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Sadegh et al.

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(54) **AUTOMATIC PAGE TURNER WITH BELT DRIVE ELEMENT**

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(65) **Prior Publication Data**

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(52) **U.S. Cl.** **40/531**; 84/487; 40/470
(58) **Field of Search** 40/343, 531, 470, 40/475, 466; 84/487, 493, 502–507

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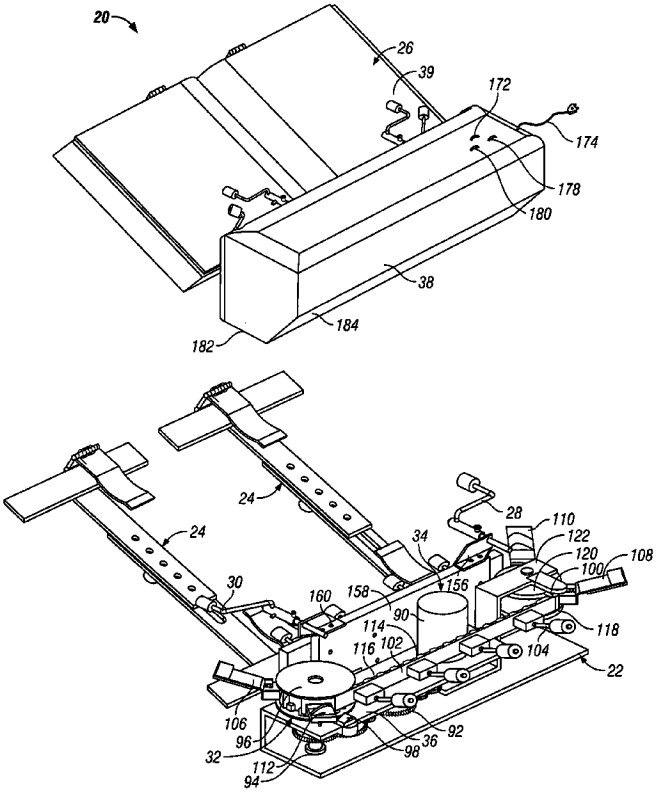
(57) **ABSTRACT**

An apparatus for turning bound pages, the apparatus having a frame; a book support assembly coupled to the frame; at least one pickup arm coupled to the frame; a motor assembly coupled to the frame; and a conveyor assembly coupled to the frame. The conveyor assembly has a belt; a plurality of fingers coupled to the belt; and at least one actuator coupled to the belt. A subset of the plurality of fingers hold the book in an open condition. Upon rotation of the belt by the motor assembly, the at least one actuator causes the at least one pickup arm to lift a portion of a page while a subset of the plurality of fingers hold the bound pages in an open condition and turn the lifted page.

