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(54) **Conveyor assembly apparatus**

Fördereinrichtung

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Description

This invention relates generally to conveyor assemblies and particularly to a conveyor apparatus used in the patterned application of dyestuff or other liquids to carpeting that is in preferably the form of tiles.

One such conveyor assembly is described in FR-A-2,256,982 (equivalent to US-A-4,034,584 and US-A-4,084,615). The conveyor described has an endless flexible element with first and second longitudinal end portions.

One major problem with current conveyors used for this application is the inability to align the carpet tiles properly on the conveyor to produce precise repeatable results when being sprayed by electronically controlled gun bars in the form of intricate patterns. One reason for this is the use of dual chains on each side of the conveyor that align and position the carpet tiles on the conveyor. These chains can expand and become misaligned, which causes the slats to be no longer perfectly perpendicular with the longitudinal axis of the conveyor thereby patterning either earlier or later than required for repeatable precise patterned carpet tiles.

The present invention solves the above problem and others in a manner not disclosed in the known prior art.

Summary of the Invention

A conveyor apparatus used primarily in processing products such as applying liquids such as dyestuff by means of patterned application of a moving stream of dyestuff, having a first planar portion and an endless flexible element adjacent said first planar portion and a second planar portion adjacent said endless flexible element, where said flexible element has a series of slats mounted thereon that precisely coordinate the processed item underneath the processing element that provides patterned application of dyestuff in order to achieve precise repeatable results.

Thus in one aspect, the present invention provides a conveyor apparatus (10) for transporting material comprising a first endless flexible element having first and second longitudinal axes;

characterised by:

(a) a first planar portion (90) having a longitudinal axis adjacent said first endless flexible portion and coplanar therewith;

(b) a second planar portion (90) having a longitudinal axis adjacent said first endless flexible element and coplanar therewith;

(c) wherein said first planar portion (90) and said second planar portion (90) are located on the left and right sides respectively of said first endless flexible element; and

(d) at least one slat (402) removedly attached upon said first endless flexible element for movement therewith and extending across said first planar portion (90) and transverse to the longitudinal axis thereof as well as extending across said second planar portion (90) and transverse to the longitudinal axis thereof, for transporting said material which is supported by said first planar portion (90), said first endless flexible element and said second planar portion (90) and which is in direct contact therewith.

It is an advantage of this invention to be able to maintain processed material, i.e., carpet tiles, in a fixed location perpendicular to the longitudinal axis of the conveyor for repeatable precise processing.

It is another advantage to remove processed material by means of lifters and a take-off conveyor so that there is no load placed on the alignment slats.

These and other advantages will be in part obvious and in part pointed out below.

Brief Description of the Drawings

The above as well as other objects of the invention will become more apparent from the following detailed description of the preferred embodiments of the invention, which when taken together with the accompanying drawings, in which:

FIG. 1 is a side elevational view of the conveyor apparatus of the present invention used in the patterning of textile materials by the application of dyestuff;

FIG. 2 is an enlarged side elevational view of the isolated conveyor mechanism and dual support members;

FIG. 3 is a top plan view of the conveyor mechanism;

FIG. 4 is a cross sectional view taken on line 4-4 of FIG. 3;

FIG. 5 is a top plan view of the lifter mechanism;

FIG. 6 is a cross sectional view taken along line 6-6 of FIG. 5;

FIG. 7 is a cross sectional view taken along line 7-7 of FIG. 5;

FIG. 8 is a cross-sectional view taken along line 8-8 of FIG. 1;

FIG. 9 is a side elevational view of the take-off conveyor assembly;

FIG. 10 is a cross-sectional view taken along line 10-10 of FIG. 1;

FIG. 11 is a top plan view of the carriage lock assembly;

FIG. 12 is a front elevational view of the carriage lock assembly;

FIG. 13 is a right side elevational view of the carriage lock assembly;

FIG. 14 is a cross-sectional view taken on line 14-14 of FIG. 13;

FIG. 15 is a cross-sectional view taken on line 15-15 of FIG. 1;

FIG. 16 is a cross-sectional view taken on line 16-16

of FIG. 15;
FIG. 17 is an isolated top plan view of the conveyor assembly including a missing tile detector sensor assembly and a process initiation sensor assembly;
FIG. 18 is a cross-sectional view taken on line 18-18 of FIG. 17;
FIG. 19 is a cross-sectional view taken on line 19-19 of FIG. 17;
FIG. 20 is a top plan view of a conveyor plate;
FIG. 21 is a cross-sectional view taken on line 21-21 of FIG. 20;
FIG. 22 is a cross-sectional view taken on line 22-22 of FIG. 20;
FIG. 23 is a cross-sectional view taken on line 23-23 of FIG. 2; and
FIG. 24 is a cross sectional view taken on line 24-24 of FIG. 23.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Detailed Description of the Preferred Embodiment

Referring more specifically to the drawings, FIG. 1 discloses an overall side elevational view of the apparatus for conveying material to which the present invention pertains. As shown and will be described, the apparatus is particularly adapted for transporting pile carpet material that is processed by the application of dyestuff in the form of a pattern. However, it will be understood that this conveyor assembly could be employed for transporting a variety of material in a wide spectrum of applications. All of the mechanical attachments in this invention may be accomplished by any of a wide variety of conventional hardware, adhesives, and so forth.

