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(54) **ARTICLE FEEDER AND METHOD OF FEEDING**

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(57) **ABSTRACT**

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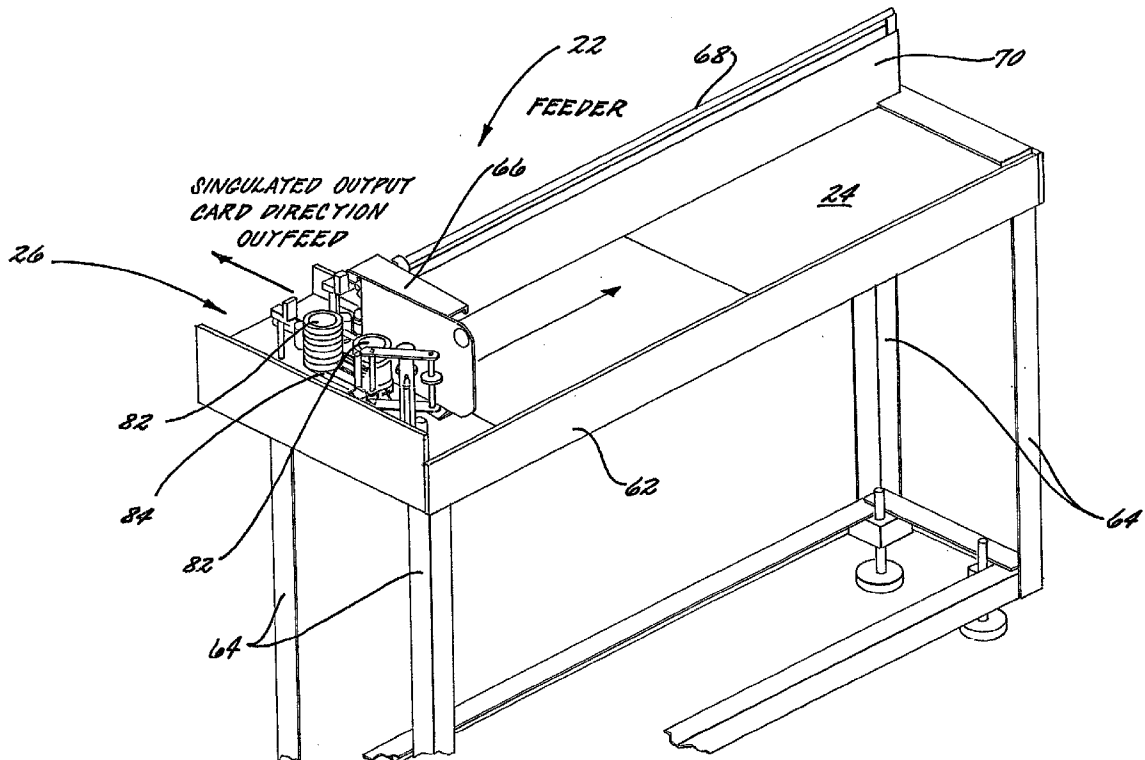
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An article feeder includes a feeder bin for holding and advancing a stack of articles. A stripper belt mechanism engages the first article contained in the stack and singularly draws the article from the stack. The stripper belt mechanism includes a source of vacuum for drawing vacuum onto the first article. A biasing mechanism biases the stripper belt mechanism against the stack of articles and applies back pressure thereto. The biasing mechanism is adjustable for varying the back pressure against the stack of articles to accommodate articles of varying thickness. A method for operating an article feeder is also disclosed.