14 Claims, 12 Drawing Sheets



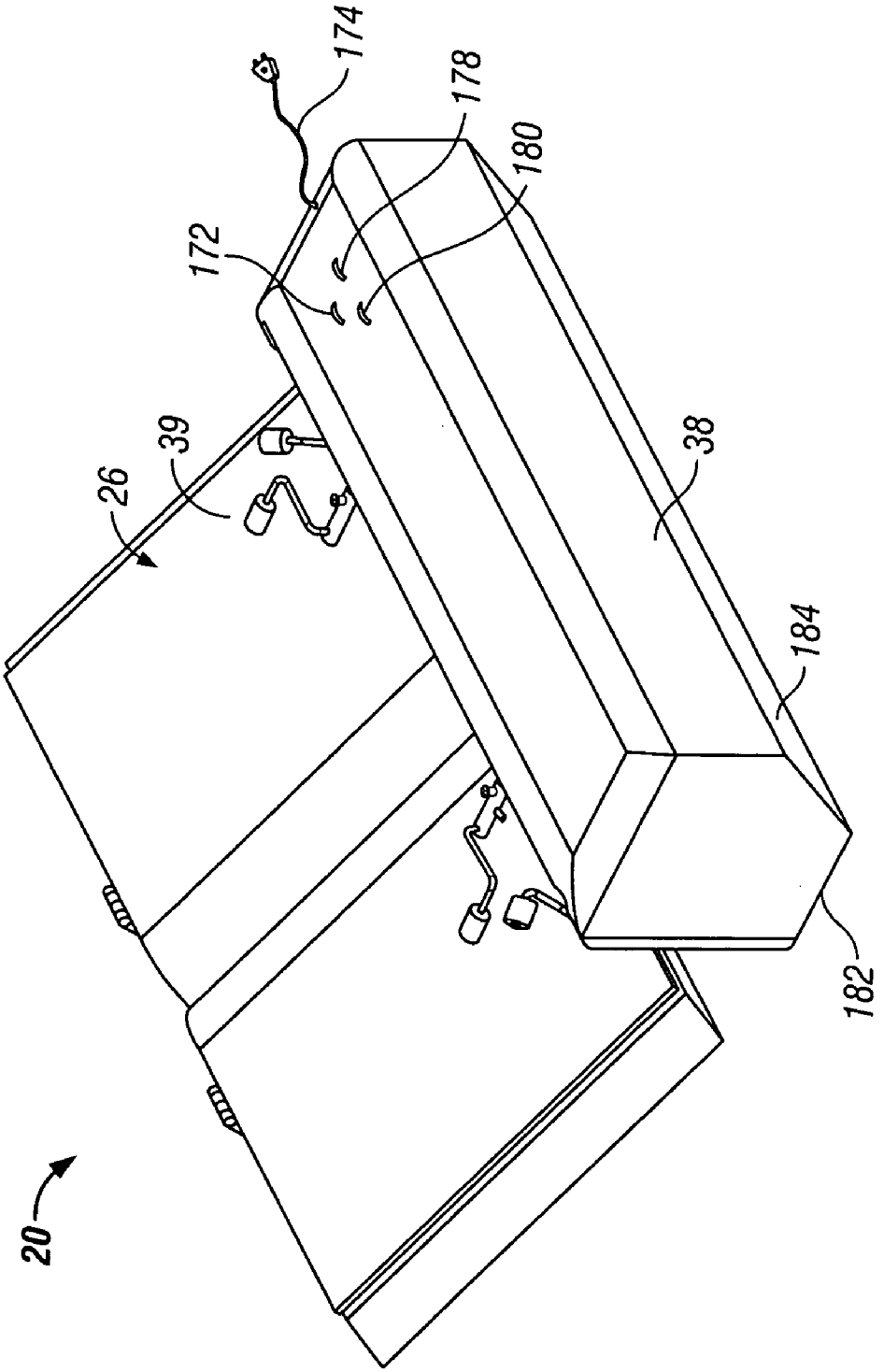


FIG. 1

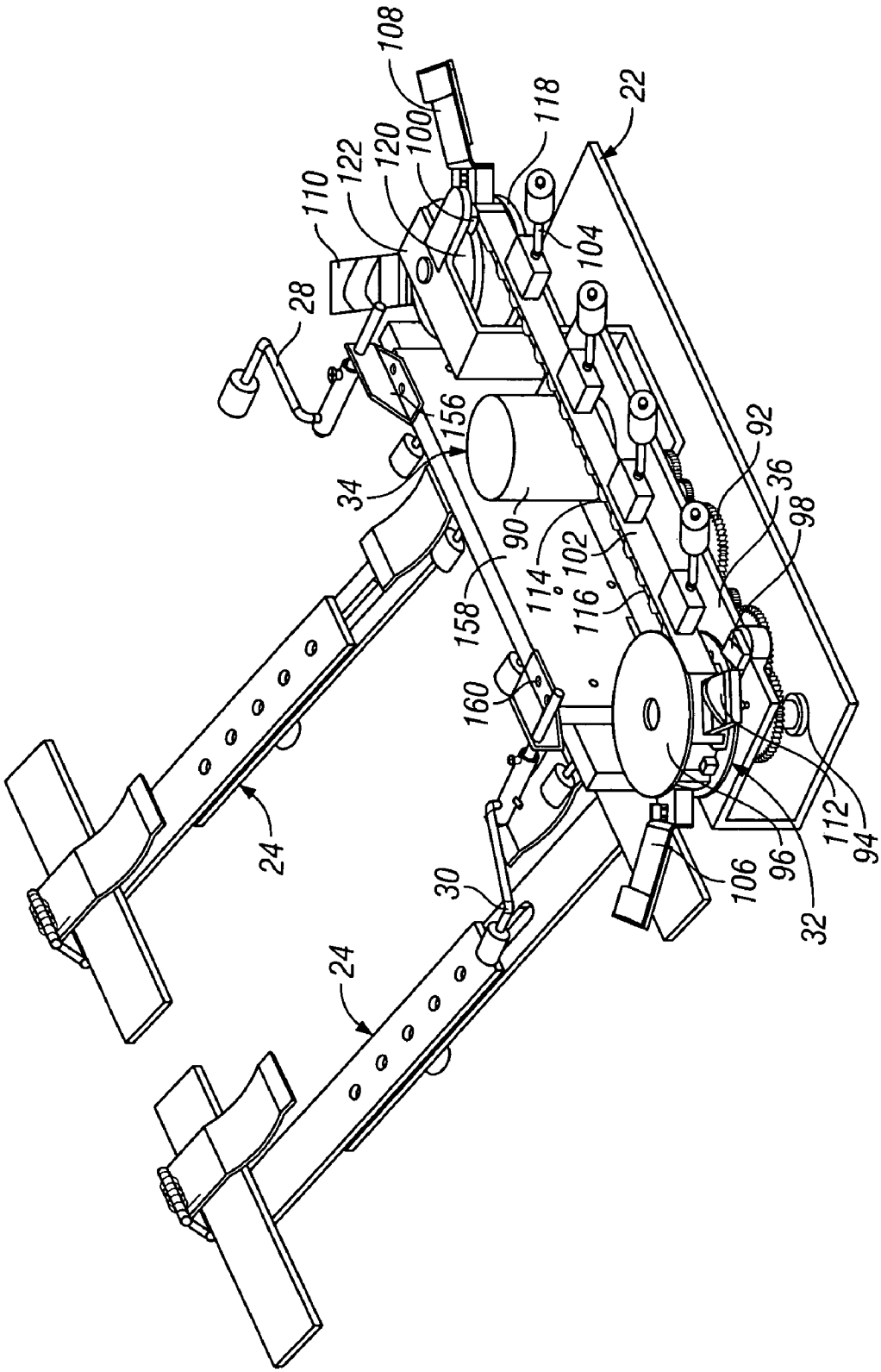


FIG. 2

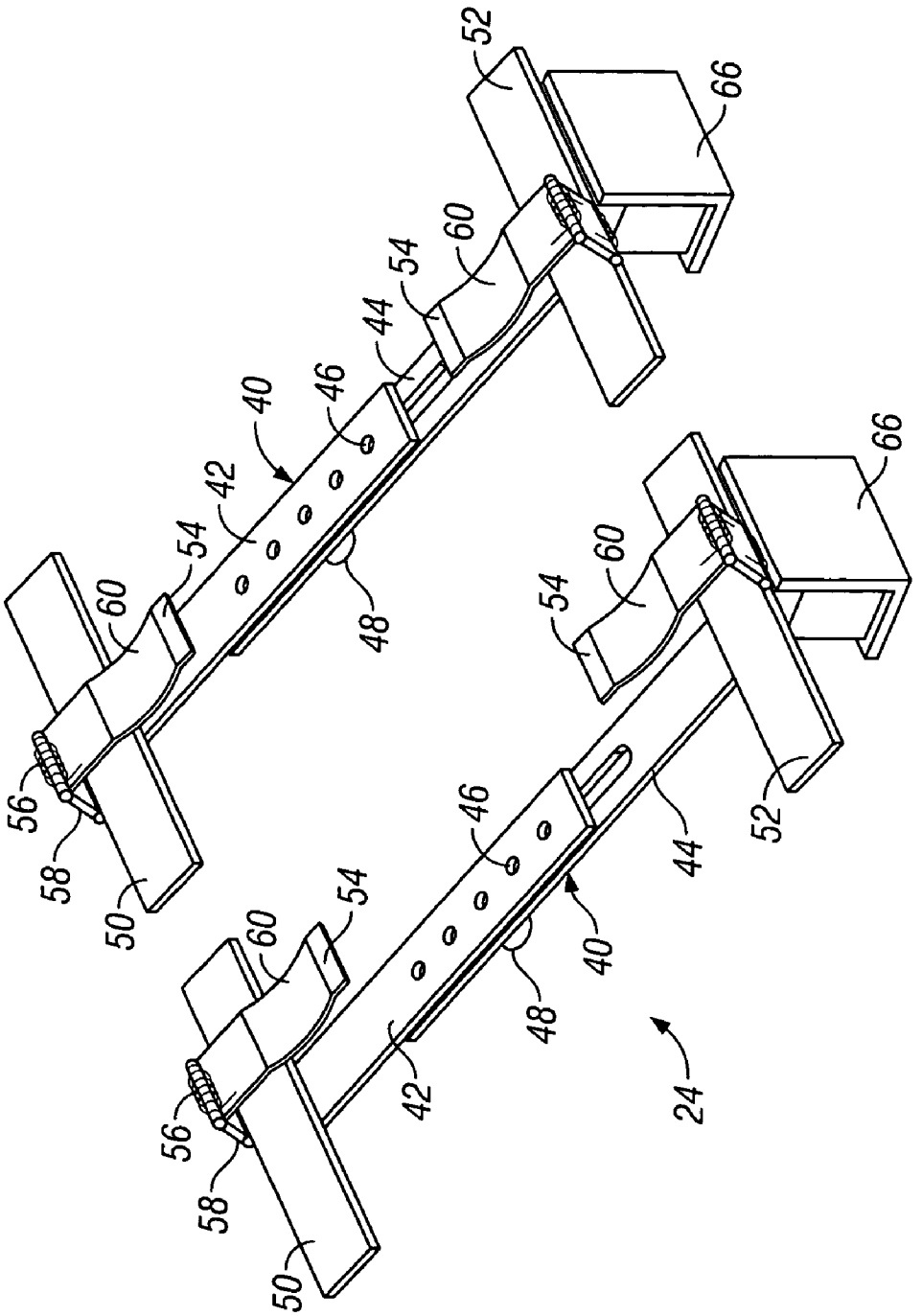


FIG. 3

