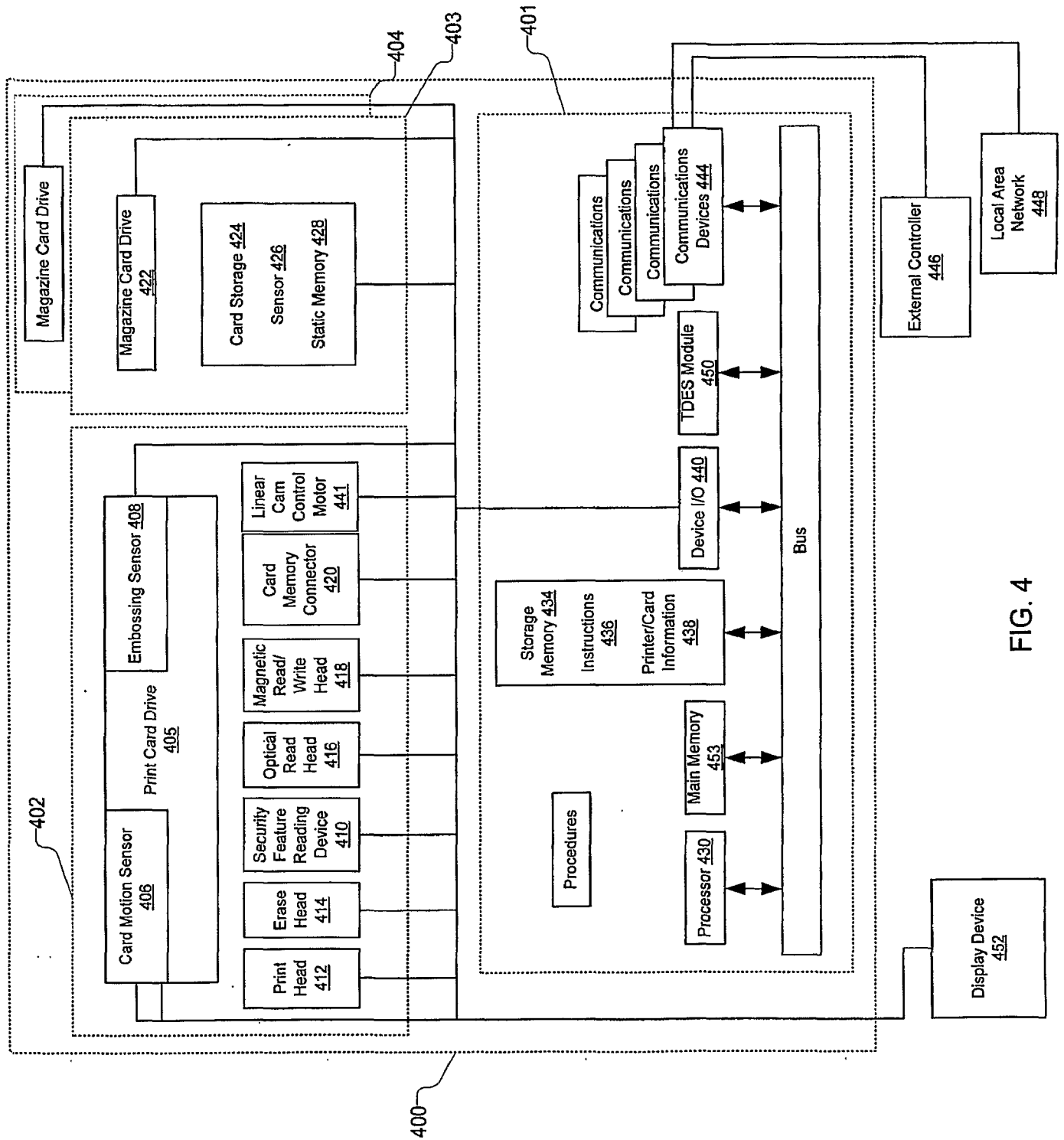


FIG. 4

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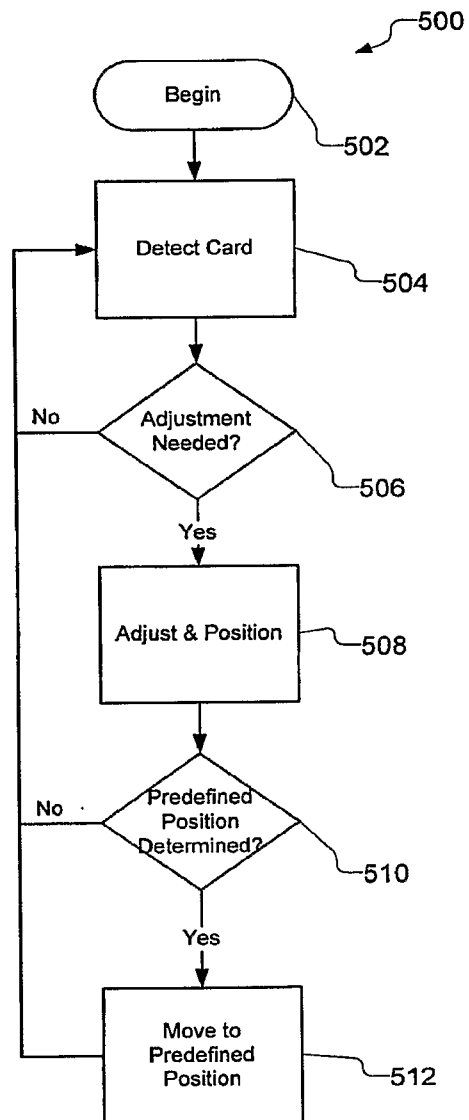


FIG. 5