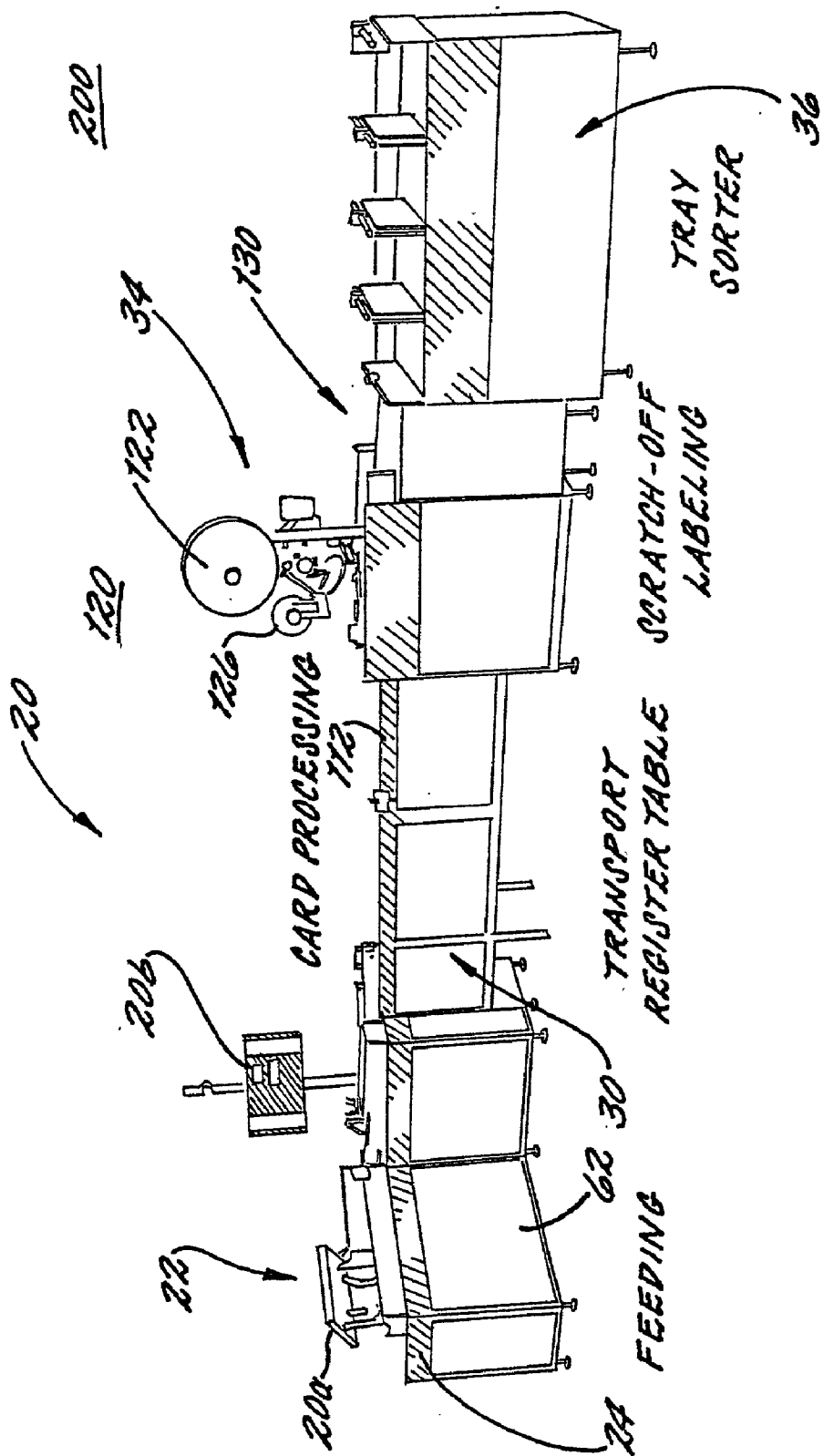
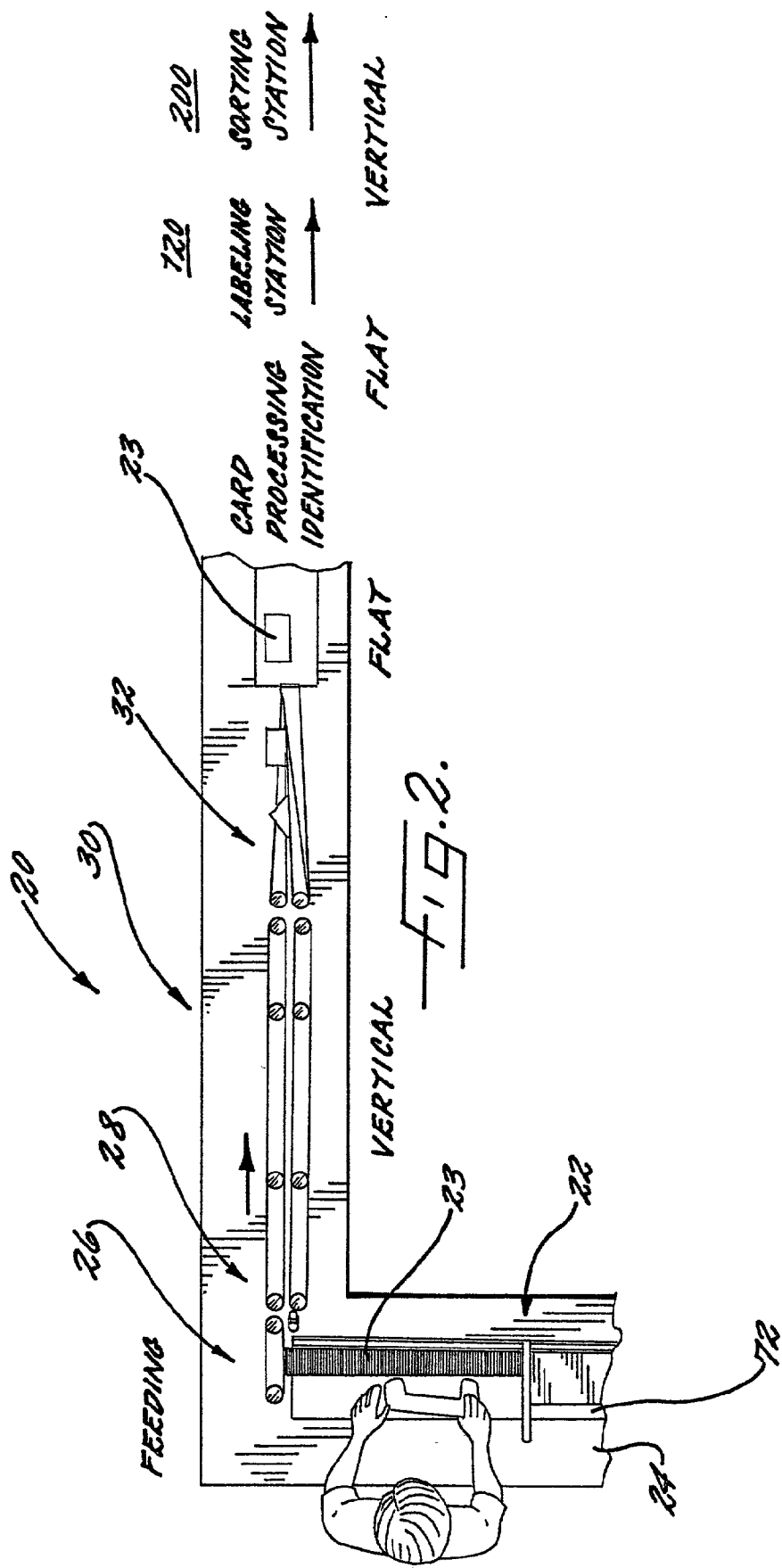
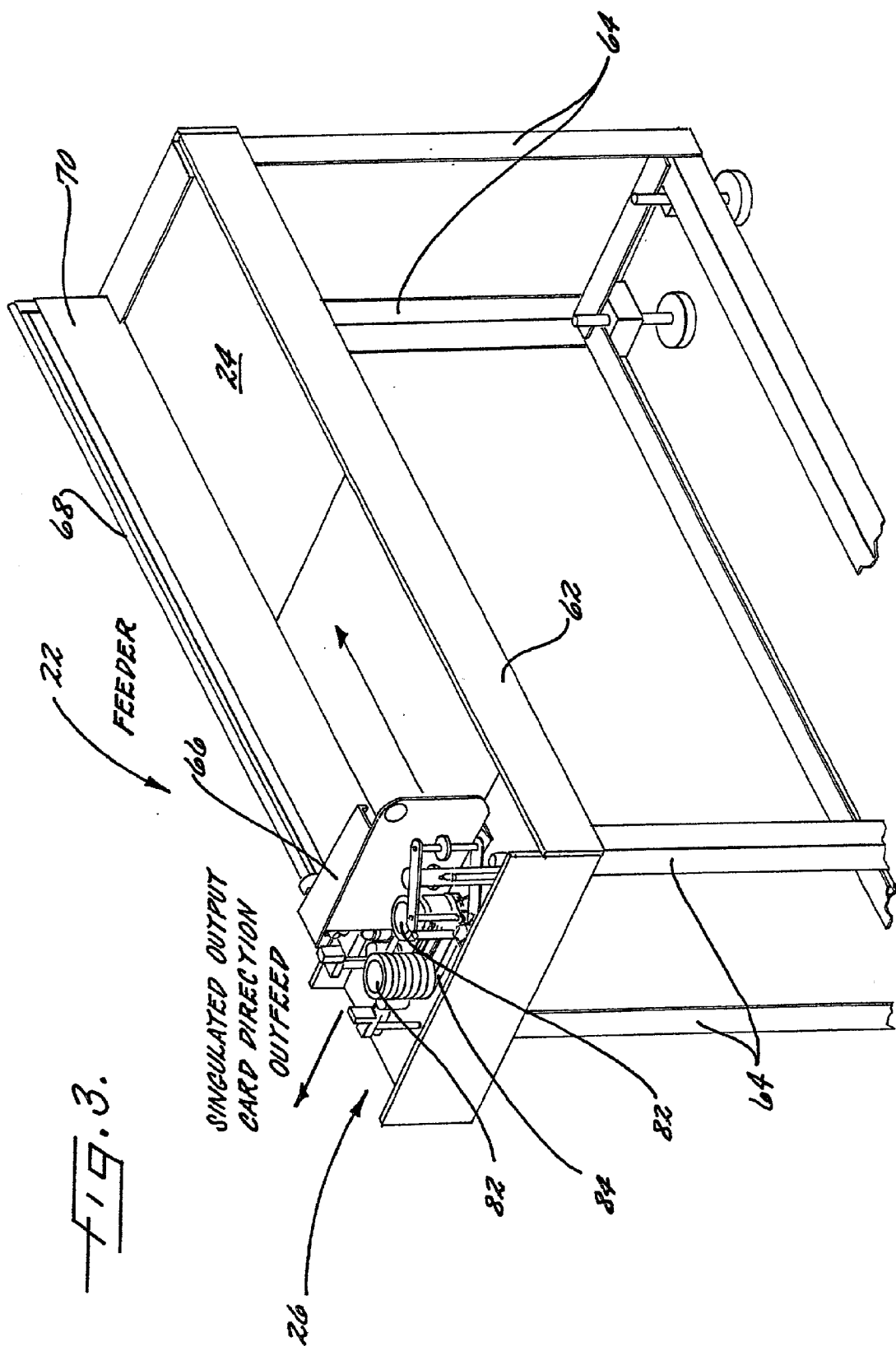
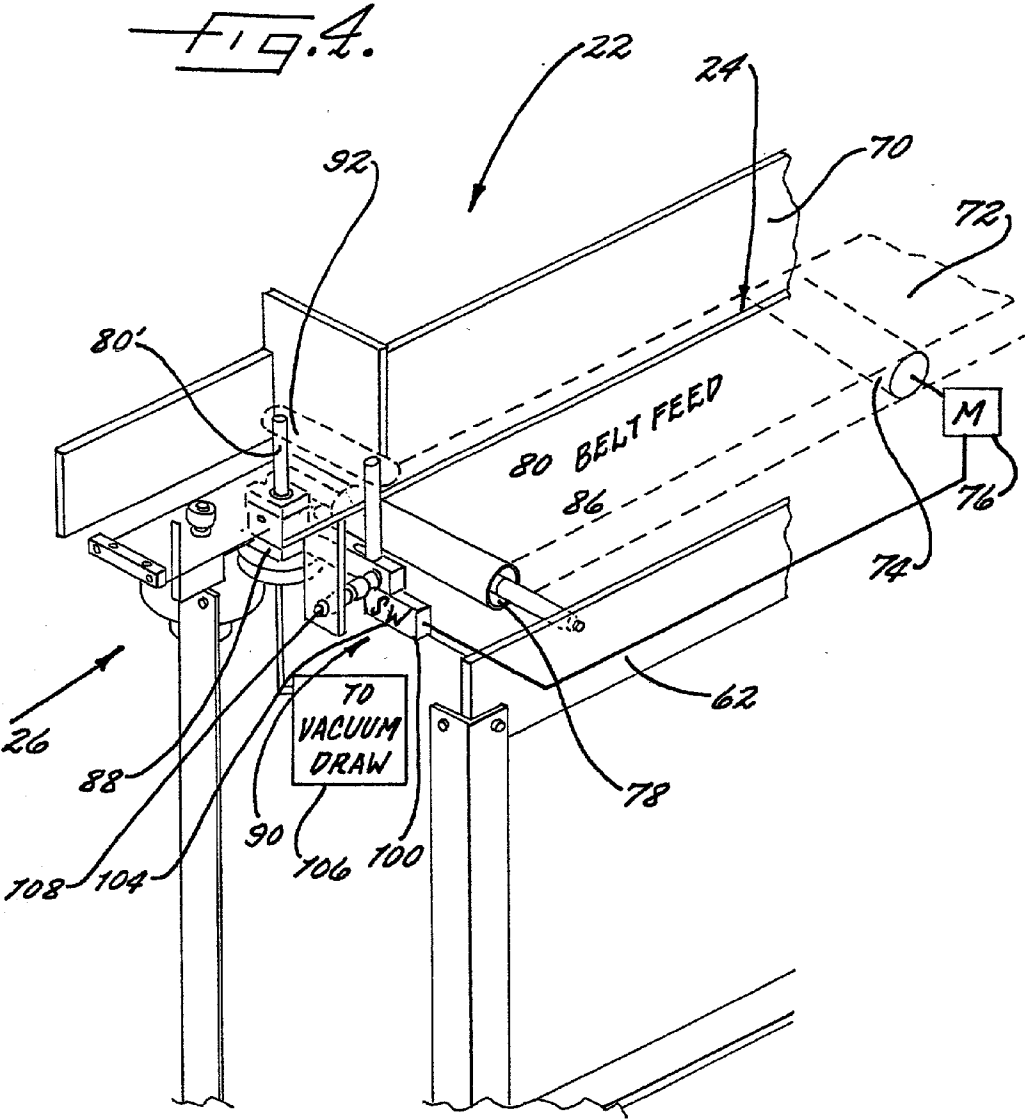
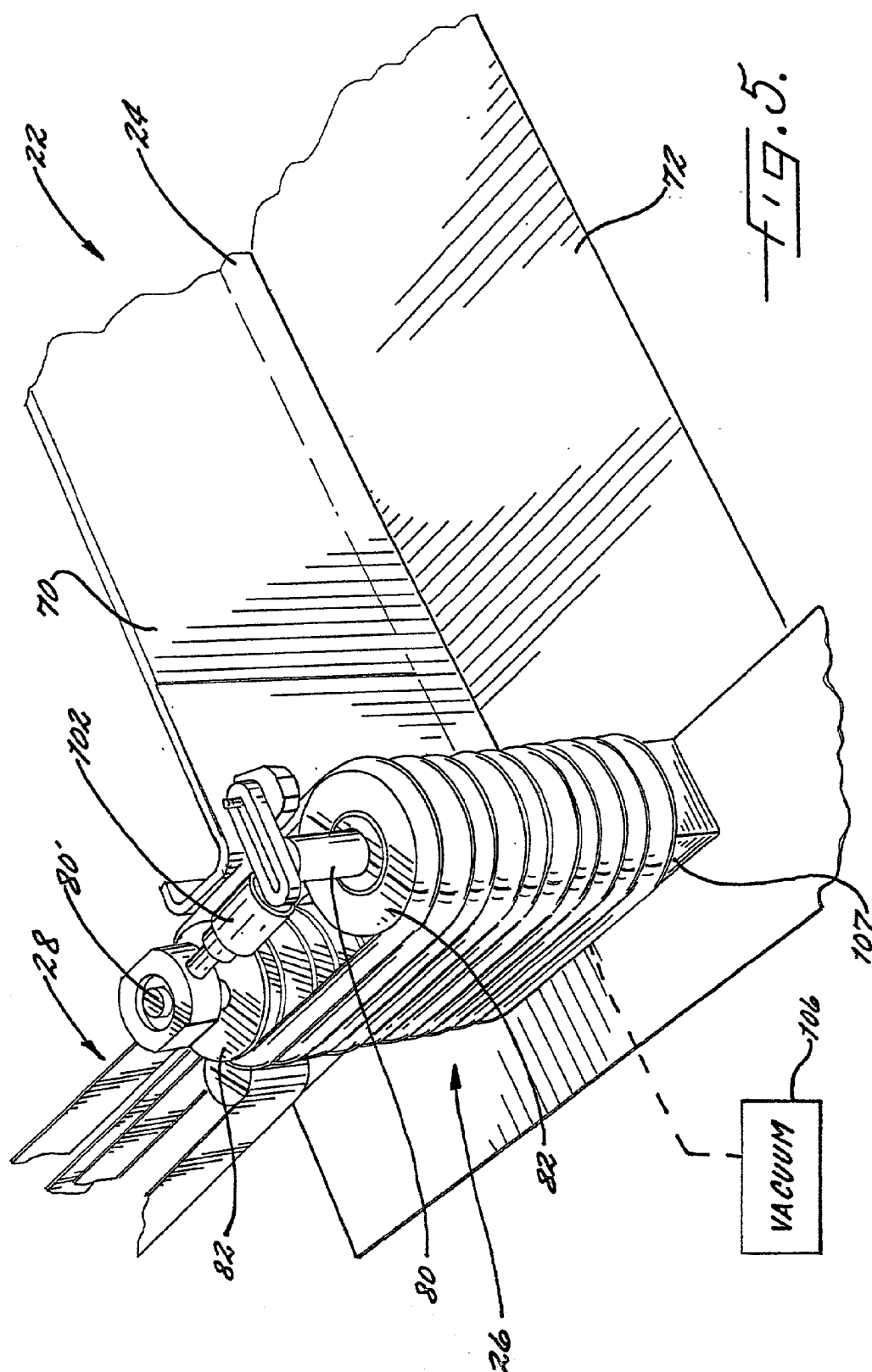