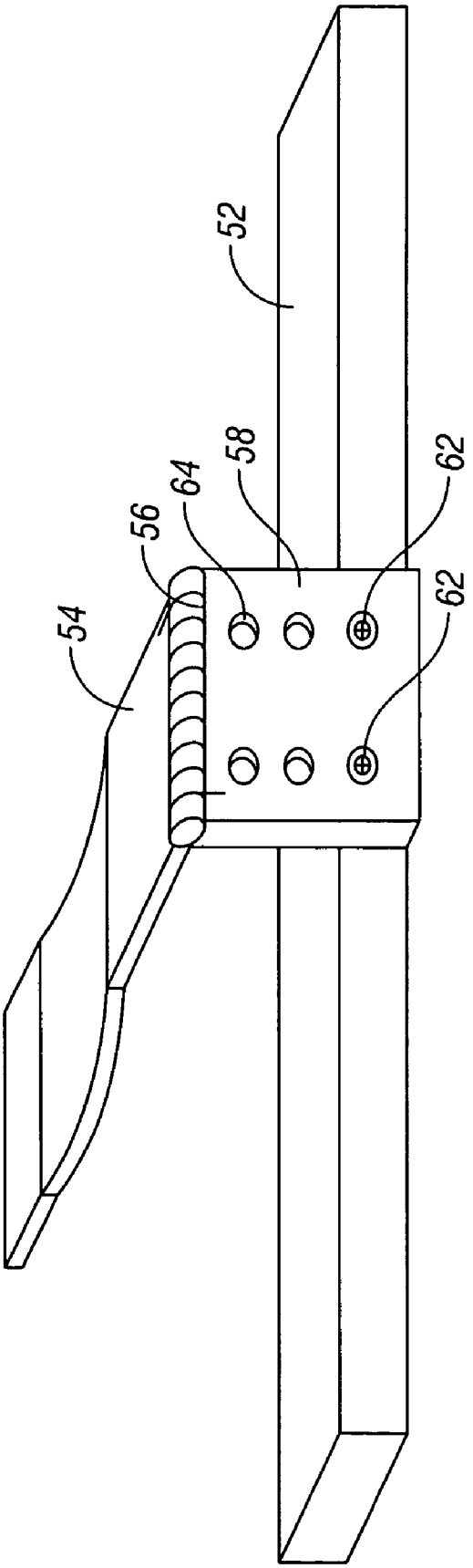


FIG. 4

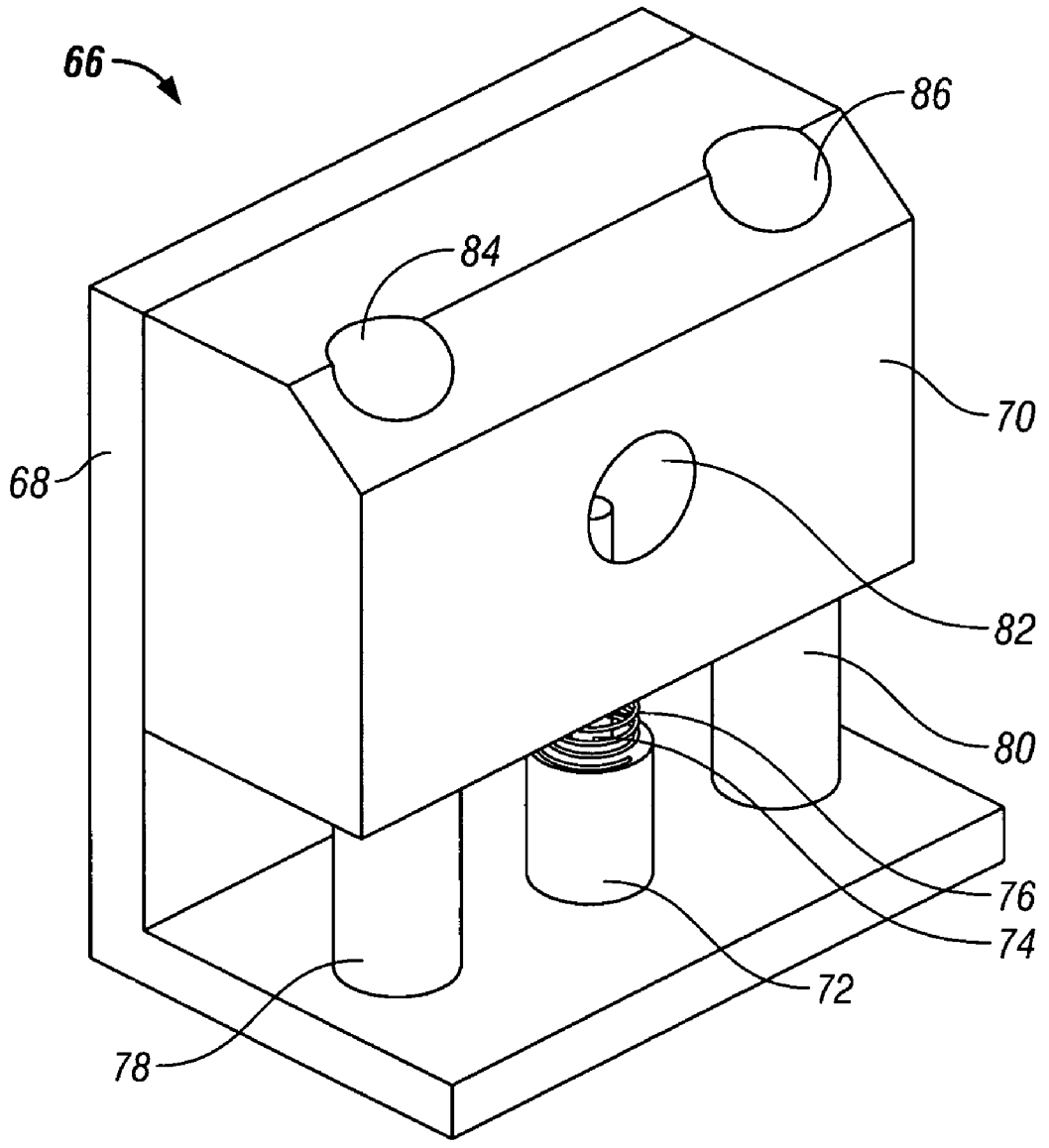


FIG. 5

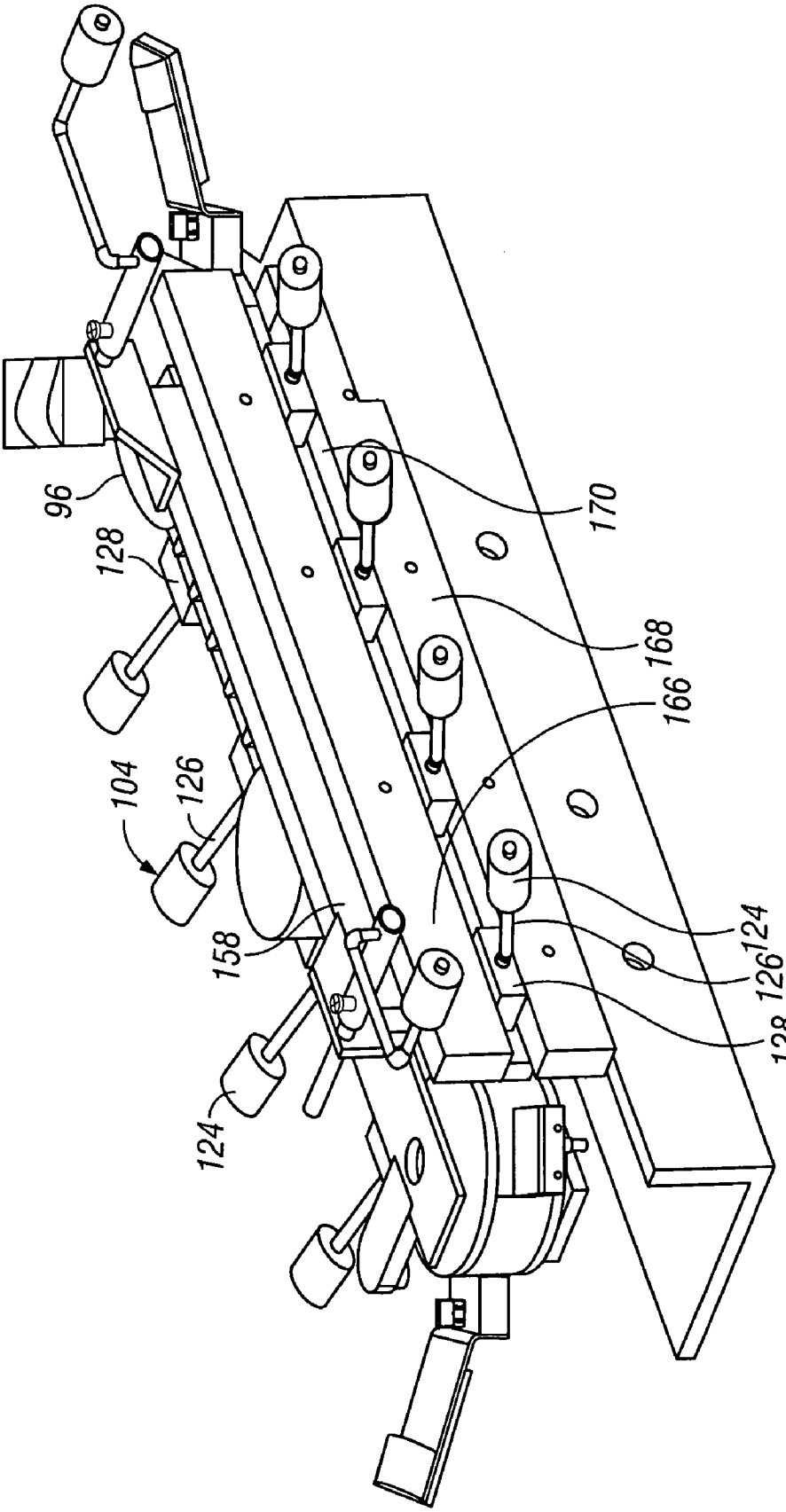


FIG. 6

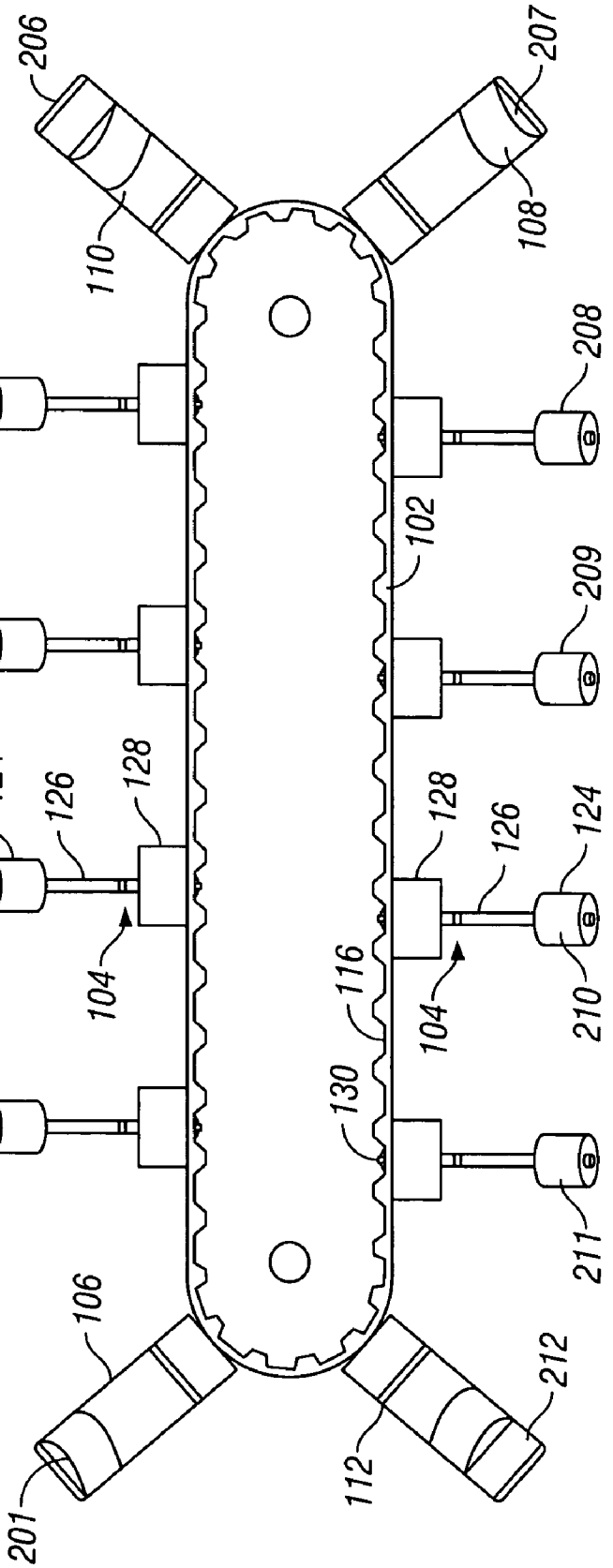


FIG. 7

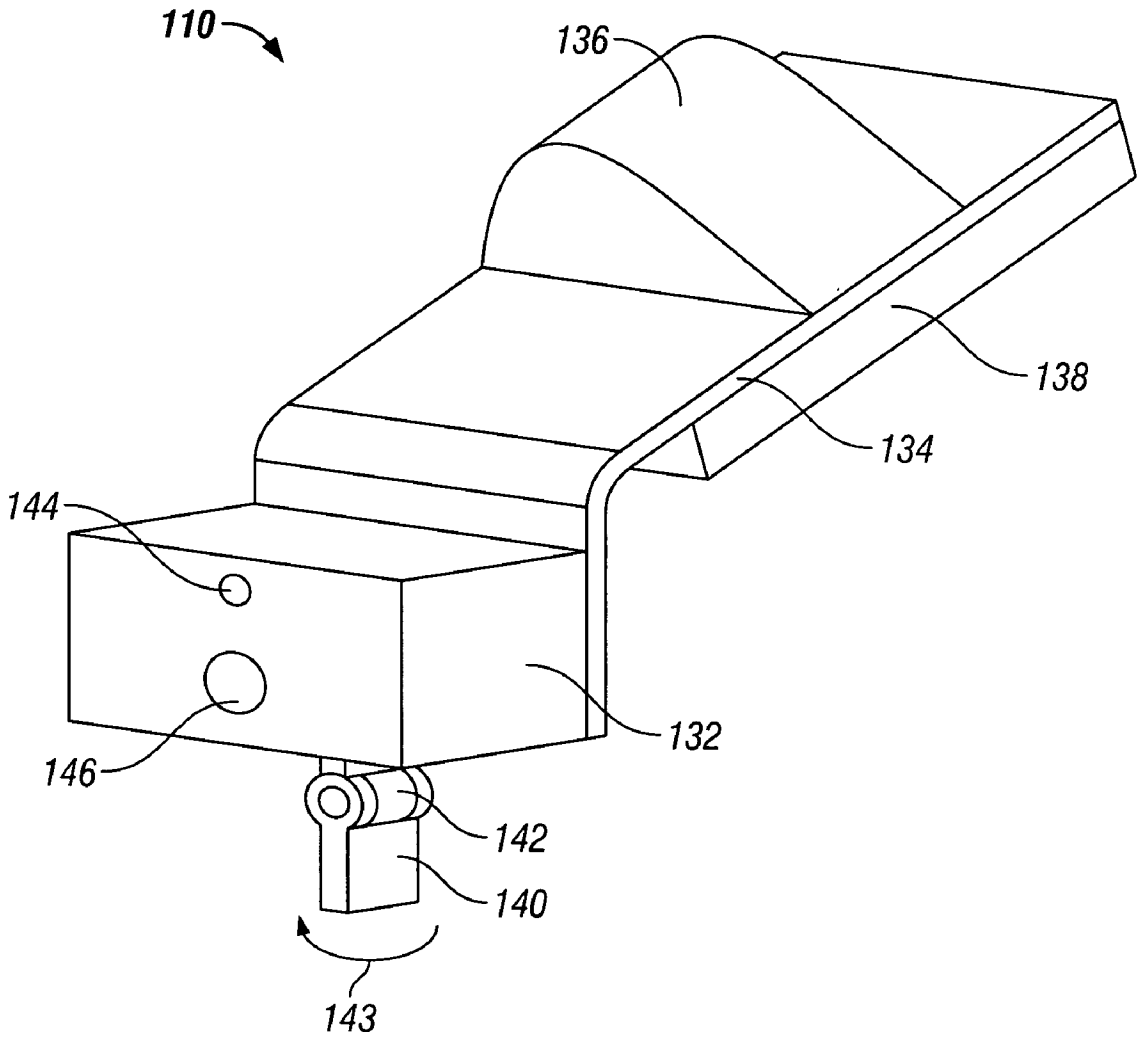


FIG. 8

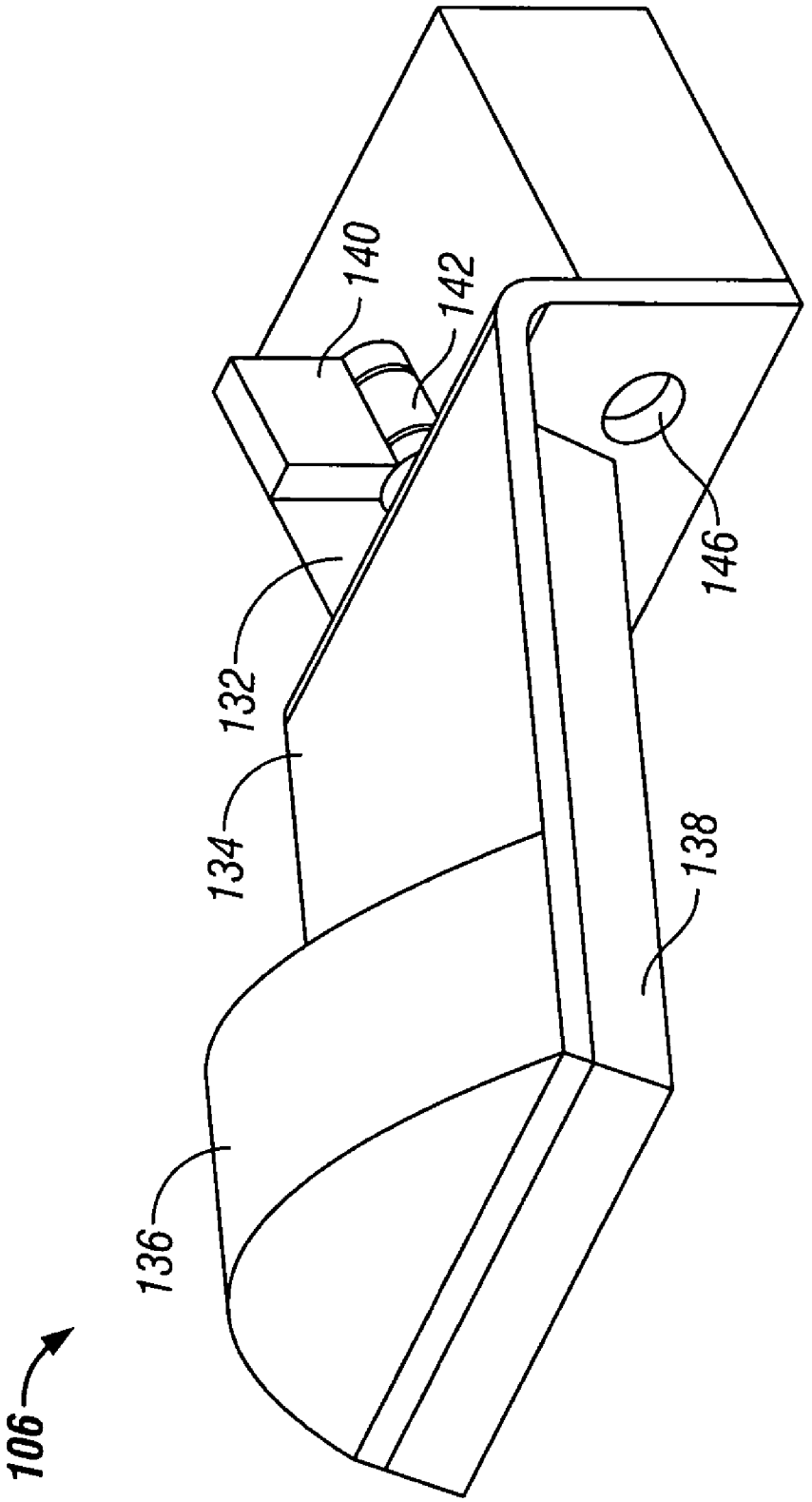


FIG. 9

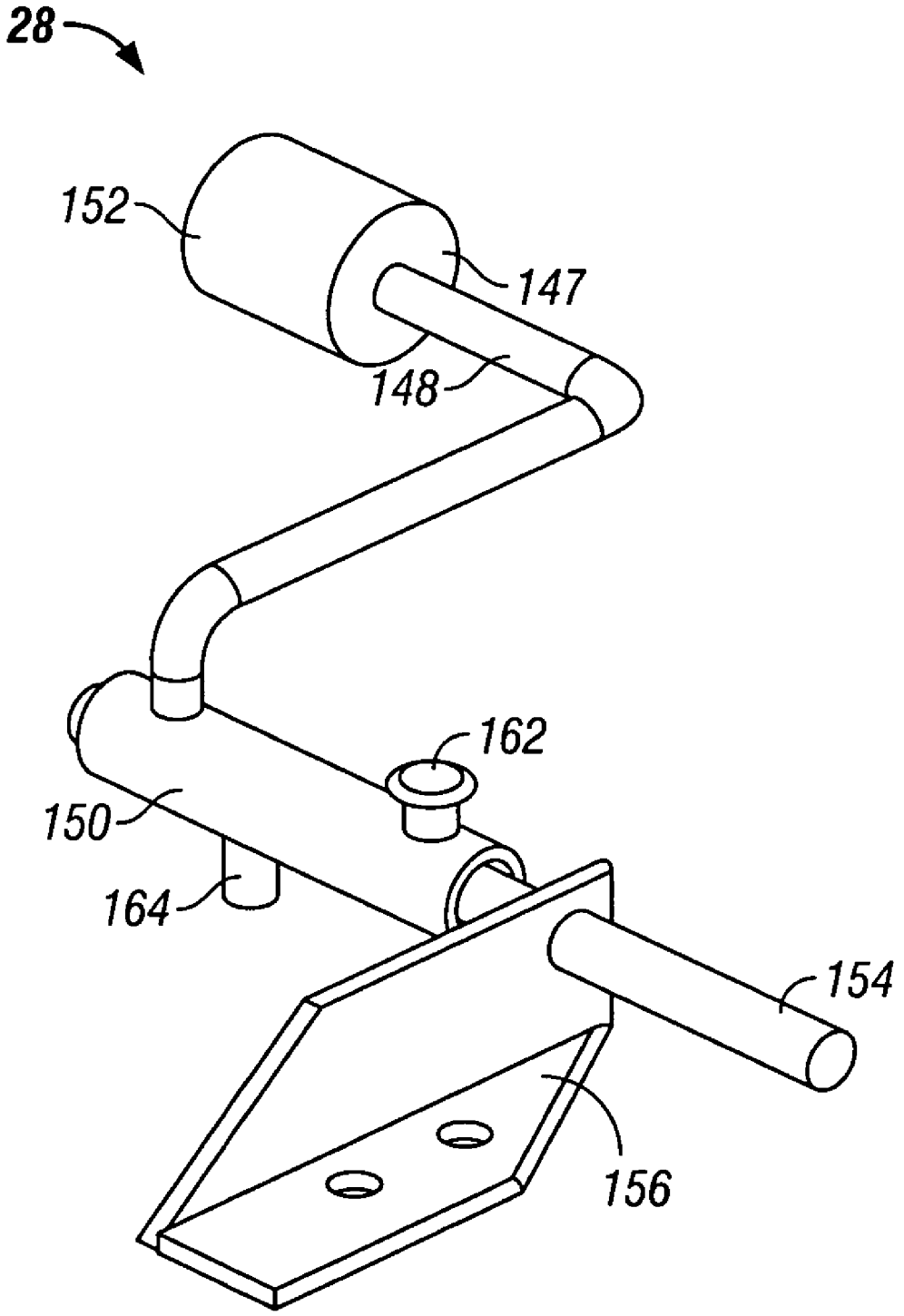


FIG. 10

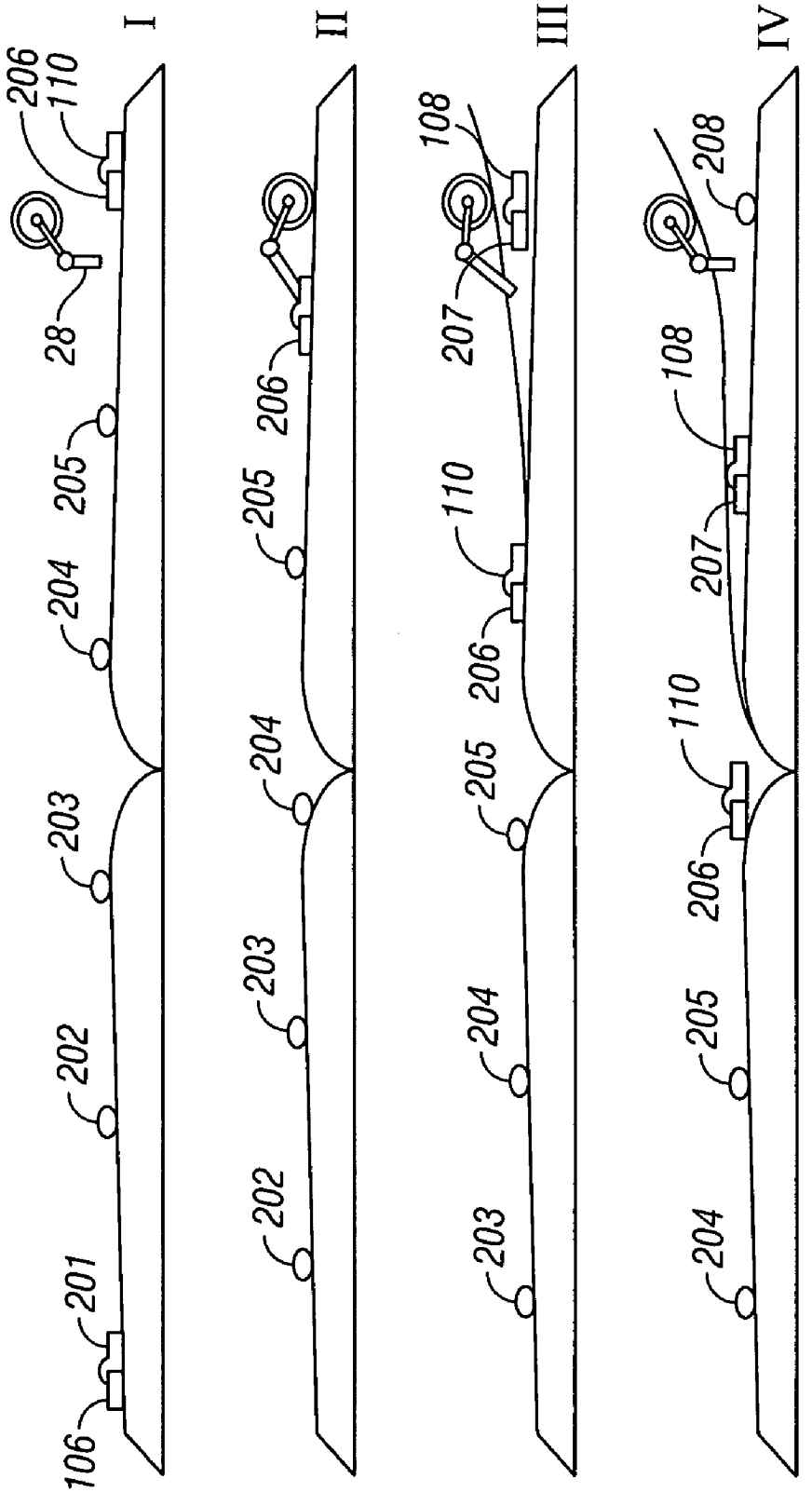


FIG. 11A