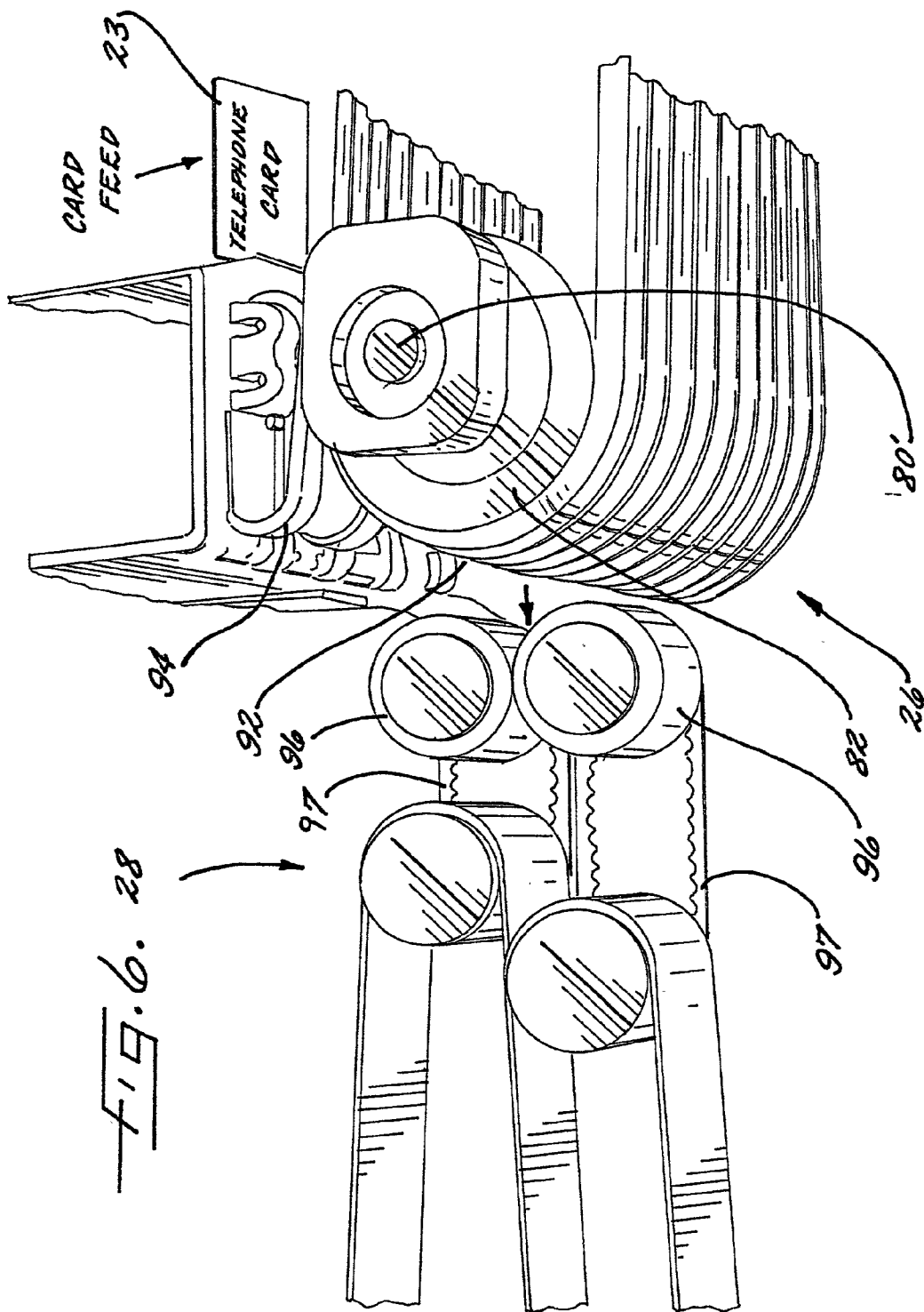
FIG. 1.











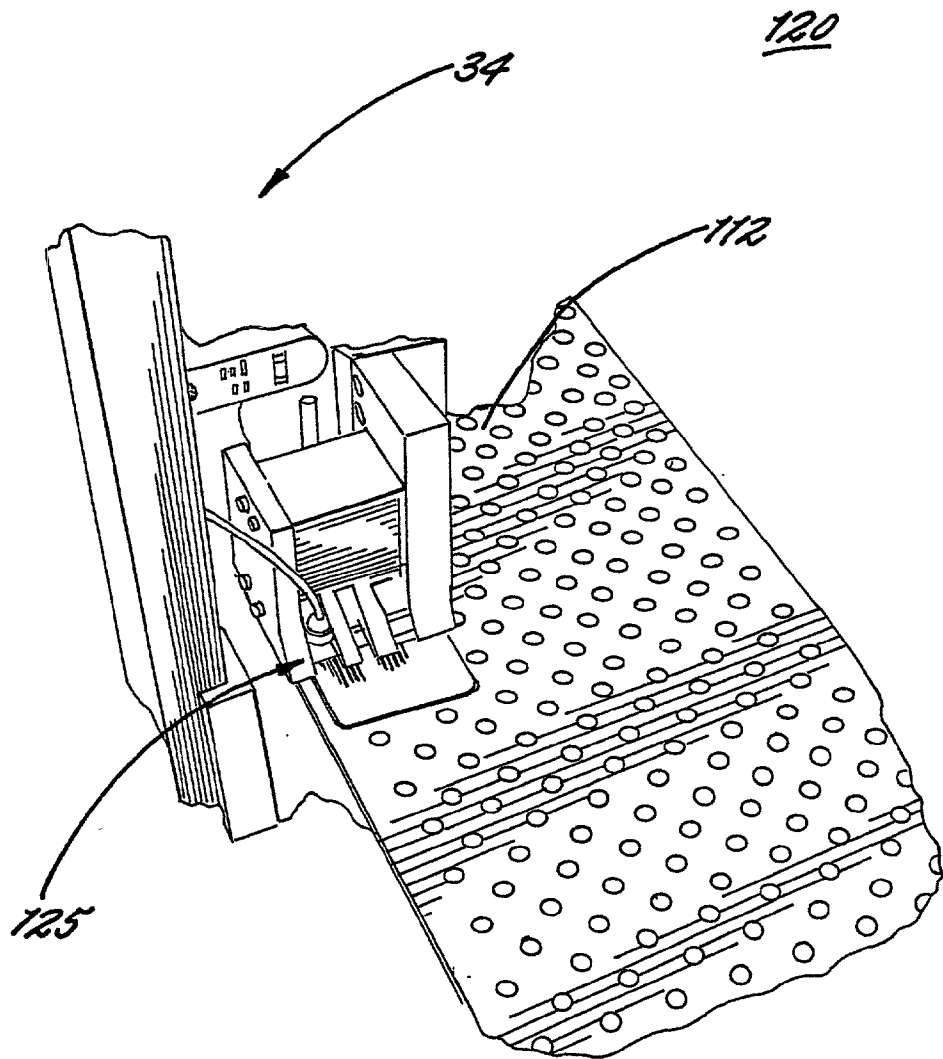
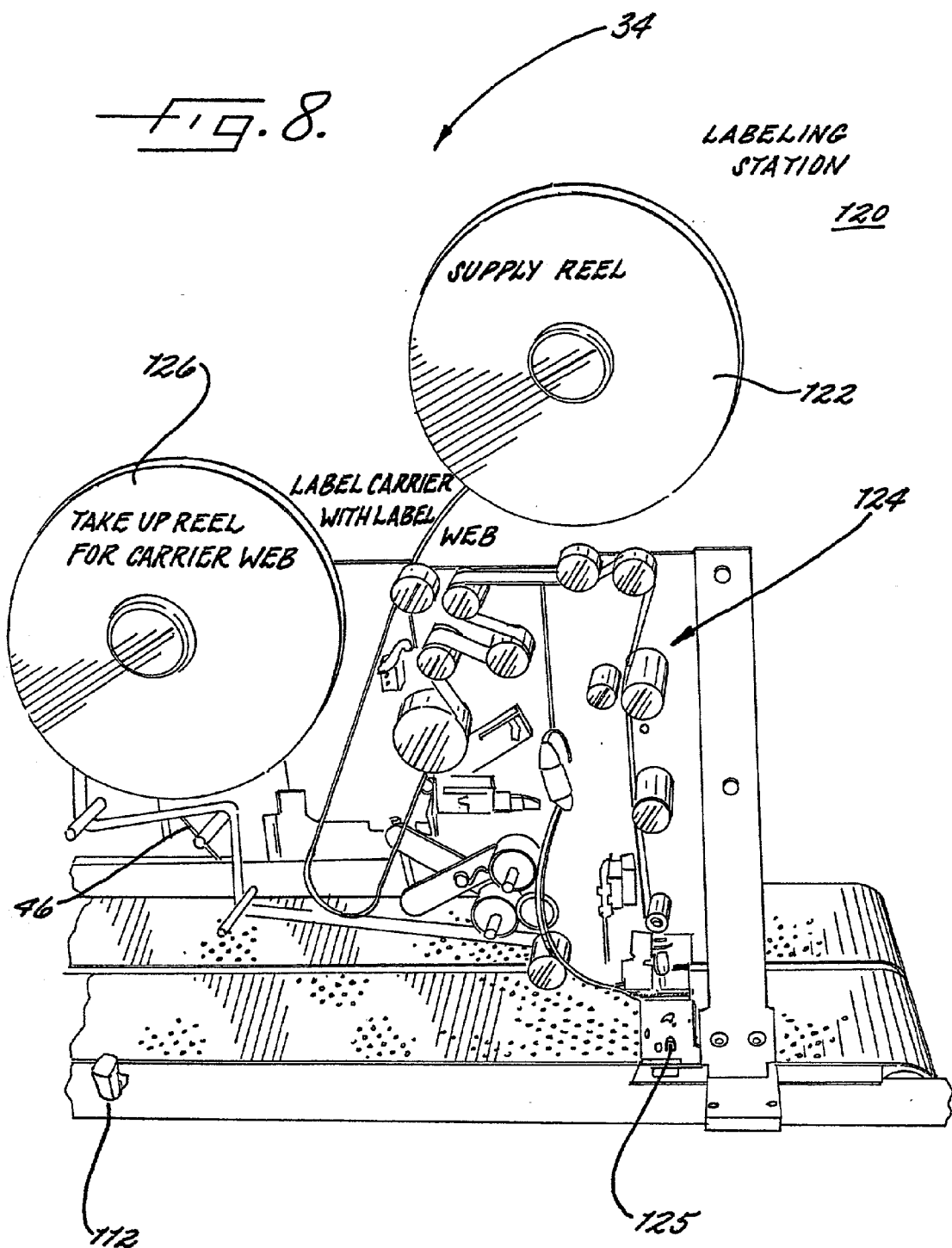


FIG. 7.



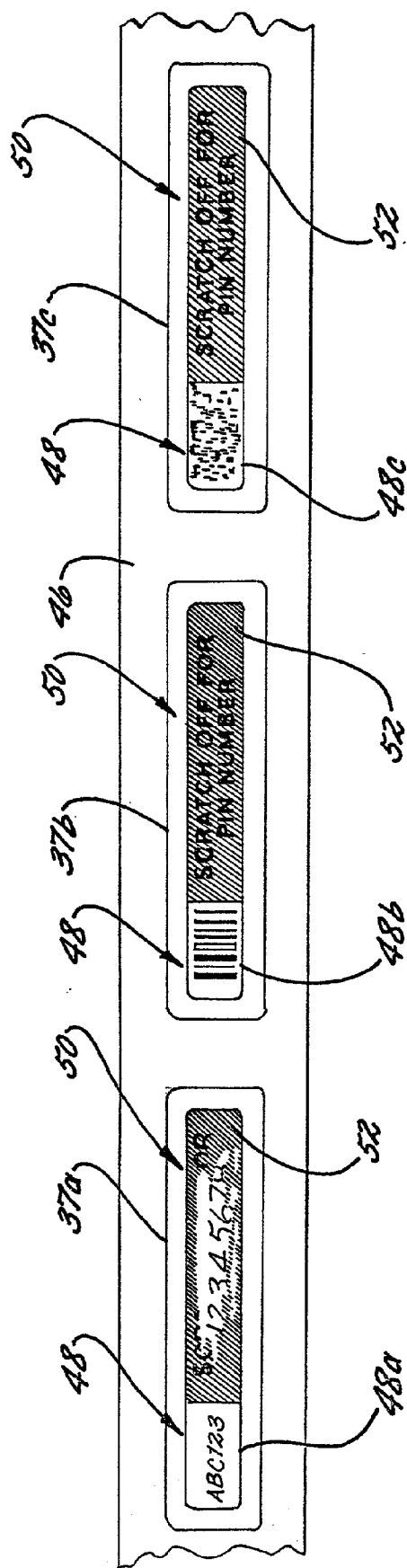
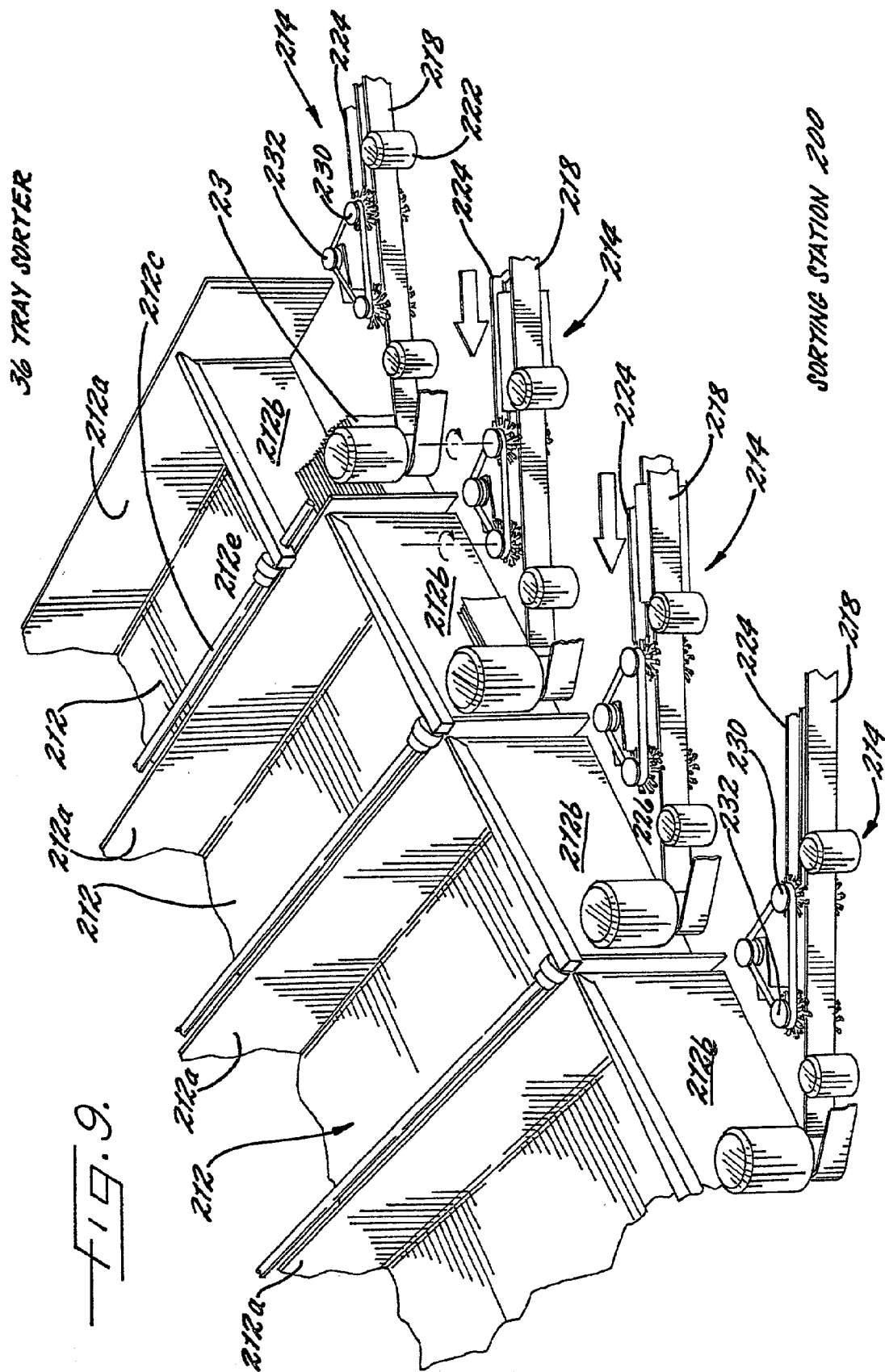


FIG. 8A.



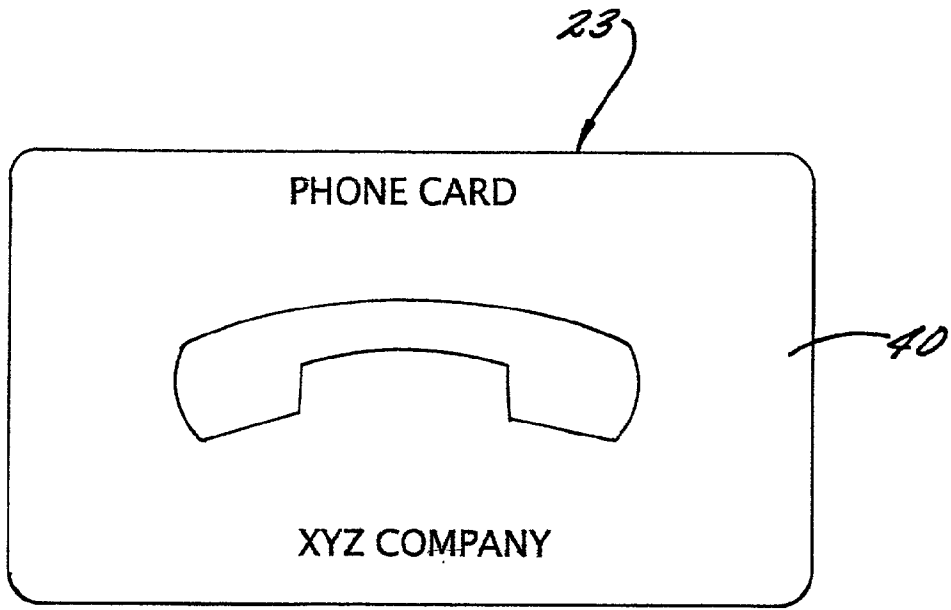


FIG. 10.