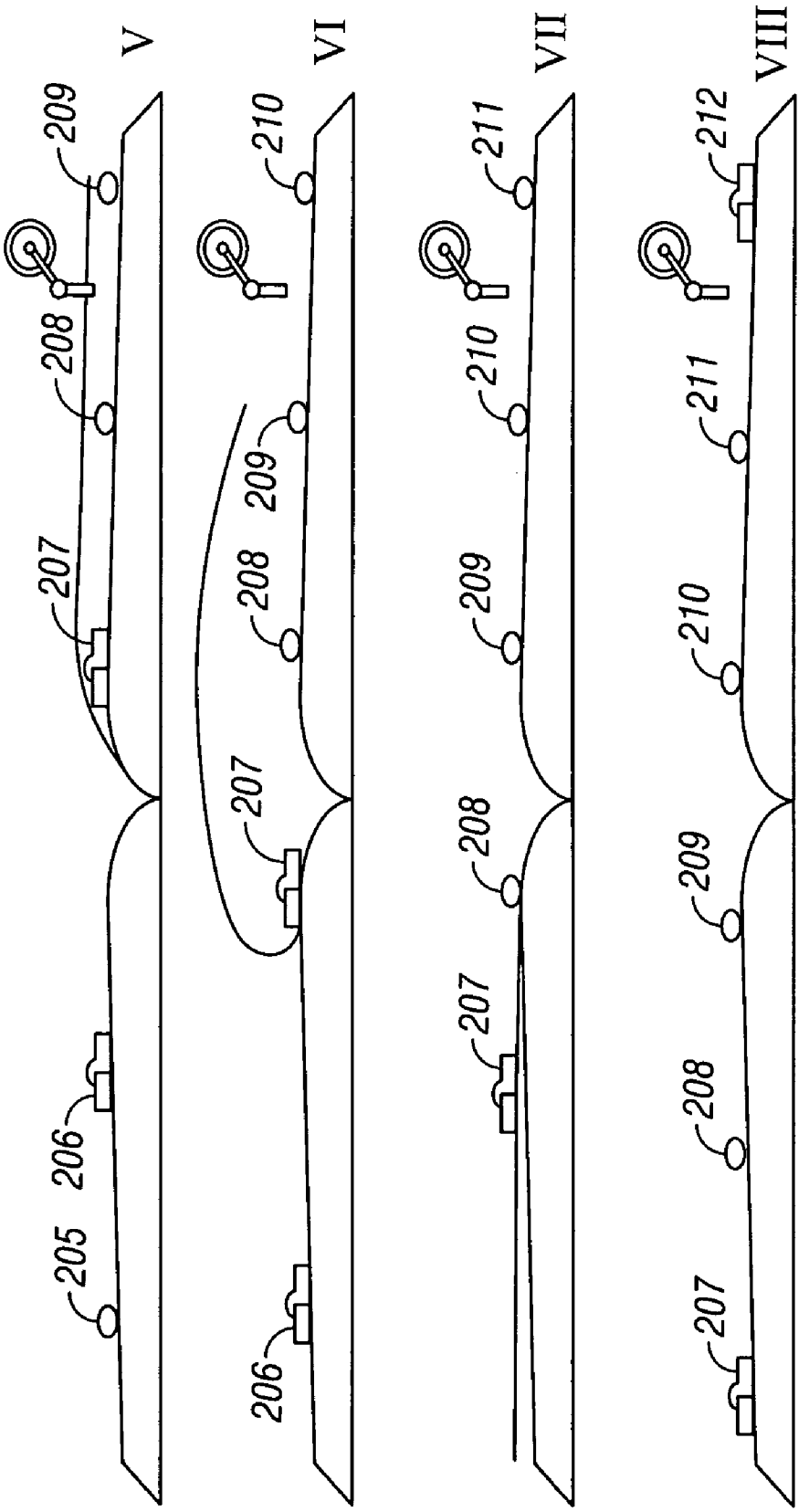


FIG. 11B

AUTOMATIC PAGE TURNER WITH BELT DRIVE ELEMENT

BACKGROUND

The present invention relates to a compact page turning device suitable for turning bound pages.

Page turning is an important ancillary process of reading. It is a pervasive task that many people take for granted. An automatic page turner can assist people with disabilities and the elderly, who may have limited upper extremity function. A page turner can also furnish hands-free operation to musicians, and provide avid readers with convenient book support and page turning features.

While there are many patents on the subject of automatic page turners, virtually none of them have led to successful working products. This is due to the fact that all of the patents lack one or two of the three major functions of a successful page turner: engagement with the page, transport of the page, and restraining the book pages to lie flat. A review of the patents identifies several design flaws, including unreliable and noisy mechanisms for engaging one page at a time, and cumbersome preprocessing whereby clips or tabs must be attached to each page.

Some relevant patents in this area include, U.S. Pat. No. 4,040,195 to Claypool et al.; U.S. Pat. No. 4,160,334 to Willis; U.S. Pat. No. 4,644,675 to Berger et al.; U.S. Pat. No. 4,719,712 to Moreau et al.; U.S. Pat. No. 5,203,248 to Carr et al.; U.S. Pat. No. 5,233,900 to Fitzgerald; U.S. Pat. No. 5,373,772 to Shemoul; U.S. Pat. No. 5,493,943 to Horikawa; U.S. Pat. No. 5,575,097 to Chou et al.; U.S. Pat. No. 5,962,801 to Bowman et al.; U.S. Pat. No. 6,049,033 to Dallas. The present invention seeks to remedy the defects of the prior art.

SUMMARY OF THE INVENTION

The present invention is directed to an apparatus for turning bound pages. In one embodiment of the present invention, the apparatus has a frame; a support assembly coupled to the frame; at least one pickup arm coupled to the frame; a motor assembly coupled to the frame; and a conveyor assembly coupled to the motor assembly. The conveyor assembly has a belt; a plurality of fingers coupled to the belt; and at least one actuator coupled to the belt. A subset of the plurality of fingers holds the bound pages in an open condition. Upon rotation of the belt by the motor assembly, the actuator causes the pickup arm to lift a portion of a page. At least one of the plurality of fingers turns the lifted page while another of the plurality of fingers holds the bound pages in an open condition.

The motor assembly can have a motor; a gear reduction train coupled to the motor; a clutch coupled to the gear reduction train; and a sprocket coupled to the clutch, the sprocket being connectable to the belt. Optionally, the motor is reversible. At least one button can be electrically coupled to the motor for energizing the motor. Optionally, at least one of a foot pedal, a breath-controlled switch, a chin switch, a voice activation device, or a computerized timer is electrically coupled to the motor for energizing the motor.

The support assembly can have two expandable spines, each spine having a proximal end and a distal end. A crossbar support can be mounted on each end of the spine. A clamp can be mounted on each crossbar support by a spring hinge, the spring hinge providing a bias force on the bound pages.

Each spine can be attached to the frame by a mounting bracket. Optionally, the mounting bracket has a frame; a base having two vertical cylindrical cavities, and an angled cylindrical cavity coupled to the proximal end of one of the spines. The mounting bracket can also have a center rod having an inner rod; a spring located coaxially around the center rod; and a plurality of guiding rods located on each side of the center rod, the guiding rods being coupled to the frame and insertable in the two vertical cavities of the base. The base is moveable along the two guiding rods to generate a reaction bias force in the spring.

Optionally, the conveyor assembly further comprises: two right actuators coupled to the belt and two left actuators coupled to the belt. Each finger can have a base; an arm coupled to the base; and a roller coupled to the arm. The actuator can have a base coupled to the belt; a frame coupled to the base; a cam coupled to the frame; and a switch trigger coupled to the base. The switch trigger on the actuator is only rotatable in one direction.

Optionally, the pickup arm can have: a bracket mountable to the frame; a shaft mounted to the bracket; an arm coupled to the shaft, the arm having a proximal end and a distal end, the arm being bent, curved or angled; a roller rotatably coupled to the distal end of the arm, the surface of the roller being covered with an adhesive; a torsional spring coupled to the shaft, the torsional spring applying a bias torque to the arm and thereby maintaining the arm in a neutral position; and a follower pin coupled to the shaft. The follower pin impacts the actuator to rotate the arm and place the roller in contact with the page of the book. Upon release of the follower pin by the actuator, the spring provides a bias torque and lifts the arm. Optionally, the roller could be replaced with a suction means, where a pneumatic negative pressure will lift the page.

The present invention is also directed to a method for turning bound pages comprising: selecting the apparatus of the present invention; placing bound pages in the support assembly; and energizing the motor assembly to turn at least one of the bound pages.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the present invention will be had with reference to the accompanying drawings in which:

FIG. **1** is a front perspective view of one embodiment of the page turner of the present invention shown with a book;

FIG. **2** is a front perspective view of the page turner of FIG. **1**, shown without the casing;

FIG. **3** is a front perspective view of the book support assembly of FIG. **2**;

FIG. **4** is a perspective view of one of the crossbar clips of FIG. **3**;

FIG. **5** is a perspective view of one of the book support brackets of FIG. **3**;

FIG. **6** is a rear perspective view of the page turner of FIG. **1**;

FIG. **7** is a top view of the belt with attached fingers usable with the invention;

FIG. **8** is a perspective view of one of the right actuators of FIG. **2**;

FIG. **9** is a perspective view of one of the left actuators of FIG. **2**;

FIG. **10** is a perspective view of one of the pickup arms of FIG. **2**;

FIG. **11**A is a schematic view depicting a first portion of the page turning process; and

FIG. **11**B is a schematic view depicting a second portion of the page turning process.

DETAILED DESCRIPTION

As shown in FIGS. **1** and **2**, an automatic page turner **20** according to one embodiment of the present invention generally has a frame **22**. A book support assembly **24** for holding a book **26** is coupled to the frame **22**. Also coupled to the frame **22** is a right pickup arm **28**, a left pickup arm **30** and a conveyor assembly **32**. A motor assembly **34** is coupled to the frame **22** by a support **36**. A cover **38** is coupled to the frame **22** and covers the conveyor assembly **32** and the motor assembly **34**. As will be explained below, the conveyor assembly **32**, in conjunction with the right pickup arm **28** and the left pickup arm **30**, are operated to turn pages **39** of the book **26**.

The book support assembly **24** will now be considered in more detail. As shown in FIG. **3**, the book support assembly **24** comprises two telescopic spines **40**. Each telescopic spine has an upper member **42** and a lower member **44**. Optionally, the upper and lower members **42**, **44** can slide over one another through a tongue and groove. The upper and lower members **42**, **44** can be made of hard materials such as metal or plastic. Optionally, the total height of the spines **40** can be fixed by a series of pinholes **46** and setscrews **48**.

An upper crossbar **50** is attached at a distal end of each upper member **42**. A lower crossbar **52** is attached to the proximal end of each lower member **44**. A clip **54** is connected to each of the upper and lower crossbars **50**, **52** through a spring **56** and an adjustable clip support **58**. The clip **54** is biased by the spring **56** so as to apply a restraining force on the book pages to keep the book open. In one embodiment, the clip **54** has a contact region **60** that is curved toward the upper member **42** for increasing the contact force between the clip and the book pages.

As shown in FIG. **4**, each clip support **58** is attached to one of the upper or lower crossbars **50**, **52** using a pair of pins **62** inserted into a pair of pinholes **64**. Depending on the number of pages on each side of the book **26**, the height of the clip support **58** is adjusted by using an appropriate set of pinholes **46**.

The lower members **44** of the spines **40** are attached to the frame **22** through two support brackets **66**. As shown in FIG. **5**, each support bracket **66** has a frame **68**, a base **70**, and a center tube **72** connecting the base **70** to the frame **68**. The center tube **72** has an inner rod **74** and a spring **76** located coaxially around the rod **74**. First and second guiding rods **78**, **80** also connect the base **70** to the frame **68**.

The base **70** has disposed in it a first cylindrical cavity **82** which has an angle of about 60 degrees with respect to a vertical rear plane of the frame **68**. The proximal end of the lower member **44** of the spine **40** is rod shaped and is insertable into the first cylindrical cavity **82** of the base **70**.

The base **70** also has disposed in it second and third vertically oriented cylindrical cavities **84**, **86** into which slide the first and second guiding rods **78**, **80**. Additionally, the base **70** has disposed in it a fourth vertically oriented cylindrical cavity (not shown) into which slides the inner rod **74**. The base **70** can slide downward upon exertion of a downward force against the spring **76**. The book support assembly is pushed upward by the spring **76** to ensure a proper orientation of the book with respect to the other arts of the automatic page turner.

Considering the motor assembly **34** in more detail, as shown in FIG. **2**, the support **36** coupled to the frame **22** provides bearing support for a motor **90**. The motor **90** is coupled to a gear reducer train **92**, which is in turn coupled to a clutch **94** and a driver sprocket **96**. The motor **90** can be any small conventional electric motor. A right limiting switch **98** and a left limiting switch **100** are rigidly attached to the left and the right side of the support **36**, respectively. The limiting switches disconnect the power from the motor **90**.