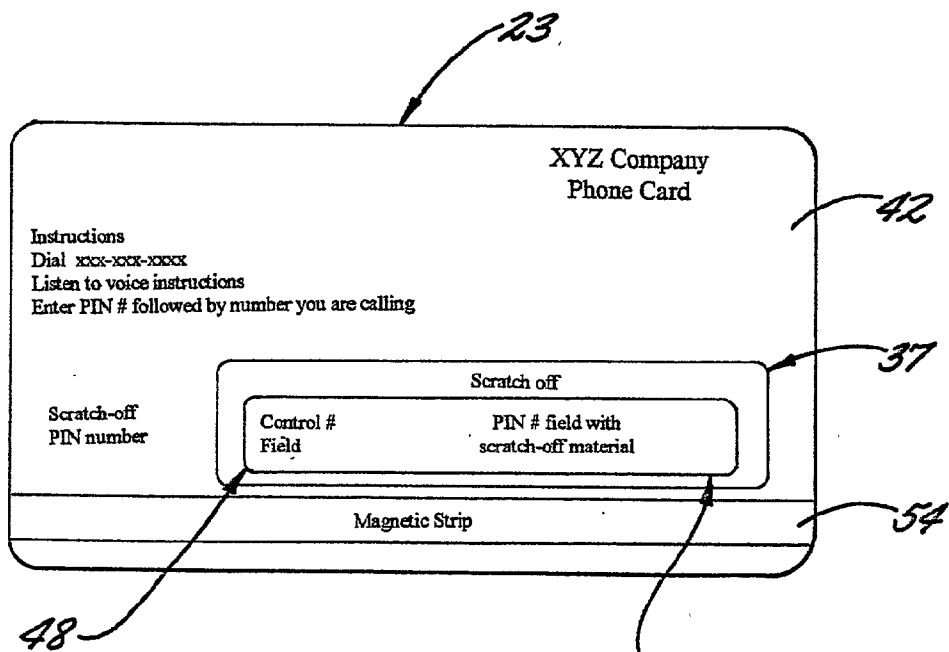
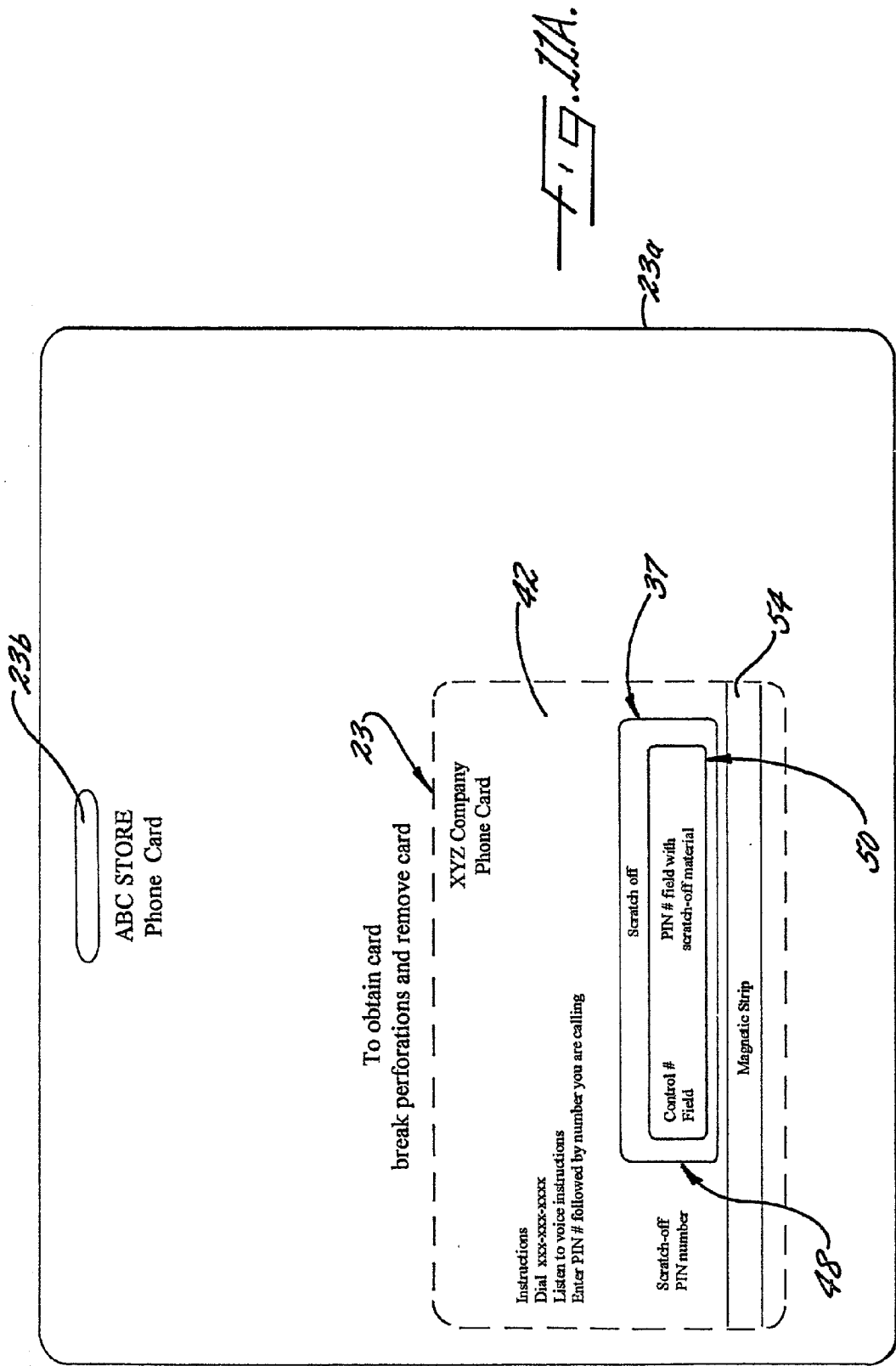
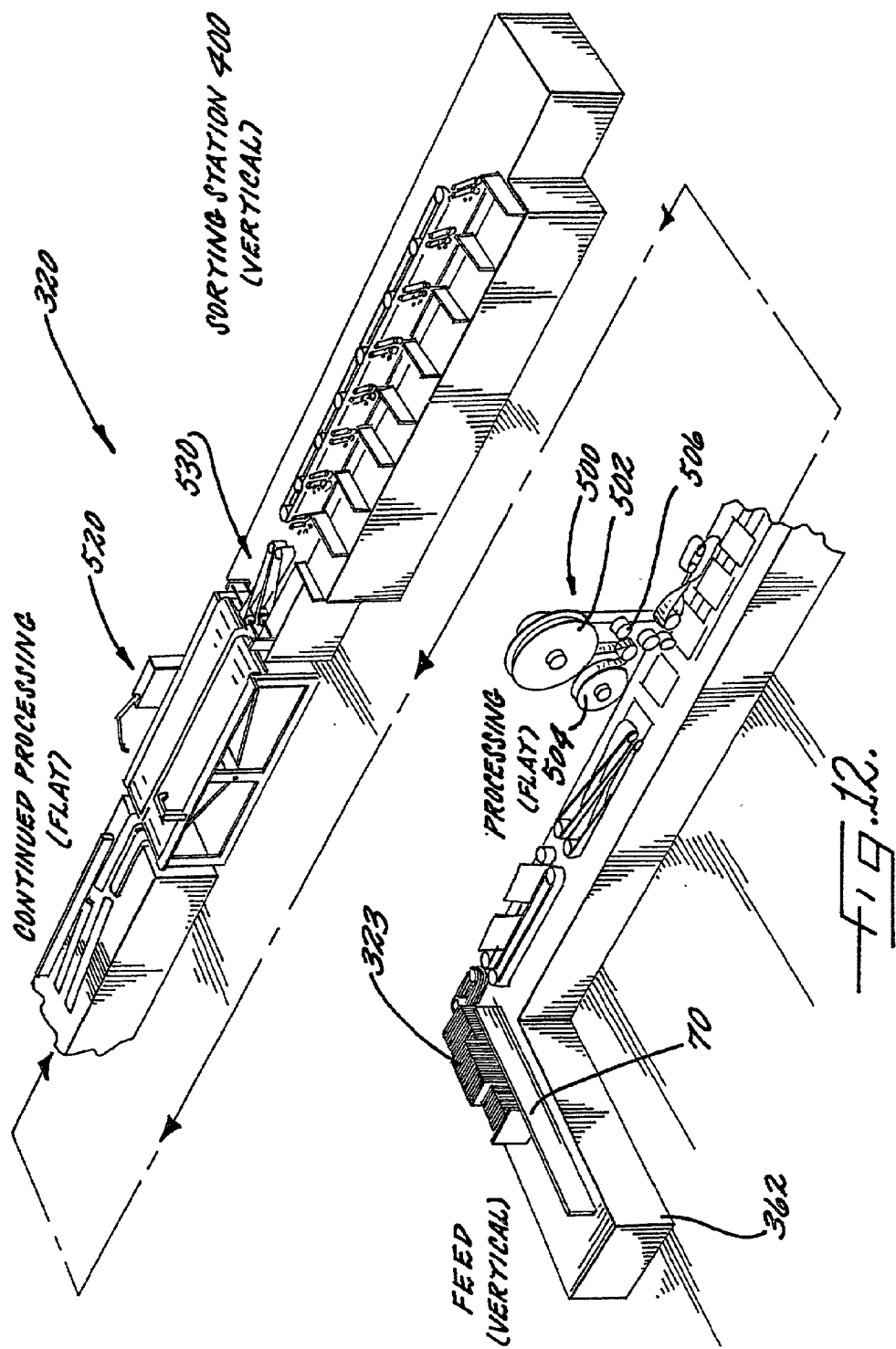


FIG. 11.





ARTICLE FEEDER AND METHOD OF FEEDING

FIELD OF THE INVENTION

[0001] This invention relates to article feeders, and more particularly, this invention relates to an article feeder that withdraws, i.e., “strips,” articles and strips articles one at a time from a stack of articles.

BACKGROUND OF THE INVENTION

[0002] Articles of mail and debit cards, such as credit cards and phone cards, are often initially processed in automated lines through high-speed, continuous friction feeders. Some of these feeders have a feeder bin that holds and advances a stack of articles against a stripper belt mechanism that contains two upright stripper belt support shafts, each having a stripper roll that supports a plurality of belts. The stripper belt mechanism is biased against the stack of articles and creates a back pressure and friction for grabbing the first article within the stack and drawing, i.e., “stripping,” the first piece of mail or card contained within the stack of articles away from the stack into a feed discharge belt assembly or other conveyance mechanism. However, different sized articles, and more particularly, articles having different thicknesses, sometimes can be pulled or “stripped” in “bunches”. Thus, a large “bunch” of articles is “stripped,” and this causes processing delays and failures in downstream processing.

SUMMARY OF THE INVENTION

[0003] It is therefore an object of the present invention to provide an improved article feeder that uses a stripper belt mechanism that can maintain singularity of feeding without inadvertent feeding of “bunches” of articles.

[0004] In accordance with the present invention, the article feeder includes a feeder bin for holding and advancing a stack of articles. A stripper belt mechanism engages the first article contained in the stack for drawing in single article fashion an article from the stack. The stripper belt mechanism includes a source of vacuum for drawing vacuum onto the first article. A biasing mechanism biases the stripper belt mechanism against the stack of articles and applies back pressure thereto. The biasing mechanism is adjustable for varying the back pressure against the stack of articles to accommodate articles of varying thickness.

[0005] In still another object of the present invention, the stripper belt mechanism further comprises at least one stripper belt and a pair of stripper rolls that support the at least one stripper belt. A stripper roll support shaft supports each stripper roll and a drive motor engages one of the stripper roll support shafts and drivingly rotates the stripper roll support shaft and drives by belt action the other stripper roll. The biasing mechanism further comprises a spring. A support member can engage the spring and support the stripper belt mechanism. The spring is adjustable in tension to change the biasing against the support member and is exerted by the stripper belt mechanism against the first article contained within the stack. The feeder bin can comprise a support table, while the articles can comprise wallet size cards or mail pieces that are further processed.

[0006] In still another object of the present invention, the article feeder can include a feeder bin that has a feed

conveyor that advances the stack of articles along the path of travel. The stripper belt mechanism engages the first article in the stack along the path of travel and includes a switch connected to the biasing mechanism and the feed conveyor for actuating the feed conveyor when a predetermined amount of back pressure is exerted.

[0007] In a method aspect of the present invention, the method comprises the step of advancing a stack of articles against a stripper belt mechanism that engages the first article contained within the stack of articles and drawing vacuum on the first article to draw the first article against the stripper belt mechanism. The stripper belt mechanism is adjustably biased against the stack of articles for accommodating articles of varying thickness.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Other objects, features and advantages of the present invention will become apparent from the detailed description of the invention which follows, when considered in light of the accompanying drawings in which:

[0009] **FIG. 1** is an overall perspective view of an automated card processing system of the present invention showing an article feeder, a transport register table, a scratch-off labeling station, and a tray sorter.

[0010] **FIG. 2** is a fragmentary plan view of the automated card processing system showing the feeder, transport register table, the general location of labeling and sorting stations, and the locations where a debit card or other article is oriented vertical (standing up), flat and then vertical during processing.

[0011] **FIG. 3** is a schematic, isometric view of the article feeder and showing details of the article stripper mechanism.

[0012] **FIG. 4** is a partial isometric view of the article feeder of **FIG. 3**, showing greater details of the stripper mechanism, including the belt feed, vacuum draw and microswitch for controlling the belt feed motor.

[0013] **FIG. 5** is an enlarged isometric view of the stripper belts shown in **FIG. 3**.

[0014] **FIG. 6** is another isometric view of the stripper belts and showing the stripper fingers and feed discharge belt assembly.

[0015] **FIG. 7** is a partial isometric view of a labeler used for applying the scratch-off label of the present invention.

[0016] **FIG. 8** is a schematic, side elevation view of the labeler used for applying the scratch-off label to an article.

[0017] **FIG. 8A** is an example of a carrier web showing scratch-off labels applied in spaced orientation.

[0018] **FIG. 9** is a perspective view of a tray sorter showing a plurality of article bins and feed belt assemblies.

[0019] **FIGS. 10 and 11** show the front and rear (reverse) sides of a phone card of the present invention having the scratch-off label applied on the rear face.

[0020] **FIG. 11A** shows the rear side of a planar card carrier member having a phone card secured by perforations.

[0021] **FIG. 12** is an overall perspective view of a system similar to the card processing system shown in **FIG. 1**, except a tabbing operation is illustrated, where articles such

as envelopes are fed vertically (standing up), laid down, and then oriented vertically for sorting.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] The present invention is advantageous because it allows the controlled feeding of an article, such as a phone card or credit card, or mail products of different thickness, from a stack held in a feeder bin, and into a singulated stream without bunching. The present invention is also advantageous because it provides for the application of a scratch-off label onto an article, such as on a telephone card or other debit or credit card article, in an efficient manner without requiring ink printing of any control codes or PIN's onto the card. The present invention is also advantageous because the cards or other mail articles can be fed vertically (standing up), laid flat for further processing, such as for tabbing, labeling or other applications, and then oriented vertically for sorting.

[0023] FIG. 1 shows an overall perspective view of an automated card processing system 20 as used with the present invention, having controller 20a for controlling the article feed and controller 20b for controlling subsequent processing. FIG. 2 illustrates a fragmentary plan view of the system 20 with an article feeder 22 storing a large plurality of cards, such as wallet sized debit cards, which are illustrated as phone cards 23, stacked in a feeder bin 24.

[0024] FIG. 11A shows that a phone card can be contained within a card carrier member, illustrated at 23a. The actual phone card can be perforated and separated from the card carrier member. For example, in the initial processing of a rigid and planar hard plastic material that would form the card carrier member, the actual phone card can be outlined by perforations. Later, the card carrier member can be processed to place information on the area within the perforations that form the phone card. A plurality of card carrier members can then be stacked within the article feeder and feeder bin 24, and processed in a manner as will be described below. Although the description will apply to wallet sized phone cards, it should be understood that the card carrier member as shown in FIG. 11A can also be processed, and may be a preferred manner for processing. Thus, many different types of card carrier members having different dimensions, widths and heights can be processed.

[0025] It is possible to have a card carrier member that includes one or more phone cards that could also later be stamped out instead of broken by perforations. Also, the card carrier member could be printed with a designation, such as the card origin, i.e., "ABC Store", to indicate the source of a phone card. The card carrier members can be displayed at a point-of-purchase display such as hanging the card carrier member via the open slot 23b onto a post of a point-of-purchase display within a store. The card carrier member can then be fed in a vertical orientation followed by turning into the flat or laid-down configuration for processing, such as labeling, and then turned and stood back up in a vertical, standing-up orientation for sorting, as will be explained below.

[0026] The cards are then fed against a stripper belt mechanism 26 and discharged one at a time in a vertical, i.e., standing up orientation, in what is termed as a singulated manner via a feed discharge belt assembly 28 processing

area, which includes a transport register table 30, which could include an associated air transport table.

[0027] As shown in FIG. 2, the article is laid flat by a twisted belt feed section 32, which orients the card 90° to lay the card flat. With the phone card 23 of the present invention, the phone card can be processed and identified, as well as encoded in some instances. The card or card carrier member 23a can advance while laying flat onto an air transport table having an associated scratch-off labeler 34 that applies a scratch-off label 27 onto the phone card. The phone card moves into a tray sorter 36, as shown in FIG. 9, which includes a plurality of article bins 212 where the cards or other articles are stacked, as will be explained below.

[0028] FIGS. 10 and 11 show an example of the phone card 23 of the present invention having a scratch-off label 37 of the present invention applied onto the rear face. The phone card is of a type such as issued by various telephone and other companies. The phone card is wallet sized and formed of a rigid plastic material. Although the card is illustrated as a phone card, it could be a credit card, phone card or other similar type of debit card.

[0029] The phone cards are common in the United States and in many Latin American countries, where the phone cards can be used without having to establish accounts or billing connections with a telephone company. The card 23 includes on its front face 40 (FIG. 10) the identification of the phone card company, such as XYZ Company. The rear or back face 42 includes instructions for using the phone card, such as "Dial XXX XXX XXXX," corresponding to the number of the respective card issuer. An instruction to listen to any voice instructions on the phone is printed below the dialing instruction. Naturally, the voice instructions tell a user how to use the phone card. Such instructions could include also written instructions, such as instructions of how to enter the PIN number followed by the number the user is calling. Also, because a PIN number is secret, the instructions can include the directions for scratching off the covering contained over the PIN number.

[0030] FIG. 11 also illustrates the scratch-off label 37 of the present invention that has been applied to the phone card. The label 37 typically is formed from a lower label film, i.e., base label layer 44, such as formed from polyester or some other thin film material. This lower label film 44 forms the base part of the scratch-off label 37 and a plurality of these lower label films 44 forming the labels 37 are positioned on a carrier web 46 (FIG. 8A) as known to those skilled in the art. The carrier web 46 having the applied labels is typically wound on a supply roll as known to those skilled in the art. The lower side of the lower label film 44 engaging the carrier web includes a self-adhesive that adheres the label 37 to the carrier web. A control code field 48 is positioned on one side of the lower label film 44, together with an associated PIN code field 50. The PIN code field 50 has a PIN printed thereon and is covered with a scratch-off paint or other coating 62 that can be scratched-off by the purchaser of the phone card. The PIN typically is four to eight digits or could include an alphanumeric code. FIG. 8A illustrates three scratch-off labels carried on a web. The first label 37a has a portion of the coating 52 scratched off to display a numeric PIN code.

[0031] The control code field 48 is not coated and is left exposed on the label. This field 48 could include an alpha-

numeric code **48a**, a bar code **48b** or a two-dimensional bar code **48c**, as illustrated in **FIG. 8A**. It is also possible to use a series of snow flakes or dots formed as a grid or matrix that can be decoded in bit form. The bar code can be a two-dimensional bar code with a dot matrix configuration. As is known, the control code could be scanned optically by other means to allow encoding via a data encoded strip, such as a magnetic strip **54**, of dollar amounts. Other information could be contained on the magnetic strip as is well known to those skilled in the art. It is also possible to apply the data encoded strip as a label stripe during processing before, simultaneously or after the application of the scratch-off label **37**.

[0032] The article feeder **22** of the present invention can be used not only for feeding thick and rigid articles, such as credit cards and phone cards, but can also be used for feeding many different types of mail, including small envelopes to large envelopes of varying thickness and intermixed mail that is tabbed. The article feeder **22** can feed up to 50,000 pieces per hour and has a unique feed system, e.g., singulator, to allow most inter-mixed mail to feed without adjustments from a large stack, such as shown in **FIG. 2**, where exemplary phone cards are stacked in a stand-up, i.e., vertical configuration. Although **FIG. 2** shows a large plurality of about three feet of phone cards stacked in the feeder bin **24**, any type of mail can be intermixed and then fed single into the feed discharge belt assembly **28**.