As shown in FIG. **2**, the conveyer assembly has a timing belt **102**. The timing belt **102** has a series of fingers **104**, two left actuators **106**, **108**, and two right actuators **110**, **112**. The timing belt **102** has a plurality of teeth **114** and a plurality of depressions **116** located on its interior surface. The timing belt **102** is placed around a sheave **118** of a pulley **120** coupled to the frame **22** by a bracket **122**. The timing belt **102** is also placed around the drive sprocket **96** where the timing belt teeth **114** are engaged with a series of teeth (not shown) on the sprocket **96**.

As shown in FIGS. **6** and **7**, a typical finger **104** has a cylindrical roller **124** that is attached to an arm **126**, which is attached to a base **128**. Alternatively, a finger **104** may have a flat sliding means (not shown) attached to the arm **126**. The base **128** is attached to the timing belt **102** using fasteners known in the art, such as a screw **130**. The arm **126** is bent about 60 degrees with respect to the vertical side of the page turner apparatus. The base **128** is attached to the belt **102** so that the head of the screw **130** is located in the middle of one of the depressions **116** of the belt **102**. To accommodate the screw head, the teeth of the sprocket **96** have a circumferential cut (not shown).

The actuators will now be considered in more detail. As shown in FIG. **8**, each of the right actuators **110**, **112** has a base **132** coupled to a frame **134**. A cam **136** is coupled to a middle section of the frame **134**. Additionally a plate **138** with a soft material is coupled to the frame **134**. An actuating arm **140** is attached on a bottom side of the base **132** through a torsional spring hinge **142**. The spring hinge **142** allows the actuating arm **140** to rotate only in a clockwise direction as indicated by the arrow **143** in FIG. **8**.

When the belt **102** rotates in either direction, the actuating arm **140** contacts the right limiting switch **98**. The hinge **142** only allows for activation of the left limiting switch **100** if the belt **102** is rotating in a counterclockwise direction. When the belt **102** rotates clockwise, the actuating arm **140** rotates clockwise about the spring hinge **142** and does not activate the switch **98**.

As shown in FIG. **9**, the left actuators **106**, **108** have a similar configuration to the right actuators **110**, **112** except the actuating arm **140** and the torsional spring hinge **142** are located on an upper surface of the base **132**. Additionally, the cam **136** is located at a distal end of the frame **134**. The spring hinge **142** allows the actuating arm **140** to rotate only in a clockwise direction.

When the belt **102** rotates in either direction, the actuating arm **140** contacts the right limiting switch **100** and only actuates the right limiting switch **100** in the clockwise rotation of the belt **102**. When the belt **102** rotates counter-clockwise, the actuating arm **140** rotates clockwise about the spring hinge **142** and does not activate the switch **98**.

The bases of the actuators are coupled to the timing belt **102**. In one embodiment, as shown in FIGS. **8** and **9**, each base **132** has a pinhole **144** and a threaded hole **146**. A pin (not shown) and a screw (not shown) are inserted through the belt **102** and into the pinhole **144** and the threaded hole **146** to secure the base **132** to the belt **102**.

As shown in FIG. **10**, the right pickup arm **28** comprises a cylindrical roller **147** rotatably mounted to an L-shaped

arm **148**, which is coupled to a cylinder **150**. A surface **152** of the roller **147** is covered with an adhesive. A rigid bar **154** is located coaxially inside the cylinder **150** and provides a bearing for the cylinder **150**. The bar **154** is rigidly connected to a base bracket **156**. As shown in FIG. **2**, the base bracket **156** is rigidly connected to a guide plate **158** using a fastener known in the art, such as a screw **160**. The guide plate **158** is connected to the support **36**.

As shown in FIG. **10**, a torsional spring (not shown) is coaxially located around the bar **154** and is secured between a pin **162** connected to the cylinder **150** and the base bracket **156**. The biased spring applies a bias torque to the L-shaped arm **148** and keeps the arm in a neutral horizontal position. A follower pin **164** is rigidly attached to the cylinder **150** at a location such that it only engages the cam **136** of one of the right actuators **110**, **112**.

When one of the right actuators **110** moves under the right pickup arm **28**, from the right to the left, the pin **164** moves over the cam **136** and causes the arm **148** to turn to the right (clockwise) and the roller **147** and the adhesive on the surface **152** of the roller come in contact with a book page **39**. Once the right actuator **110** passes the pin **164**, the biased spring turns the arm **148** (counterclockwise) and the book page **39** is lifted. Although a roller with an adhesive is used in the exemplary embodiment of the present invention illustrated herein, the roller can be replaced with another lifting device known in the art, such as a suction cup where a pneumatic negative pressure will lift the page.

The left pickup arm **30** is a mirror image of the right pickup arm **28** except that the pin **164** is located so that the pin **164** only comes in contact with the cam **64** of one of the left actuators **106**, **108**. It will be appreciated by those skilled in the art that the L-shaped arm **148** does not necessarily have to be L-shaped, but rather may be otherwise bent, curved, or angled such that the roller **147** is placed in contact with a book page **39** upon rotation of the arm **148**.

To constrain the fingers **104** and the actuators **106**, **108**, **110** and **112** with respect to the timing belt **102** and the book **26**, two guide rails **166**, **168** are attached to the guide plate **158** and the support **36**, as shown in FIG. **6**. The two guide rails **166**, **168** are separated to create a slot **170**, which has the same height as the finger base **128** and the actuator base **132**. The timing belt **102**, which is flexible in the region between the pulley **120** and the sprocket **96**, is also restrained by passage through a belt slot (not shown) on the guide plate **158**. When the sprocket **96** is turned, the finger bases **128** and the actuator bases **132** pass through the slot **170**. Optionally, both ends of the slot **170**, the edges of the finger bases **128**, and the edges of the actuator bases **132** can be rounded to minimize the friction as the fingers and actuators enter into and exit from the slot **170**. Optionally, the tolerance of the slot **170** can be tighter at both of its ends than at its midsection to further reduce friction.

As shown in FIG. **1**, an on/off switch **172**, located on the cover **38**, energizes the page turner **20** through an electric cord **174** electrically coupled to a conventional electrical outlet. In an additional embodiment, the page turner **20** is a portable cordless apparatus in which a set of batteries are used to energize the page turner **20**.

Upon manually pressing a forward button **178** located on the cover **38**, the motor **90** is energized. Once energized, the motor **90**, in conjunction with the gear reducer train **92** and the clutch **94**, rotates the sprocket **96** and the timing belt **102** in a counterclockwise direction to turn the page **39** from right to left (forward).

Similarly, upon pressing a reverse button **180** located on the cover **38** the motor **90** is energized. Once energized the motor **90**, in conjunction with the gear reducer train **92** and the clutch **94**, rotates the sprocket **96** in a clockwise direction to turn the page **39** from left to right (reverse).

Instead of the on/off, forward, and reverse buttons located on the casing, other triggers may be employed. Alternative triggers including, but not limited to, foot pedals, breath-controlled switches, chin switches, voice activation devices, or computerized timers, can be used to energize the motor **30** in either forward or reverse directions. The clutch **94** is a safety clutch that limits the maximum torque for the shaft over which the sprocket's shaft turns idle.

Operation of the page turner **20** according to one embodiment of the present invention will now be considered in more detail. First, the book is restrained in the book support assembly **24**. The length of the spines **40** is adjusted by sliding the upper and lower members **42**, **44** of each spine to the height of the book. The length of the spines **40** is then fixed using the pinholes **46** and set screws **48**. The two sides of the book **26** are placed on the two spines **40**. Clips **54** are used to restrain the top and the bottom of each sides of the book, leaving only about 50 loose (floating) pages on each side of the book. More or less pages can be left loose depending on how fast and how long a user intends to read.

Once the book **26** is restrained in the book support assembly **24**, the book support assembly is connected to the frame **22** through the book support bracket **66**. The springs **76** of the two brackets **66** exert an upward force on the book, thereby pushing the loose pages against the fingers **104**.

FIG. **7** shows the rest positions of the left actuators **106**, **108** and the right actuators **110**, **112**. The actuators are located symmetrically with respect to a center of the belt **102**. There are several fingers **104** attached to the timing belt **102**. The fingers **104** are equally spaced over the regions of the belt, located between adjacent pairs of actuators. The number of fingers may be altered depending on the size of the book and the page turner.

In an exemplary embodiment, there are a total of eight fingers and four actuators. To explain the process of turning a page, the fingers and actuators are numbered **201** to **212**, as shown in FIG. **7**. The sequence of operation for turning a page forward is shown in steps I to IV in FIG. **11A**, and in steps V to VIII in FIG. **11B**.

The rest position of the fingers and the right pickup arm **28** is depicted in section I of FIG. **11A**. When the motor **90** is energized in a forward direction, the belt **102** rotates counterclockwise and one of the right actuators **110** (labeled as number **206** in FIGS. **7** and **11A**) moves from the right side toward the left side. As the belt **102** rotates, the fingers **104** (labeled as numbers **202** to **205**) roll across the pages **39** of the book **26** to the left, and the cam **136** of the right actuator **206** comes in contact with the pin **164** of the right pickup arm **28**.

As the cam **136** pushes against the pin **164**, the arm **28** turns clockwise (downward) so that the roller **147** and the adhesive on the surface **152** adhere to the book page **39**, as shown in section II of FIG. **11A**. Once the cam **136** has passed under the pin **164**, the spring (not shown) turns the arm **148** counterclockwise to its original upward position. This creates a curl and lifts the page **39** upward, as shown in section III of FIG. **11A**.