[0033] As shown in greater detail in **FIGS. 3 and 4**, the feeder bin **24** is positioned on a support table **62** having support legs **64**, which give a feed height that is the same as the other components and tables of the automated card processing system, as shown in **FIG. 1**. An article retaining plate **66** is slidably moveable on a guide rod **68** and positioned adjacent a side support **70**. Cards, such as the illustrated phone card, or other articles, such as pieces-of mail and envelopes, are stacked against the side support **70**. The retaining plate **66** is moved forward with spring biasing against the articles as shown in **FIG. 2**. As better shown in **FIG. 4**, the stack of articles positioned in the feeder bin **24** rest on a conveyor belt **72** that is positioned over a first belt pulley **74**, which is driven by a motor **76** that actuates and drives a second belt pulley **78**.

[0034] **FIG. 5** is an enlarged isometric view of the stripper belt mechanism **26** for the article feeder **22**. The stripper belt mechanism **26** includes two stripper support shafts **80** (**FIGS. 3 and 4**) that support stripper rolls **82** having a plurality of stripper belts **84** positioned on the stripper rolls **82**. As shown in **FIG. 4**, the first and second stripper support shafts **80** are positioned such that the stripper rolls **82** and associated stripper belts **84** provide a flat surface against which the cards or other articles engage the belts as shown in **FIG. 2**.

[0035] The stripper support shafts **80** are supported on a horizontally moveable shaft support member **86** that is moveable in a direction to and from the article conveyor belt **72**. A drive motor **88** engages one of the stripper support shafts, i.e., the first shaft, to rotate the associated stripper rolls and stripper belts. In **FIG. 4**, the first stripper support shaft **80'** is powered for rotation. An adjustable biasing member **90** is engaged against the shaft support member **86** and applies a biasing force against the shaft support member **86** to allow a back pressure to be exerted against articles stacked in the feeder bin **24**.

[0036] Friction between the article, such as the illustrated phone card, and the stripper belts **84**, allows an article to be "stripped" or drawn away from the stack in singulated fashion, one-by-one, into the feed discharge belt assembly **28**. As shown in **FIG. 6**, each article is pulled away from the article stack through a pre-shingler **92**, such as formed from Teflon, and through a series of stripper fingers **94**, which guide the article through two discharge pinch rolls **96**, which then feed the article into the discharge belts of the feed discharge belt assembly **28**. The feed discharge belt assembly **28** and pinch rolls **96** can be driven from common belt transmission **97**. At the same time, the stack of articles is pushed by the conveyor belt **72** and retaining plate **66** against the stripper belts **84** to create friction. The conveyor belt movement is controlled in off/on fashion by a microswitch **100**, as shown in **FIG. 4** as a schematic, rectangular block. A pressure coupling mechanism **102** is mounted on top of the support shafts and the microswitch **100** could be operative with the coupling mechanism (**FIG. 5**). Different types of microswitches can be used as known to those skilled in the art.

[0037] In one aspect of the present invention, the biasing member **90** is formed as spring **104**, and biases the shaft support member **86** forward, which in turn, biases the stripper belts **84** against the stack of articles. As the spring biases the shaft support member **86** forward, it actuates the microswitch **100**, which turns the conveyor belt motor **76** on and advances the conveyor forward to force cards or articles against the stripper belts. This action forces the stripper belts and shaft support member **86** back, actuating the microswitch to turn the motor off. This releases the back pressure against the article. However, as noted before, with this system only, thinner articles, such as very thin envelopes, sometimes have excessive pressure exerted against them, and as a result, "bunches" of envelopes or other thin articles could be grabbed under friction and forced through the discharge area.

[0038] In accordance with the present invention, vacuum is applied from a vacuum source **106** onto the area associated with the front part of the stripper belts, such as through a vacuum plate **107**, having vacuum orifices contained in the plate, or through orifices in the shafts or other means, to draw the first article in the stack against the stripper belts **84** (**FIG. 5**). Also in accordance with the present invention, the spring **104** is adjustable, such as by an adjustable screw **108**, as illustrated, to increase or decrease the amount of tension, and thus, the exerted back pressure. Thus, it is possible to decrease the amount of tension (back pressure) that could be applied by the stripper belts onto the article stack such that primarily the vacuum provided by the vacuum source **106** would retain an article, such as a thin envelope, against the stripper belts. With this low pressure used for retaining an article, such as when thin articles are fed, only one thin article would be fed or "stripped" into the feed discharge belt assembly **28**.

[0039] The smaller biasing force of the retaining plate **66** can also be used to push the articles with sufficient pressure against the belts, which together with the vacuum draw of the article, allows article feeding in a singulated fashion even when thin articles and envelopes are used or other articles of mail. If thicker articles, such as a phone card or credit card, are stacked in the feeder bin, then greater back

pressure can be exerted by adjusting the spring pressure to allow greater back pressure and allow "stripping" of the cards from the stack.

[0040] The article passes into the feed discharge belt assembly **28** and into a transport register table **30**. Up to this point in time, the articles have been processed in vertical orientation, i.e., "standing up." At this time, the article is laid flat by the twisted belt feed section **32**, which rotates the article 90° to lay the article flat for further processing, such as tabbing, or as in the present description, to allow card processing identification, such as encoding, and labeling, where the scratch-off label **37** is applied. An example of a type of twisted belt feed section that could be used is disclosed in U.S. Pat. No. 5,393,366 and assigned to the present assignee of the present invention, Profold, Inc., the disclosure which is hereby incorporated by reference in its entirety.

[0041] The card is transported along the transport register table, which also could include an associated or separate air transport table **112**, which is designed for high-speed, i.e., 50,000 pieces per hour. Air suction is low vacuum and has high air volume for strong article adherence to the belt surface, such as 700 cubic feet of air suction per minute. The air transport could be formed with two belts for more controlled applications of larger articles besides cards, such as envelopes, and also provide control over other processes, such as with ink jet printing. A solid strip can separate the two parallel belts. The air transport table can be adjusted in height and has a modular design to be used in line with feeders, tabbers, labelers, affixers, and other equipment.

[0042] FIGS. 7 and 8 show a labeling station **120** where a scratch-off labeler **34** has a supply reel **122**, having a roll formed of carrier web of labels in which a series of idler and drive rolls **124** form a serpentine, controlled delivery path for the carrier web where the label is stripped by a label stripping mechanism **125** from the carrier web, in timed unison, with the phone card as the phone card advances into the label applying station **120**. The label **37** adheres to the phone card. The carrier web is taken up in a take-up reel **126**.

[0043] One of the benefits of the label **37** of the present invention over prior art phone cards using a printed PIN and control code is the accuracy required when any scratch-off paint or other coating was applied. The application of any coating had to be accurately aligned with the printed PIN number while leaving unexposed the control code. It also could not interfere with the control code field. With the present invention, on the other hand, the label having the preprinted control code field and PIN in the PIN code field can be applied onto the phone card at very high speeds, up to 50,000 pieces an hour, with some inaccuracy as long as the label does not cover the magnetic strip. The phone card would be operable.

[0044] Once the cards have been labeled, they are then transported into an article stand-up feed section **130**, where a 90° feed belt section turns the cards in vertical, i.e., "standing up", orientation. The cards are then fed into a sorting station **200**, such as that shown in FIG. 9, where a plurality of article bins receive articles from respective feed belt assemblies as explained below.

[0045] Referring now to FIG. 9, there is illustrated the sorting station **200**, which includes a tray sorter **36** that sorts

articles, such as the illustrated phone card or other articles and mail pieces, by feeding individual articles in vertical orientation along a predetermined path of travel into a respective article bin **212**. The articles could include mixed pieces that have different sizes, including different lengths and widths of mail and different thicknesses. However, in the illustrated example, the articles are the same-size phone cards **27**. An example of an article bin is disclosed in commonly assigned U.S. patent application Ser. No. 09/315,693, filed May 20, 1999, entitled APPARATUS AND METHOD FOR SORTING MAIL, the disclosure which is hereby incorporated by reference in its entirety.

[0046] As evident, the sorting station **200** has four article bins **212** that receive articles from four respective feed belt assemblies **214**. Although four article bins **212** and four feed belt assemblies **214** are illustrated, naturally, the sorting station **200** can include one, two or any number of different article bins having respective feed belt assemblies as necessary for the processing of articles.

[0047] Each article bin **212** includes two parallel side walls **212a** and a biased end wall **212b**, forming a rectangular configuration. The end wall **212b** is slidable on a support rod **212c** via a support flange **212d** that extends across the top portion of the end wall **212b**. A bottom surface **212e** holds the article. Sheet steel, plastic or other materials known to those skilled in the art can be used to construct the article bin.

[0048] The articles are fed by the feed belt assembly **214** in a vertical orientation, and not horizontal. The articles enter the feed belt assembly **214** having at least one large longitudinally extending feed belt **218** that is driven by a drive roller **220** connected to a drive motor (not shown) at the belt end defined by the endless loop. The belt **218** engages stationary tension rolls **222** that maintain pressure on the feed belt **218**. The feed belt **218** is a flat belt. Positioned adjacent the feed belt is another flat drive belt **224**. The article is passed between the endless loop feed belt **218** and the endless loop flat drive belt **224**.

[0049] As illustrated, in accordance with the present invention, the feed belt assembly **214** includes a discharge end positioned adjacent the article bin **212**, for discharging articles into the bin **212**. The feed belt assembly **214** at its discharge end **226** can include first and second brush rolls **230,232** positioned at the discharge end of the feed belt assembly. When articles are thin mail pieces, the brush rolls can be used to impart a concave profile to the mail piece to aid in reducing any damage to a side edge of each individual mail piece. When the articles are smaller dimensioned phone cards, the brush rollers do not have to be used.

[0050] FIG. 12 shows another article handling system, indicated at **320**, such as for mail pieces **323**. Similar components as in the previous system described with reference to FIG. 1 are set forth in the **300** series of reference numerals, and **400** for the sorter and stand-up section **530**. A tabber **500** is illustrated in-line with the twisted belt feed assembly. FIG. 10 illustrates the tabber **500**, such as the type sold by Profold, Inc. of Sebastian, Fla., under the trade designation Linx and Linx DX. The tabber **500** includes supply reel **502**, take-up reel **504** and guide rolls **506**. A further processing could include ink jet transport station **520** for ink jetting mail, as known to those skilled in the art.

[0051] Pressure sensitive stamps could be placed on articles. The ink jet base could use a cost effective trident

head that can operate at speeds to 22,000 pieces per hour, and a roll-up system that hangs over the transport so it can be moved out of the way. A Sciter or Video Jet could also be used. **FIGS. 1 and 12** both illustrate that articles can be fed in a vertical orientation and then laid flat for processing, such as the tabbing of **FIG. 12**, or the labeling as described with reference to **FIGS. 7 and 8**. The articles are then oriented vertically, "stood up", for sorting within a sorting station, such as with bins. This type of processing is a more efficient system than known prior art systems that print or process standing up in vertical orientation.

[0052] An example of the tabber and a processing line that can be used for feeding vertically and then laid down for processing, such as tabbing, and then feeding into an article bin is disclosed in U.S. patent application Ser. No. 08/997,565 filed Dec. 23, 1997, by the assignee of the present invention, the disclosure which is hereby incorporated by reference in its entirety. This tabber is advantageous, and as illustrated in **FIG. 12**, and allows feeding of intermixed pieces of mail to the tabber. The mail can have a plurality of different widths, lengths and thicknesses so that each of the plurality of intermixed pieces of mail would have a commonly oriented edge or side to be tabbed. For example a thickness can range from 0.007 to about 0.25 inches and the physical size of width and length dimensions can vary from 3.5 inches by 5.0 inches to about 8.5 inches by about 11.5 inches.

[0053] A commonly oriented edge to be tabbed is preferably defined as the edge or side of an article, or piece of mail being generally perpendicular to the orientation of the address and reading the address of the piece of mail. When the piece of mail or the address label thereof is properly oriented for displaying or reading the characters in a name and address sequence, the commonly oriented edge to be tabbed is generally perpendicular to this character or address sequence. The leading edge can preferably be the right-hand side when reading an address. This right-hand side or front edge preferably is commonly oriented and fed first as the leading edge downstream in the apparatus. It can also be recognized by those skilled in the art that the addressed side of a piece of mail can be fed or positioned face down instead of face up.

[0054] The tabber is positioned downstream from the article feeder and the direction aligned with an adjacent, commonly oriented edge to be tabbed for positioning at least one tab on each of the plurality of intermixed pieces of mail or articles. This tabber advantageously can eject or place more than one tab onto a piece of mail. A sensor, such as a photo cell or photo diode array, preferably senses the length of the edge to be tabbed of each of the pieces of mail, especially relevant if they are intermixed, and converts the sensed length to encoder counts. These encoder counts are then used to determine the position of the tab. For example, if the side or edge to be tabbed is less than a predetermined length, e.g., four inches, then only one tab will be placed on the piece of mail in the center of the piece. On the other hand, if the side or edge to be tabbed or greater than or equal to a predetermined length, e.g., four inches, then a pair of tabs can be placed on the piece of mail with each tab respectively positioned about one inch from the two corners or ends along the side or edge of the piece of mail.

[0055] The tabber can also include a dispensing mechanism, e.g., a tab dispenser, for dispensing at least one tab

onto each of the plurality of intermixed pieces of mail so that the dispensed tab extends about half off in the outer surface of the piece of mail at the commonly oriented edge to be tabbed. A tab wrapper can be positioned downstream from the tab dispenser for wrapping or folding the tab around the commonly oriented edge to be tabbed as each of the plurality of intermixed pieces of mail travels downstream along the predetermined path of travel. If the edge is unsealed or open, then the wrapping or folding preferably closes or seals the unsealed or open edge.

[0056] An example of the orienter for turning mail about 90° and can be used with the present invention is seen in U.S. Pat. No. 5,393,366 having the common assignee as the present application and which is incorporated herein by reference in its entirety.

[0057] The orienter or rotator that orients the plurality of pieces of mail and articles about a predetermined angle, e.g., preferably 90°, of orientation prior to position at least one tab thereon is in effect a "bump turn" or pivot point into which a piece of mail abuttingly contacts or bumps into, the contacting edge stopped, and mail piece returned or rotated about the pivot point.

[0058] This application is related to copending patent applications entitled, "DEBIT CARD HAVING SCRATCH-OFF LABEL STRIP AND METHOD OF APPLYING SAME" and "APPARATUS AND METHOD OF FEEDING AND PROCESSING ARTICLES AND PIECES OF MAIL," which are filed on the same date and by the same assignee, the disclosures which are hereby incorporated by reference.

[0059] Many modifications and other embodiments of the invention will come to the mind of one skilled in the art having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed, and that the modifications and embodiments are intended to be included within the scope of the dependent claims.

That which is claimed is:

1. An article feeder comprising:

a feeder bin for holding and advancing a stack of articles;

a stripper belt mechanism that engages the first article contained in the stack for singularly drawing the article from the stack, said stripper belt mechanism including a source of vacuum for drawing vacuum onto the first article, and a biasing mechanism for biasing the stripper belt mechanism against the stack of articles and applying back pressure thereto, wherein said biasing mechanism is adjustable for varying the back pressure against the stack of articles to accommodate articles of varying thickness.

2. An article feeder according to claim 1, wherein said stripper belt mechanism further comprises at least one stripper belt, and pair of stripper rolls that support said at least one stripper belt.

3. An article feeder according to claim 2, and further comprising a stripper roll support shaft supporting each stripper roll, and a drive motor engaging one of said stripper roll support shafts for drivingly rotating said stripper roll support shaft and driving by belt action the other stripper roll.

4. An article feeder according to claim 1, wherein said biasing mechanism further comprises a spring.

5. An article feeder according to claim 4, and further comprising a support member that engages said spring and supports said stripper belt mechanism, wherein said spring is adjustable in tension to change the biasing against the support member and exerted by said stripper belt mechanism against the first article contained within the stack.

6. An article feeder according to claim 1, wherein said feeder bin comprises a support table.

7. An article feeder according to claim 1, wherein said articles comprise wallet sized cards.

8. An article feeder according to claim 1, wherein said articles comprise mail pieces that are further processed.

9. An article feeder comprising:

a feeder bin for holding a stack of articles, said feeder bin including a feed conveyor that advances said stack of articles along a path of travel;

a stripper belt mechanism that engages the first article in the stack along the path of travel for singularly drawing the article from the stack, wherein said stripper belt mechanism further comprises a biasing mechanism for biasing the stripper belt against the stack of articles and applying back pressure thereto, a switch connected to said biasing mechanism and said feed conveyor for actuating the feed conveyor when a predetermined amount of back pressure is exerted, wherein said biasing mechanism is adjustable for varying the back pressure against the stack of articles to accommodate articles of varying thickness.

10. An article feeder according to claim 9, wherein said stripper belt mechanism further comprises at least one stripper belt, pair of stripper rolls that support said at least one stripper belt.

11. An article feeder according to claim 10, and further comprising a stripper roll support shaft supporting each stripper roll, and a drive motor engaging one of said stripper roll support shafts for drivingly rotating said stripper roll support shaft and driving by belt action the other stripper roll.

12. An article feeder according to claim 9, wherein said biasing mechanism further comprises a spring.

13. An article feeder according to claim 12, and further comprising a support member that engages said spring and supports said stripper belt mechanism, wherein said spring is adjustable in tension to change the biasing against the support member and exerted by said stripper belt mechanism against the first article contained within the stack.

14. An article feeder according to claim 9, wherein said feeder bin comprises a support table that supports said conveyor feed.

15. An article feeder according to claim 9, wherein said articles comprise wallet sized cards.

16. An article feeder according to claim 9, wherein said articles comprise mail pieces that are further processed.

17. An article feeder comprising:

a feeder bin for holding a stack of articles, said feeder bin including a feed conveyor that advances said stack of articles along a path of travel;

a stripper belt mechanism that engages the first article in the stack along the path of travel for singularly drawing the article from the stack, wherein said stripper belt

mechanism further comprises a biasing mechanism for biasing the stripper belt against the stack of articles and applying back pressure thereto, a switch connected to said biasing mechanism and said feed conveyor for actuating the feed conveyor when a predetermined amount of back pressure is exerted, wherein said biasing mechanism is adjustable for varying the back pressure against the stack of articles to accommodate articles of varying thickness;

a feed discharge belt assembly for receiving the drawn article from the stripper belt mechanism.

18. An article feeder according to claim 17, wherein said stripper belt mechanism further comprises at least one stripper belt, pair of stripper rolls that support said at least one stripper belt.

19. An article feeder according to claim 18, and further comprising a stripper roll support shaft supporting each stripper roll, and a drive motor engaging one of said stripper roll support shafts for drivingly rotating said stripper roll support shaft and driving by belt action the other stripper roll.

20. An article feeder according to claim 17, wherein said biasing mechanism further comprises a spring.

21. An article feeder according to claim 17, and further comprising a support member that engages said spring and supports said stripper belt mechanism, wherein said spring is adjustable in tension to change the biasing against the support member and exerted by said stripper belt mechanism against the first article contained within the stack.

22. An article feeder according to claim 17, wherein said feeder bin comprises a support table that supports said conveyor feed.

23. An article feeder according to claim 17, wherein said articles comprise wallet sized cards.

24. An article feeder according to claim 17, wherein said articles comprise mail pieces that are further processed.

25. A method of feeding an article comprising the steps of:

advancing a stack of articles against a stripper belt mechanism that engages the first article contained within the stack of articles; and

drawing vacuum on the first article to draw the first article against the stripper belt mechanism, wherein said stripper belt mechanism is adjustably biased against said stack of articles for accommodating articles of varying thickness.

26. A method according to claim 25, and further comprising the step of supporting at least one stripper belt with a pair of stripper rolls.

27. A method according to claim 25, and further comprising the step of biasing the stripper belt mechanism with a spring, and adjusting the spring in tension for adjusting back pressure.

28. A method according to claim 25, wherein said articles comprise wallet sized cards.

29. A method of feeding an article comprising the steps of:

advancing a stack of articles along a feed conveyor against a stripper belt mechanism that engages the first article contained within the stack of articles;

biasing the stripper belt mechanism against the stack of articles and actuating the feed conveyor when a predetermined biasing force is placed against said articles; and

drawing vacuum on the first article to draw the first article against the stripper belt mechanism, wherein said stripper belt mechanism is adjustably biased against said stack of articles for accommodating articles of varying thickness.

30. A method according to claim 29, and further comprising the step of supporting at least one stripper belt with a pair of stripper rolls.

31. A method according to claim 29, and further comprising the step of biasing the stripper belt mechanism with a spring, and adjusting the spring in tension for adjusting back pressure.

32. A method according to claim 29, wherein said articles comprise wallet sized cards.

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