As the belt **102** continues to rotate counterclockwise, the contacting fingers **104** (labeled as numbers **203**, **204**, and **205**) continue to roll to the left over the pages **39** of the book **26**, and the adjacent actuator, a left actuator **108** (labeled as **207**), moves under the curled page **39**. The left actuator carries the page **39** over to the left side while an additional

finger **104** (labeled as **208**) rolls over a new page and under the old page, as shown in section IV of FIG. **11**A.

As shown in sections V and VI of FIG. **11**B, the rotation of the belt **102** and the leftward movement of the fingers continues and the page is carried to the left. The rotation of the belt **102** stops when the right actuator **206** reaches a location where the actuating arm **140** contacts the right limiting switch **98** thereby disconnecting power to the motor **90**, as shown in section VII of FIG. **11**B. As the motor **90** stops, the left actuator **207**, reaches a leftmost position, and the forward cycle is completed, as shown in section VIII of FIG. **11**B.

In the reverse direction, an example of which will be considered in conjunction with the numbering shown in FIG. **7**, the motor **90** rotates the belt **102** in the clockwise direction and moves the left actuator **106** (labeled as **201** in FIG. **7**) located at the left side of the book to the right side of the book. As the cam **136** of the left actuator **201** moves under the pin **164** of the left pickup arm **30**, the arm **148** rotates such that the roller **147** and the adhesive on the surface **152** of the roller contacts the book page **39**. As in the forward cycle, once the cam **136** has passed under the pin **164**, the spring (not shown) turns the arm **148** clockwise to its original upward position to lift up the page **39**.

The belt **102** continues to rotate clockwise and the adjacent right actuator **112** (labeled as **212** in FIG. **7**) moves under the page **39**. The right actuator **212** carries the page **39** over to the right side while additional fingers **104** (labeled as **211**, **210**, **209**, and **208** in FIG. **7**) roll over the new page. The movement of the belt **102** stops when the left actuator **201** reaches a location where the actuating arm **140** contacts the left limiting switch **100** and disconnects the power to the motor **90**. In this position the right actuator **212** reaches to a rightmost point and the reverse cycle is completed.

As will be appreciated by those skilled in the art, in moving a page either forward or backward, the belt **102** is rotated 180 degrees, thereby switching the locations of the actuators. The location and orientation of the left actuators **106**, **108** and the right actuators **110**, **112** are such that the lifting and the transport of the page is initiated as soon as the motor **90** is energized, without any delays for resetting the position of the right and left pickup arms **28**, **30**.

The length of the fingers **104** and the actuators **106**, **108**, **110**, **112** are such that they are located in the bottom margin of the book and do not interfere with the text of the book. The length of the arm **148** of each pickup arm **28**, **30** is such that it extends to about ⅔ of the page width, where there is a sufficient lifting force. The use of different adhesives allows for the arm **148** to be extended either more or less and still generate sufficient lifting force.

Depending on the size of the book and usage location of the page turner **20**, the page turner **20** can be rested on a horizontal base **182** of the cover **38** so that the book has about a 30 degree angle with respect to the ground when mounted on the page turner **20**. Alternatively, the page turner could be rested on an oblique surface **184** of the cover **38** where the angle of the book will be about 75 degrees with respect to the ground when mounted on the page turner **20**.

Although the present invention has been described in considerable detail with reference to certain preferred versions thereof, other versions are possible. Therefore, the spirit and scope of the appended claims should not be limited to the description of the preferred versions described herein.

All features disclosed in the specification, including the claims, abstract, and drawings, and all the steps in any method or process disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive. Each feature disclosed in the specification, including the claims, abstract, and drawings, can be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

Any element in a claim that does not explicitly state "means" for performing a specified function or "step" for performing a specified function should not be interpreted as a "means" or "step" clause as specified in 35 U.S.C. § 112.

What is claimed is:

1. An apparatus for turning bound pages, the apparatus comprising:
- a frame;
- a support assembly coupled to the frame;
- at least one pickup arm coupled to the frame;
- a motor assembly coupled to the frame; and
- a conveyor assembly coupled to the motor assembly, the conveyor assembly further comprising:
  - a belt;
  - a plurality of fingers coupled to the belt; and
  - at least one actuator coupled to the belt;
- wherein a subset of the plurality of fingers holds the bound pages in an open condition; and
- wherein upon rotation of the belt by the motor assembly the at least one actuator causes the at least one pickup arm to lift a portion of a page and at least one of the plurality of fingers turns the lifted page while another of the plurality of fingers holds the bound pages in an open condition.

2. The apparatus for turning bound pages of claim **1** wherein the motor assembly further comprises:
- a motor;
- a gear reduction train coupled to the motor;
- a clutch coupled to the gear reduction train; and
- a sprocket coupled to the clutch, the sprocket being connectable to the belt.

3. The apparatus for turning bound pages of claim **2** wherein the motor is reversible.

4. The apparatus for turning bound pages of claim **2** further comprising at least one button electrically coupled to the motor for energizing the motor.

5. The apparatus for turning bound pages of claim **2** further comprising at least one of a foot pedal, a breath-controlled switch, a chin switch, a voice activation device, and a computerized timer electrically coupled to the motor for energizing the motor.

6. The apparatus for turning bound pages of claim **1** wherein the support assembly further comprises:
- two expandable spines, each spine having a proximal end and a distal end;
- a plurality of crossbar supports, one of the plurality of crossbar supports being mounted on each end of the spines;
- a plurality of clamps, one of the plurality of clamps being mounted on each crossbar support by a spring hinge, the spring hinge providing a bias force on the bound pages.

7. The apparatus for turning bound pages of claim **6** wherein each spine is attached to the frame by a mounting bracket, the mounting bracket further comprising:
- a bracket frame;
- a base having two vertical cylindrical cavities, and an angled cylindrical cavity coupleable to the proximal end of one of the spines;

a center tube coupled to the bracket frame having an inner rod;

a bias spring located coaxially around the inner rod of the center tube; and

two guiding rods, the guiding rods being coupled to the bracket frame and insertable in the two vertical cylindrical cavities of the base;

wherein the base is moveable along the two guiding rods to generate a reaction bias force in the bias spring.

8. The apparatus for turning bound pages of claim **1** wherein the conveyor assembly further comprises:

two right actuators coupled to the belt; and

two left actuators coupled to the belt.

9. The apparatus for turning bound pages of claim **1** wherein each of the plurality of fingers further comprises:

a base;

an arm coupled to the base; and

a roller coupled to the arm.

10. The apparatus for turning bound pages of claim **1** wherein the at least one actuator further comprises:

a base coupled to the belt;

an actuator frame coupled to the base;

a cam coupled to the actuator frame; and

a switch trigger coupled to the base;

wherein the switch trigger on the actuator is only rotatable in one direction.

11. The apparatus for turning bound pages of claim **1** wherein the at least one pickup arm further comprises:

a bracket mountable to the frame;

a shaft mounted to the bracket;

an arm coupled to the shaft, the arm having a proximal end and a distal end, the arm being bent, curved or angled;

a roller rotatably coupled to the distal end of the arm, the surface of the roller being covered with an adhesive;

a torsional spring coupled to the shaft, the torsional spring applying a bias torque to the arm and thereby maintaining the arm in a neutral position; and

a follower pin coupled to the shaft, the follower pin impacting the at least one actuator to rotate the arm and place the roller in contact with the page of the book;

wherein upon release of the follower pin by the at least one actuator, the spring provides a bias torque and lifts the arm.

12. A method for turning bound pages comprising:

selecting the apparatus of claim **1**;

placing bound pages in the support assembly; and

energizing the motor assembly to turn at least one of the bound pages.

13. An apparatus for turning bound pages, the apparatus comprising:

a frame;

a book support assembly coupled to the frame;

a left pickup arm coupled to the frame;

a right pickup arm coupled to the frame;

a motor assembly coupled to the frame, the motor assembly having a reversible motor; and

a conveyor assembly coupled to the motor assembly, the conveyor assembly further comprising:

a belt;

a plurality of fingers coupled to the belt; and

two left actuators coupled to the belt;

two right actuators coupled to the belt;

wherein a subset of the plurality of fingers hold the bound pages in an open condition;

wherein each of the two right actuators causes the right pickup arm to lift a portion of a right page upon counterclockwise rotation of the belt by the motor assembly;

wherein each of the two left actuators cause the left pickup arm to lift a portion of a left page upon clockwise rotation of the belt by the motor assembly;

wherein the plurality of fingers turn the lifted right page upon counterclockwise rotation of the belt by the motor assembly; and

wherein the plurality of fingers turn the lifted left page upon clockwise rotation of the belt by the motor assembly.

14. An apparatus for turning bound pages, the apparatus comprising:

a frame;

a support assembly coupled to the frame;

a means for lifting a page, the means for lifting a page being coupled to the frame;

a motor assembly coupled to the frame; and

a conveyor assembly coupled to the motor assembly, the conveyor assembly further comprising:

a belt;

a plurality of fingers coupled to the belt; and

at least one actuator coupled to the belt;

wherein a subset of the plurality of fingers holds the bound pages in an open condition; and

wherein upon rotation of the belt by the motor assembly the at least one actuator causes the means for lifting a page to lift a portion of a page and at least one of the plurality of fingers turns the lifted page.

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