The conveyor apparatus shown in FIG. 1 comprises a main conveyor apparatus generally indicated by numeral 1 with the conveyor mechanism proper indicated by numeral 10. There is a main support frame assembly 14 that is identical on both the left side and the right hand side, which includes horizontal base I-beam supports 56 supporting upper horizontal rails 18 by means of vertical I-beam supports 9 and 16, respectively. There are two ancillary vertical supports 15, 13 that also connect the horizontal base I-beam support 56 with the upper horizontal rail 18. Ancillary vertical support 13 has two transverse members 20 extending from the lower portion thereof on both sides to the upper horizontal rail 18. There is a horizontal support member 362 extending between the transverse member 20, which is on the right of ancillary vertical support 13 in FIG. 1, and vertical I-beam support 9. The conveyor mechanism 10 has a support system numerically delineated as numeral 11 comprising of dual horizontal support I-beams 22 forming the carriage weldment assembly with a longer rear vertical support member 24 and a comparatively shorter front vertical support member 26. There is a lateral support member 568 extending between the upper portions of vertical support members 24 and 26. Both vertical support members 24 and 26 have a leveling pad adjustment mechanism 28 that attaches to the conveyor mechanism 10. The leveling pad adjustment mechanism 28 comprises of a combination of hex head cap screws, hex head jam nuts and washers that are connected to an angle support bracket and is used to level the conveyor mechanism 10. The conveyor mechanism support system 11 and the main support frame assembly 14 are interconnected by means of a rail system indicated generally at numeral 30. Rail system 30 includes carriage I-beam tracks 99 located on the left and right hand side of the main conveyor apparatus 1 and running longitudinally along its length and attached to the vertical I-beam supports 9 and 16 by means of support brackets 98. Cylindrical rails 31 are attached to each of the carriage I-beam tracks 99 by means of rail support spacers 34. The conveyor mechanism support system 11 can move along the cylindrical rails 31 by means of four Thomson ® pillow block bearings 36, which are in effect open linear bearings and available from Thomson Industries of Port Washington, New York which surround and ride the cylindrical rails 31 and that are located on each side of the main conveyor apparatus 1 with one mounted underneath and outward from horizontal support I-beam 22 and below and outward from rear vertical support member 24 and the other pillow block linear bearing 36 also mounted underneath horizontal support I-beam 22 and below and outward from front vertical support member 26, as shown in FIGS. 8 and 13.

The dyeing apparatus shown generally as numeral 40 is supported by a main dye applicator support frame 42. There is a main dye apparatus forwardly slanting support member 96 with a relatively longer rear dye apparatus vertical support member 97 and a relatively shorter front dye apparatus vertical support member 100 attached thereto. The front dye apparatus vertical support member 100 is attached to horizontal base I-beam support 56 at the base of the main conveyor apparatus 1. The rear dye apparatus vertical support 97 is also attached to the carriage I-beam track 99 by means of support bracket 98. There is a horizontal support beam 360 extending between rear dye apparatus vertical support 97 and vertical I-beam support 9.

The dyeing apparatus 40 is disclosed in U.S. Patent No. 3,393,411, U.S. Patent No. 3,894,413, U.S. Patent No. 3,942,343, U.S. Patent No. 4,019,352, U.S. Patent No. 4,202,189, U.S. Patent No. 4,033,154, U.S. Patent No. 4,034,584, U.S. Patent 4,116,626, U.S. Patent No. 4,309,881, U.S. Patent No. 4,434,632, and U.S. Patent No. 4,584,854. The subject matter disclosed in each of the eleven U.S. Patents identified hereinabove is hereby incorporated by reference into the instant disclosure.

Positioned above and spaced along the length of main conveyor mechanism 10 are a plurality of dye applicator members, or gun bar assemblies 44, which extend in parallel, spaced relation across the width of the

conveyor mechanism 10. There are hand rails 46 on each side of the gun bar assemblies 44 supported by vertical members 47 and having an intermediate support member 33 in parallel with the hand rails 46. For pattern dyeing broadloom carpets the gun bar assemblies 44 are each provided with a different color dye in order to apply a colored pattern to the carpet. The length of the conveyor may vary depending on the number of gun bar assemblies used. There is an access platform 48 attached to the main dye apparatus slanting support means by vertical bracket 39 and angle bracket 49. There are two lateral bracing members (not shown) found at the rear of the main conveyor apparatus for support.

Referring now to FIG. 2 which isolates the conveyor mechanism 10, the main conveying means of this invention is an endless loop of conveyor plates 86 that are connected by linking pin joints 88 that rotate in a hinge-like manner to provide flexibility. The main portion of the conveyor mechanism 10 has an upper layer 434, intermediate layer 132 and lower layer 135. There is a transport link return guidance assembly 66, as shown in FIGS. 1, 2 and 15, for the underside of the conveyor to maintain the conveyor plates 86 in lateral alignment along the longitudinal axis. There are slats 402 that can be removedly attached to conveyor plates 86 and travel along slat support runners 68 with associated channel plates on the underside of the conveyor, as shown in FIGS. 2, 3, 4, and 9. There are eight "U" shaped support brackets 78 that hold the slat support runners in position. The main conveyor mechanism 10 is stabilized by the upper and lower interconnecting stabilizers denoted by numerals 83 and 82, respectively, which are connected by any attachment means such as hex head cap screws and flat and locking washers located at numeral 101. Each opposing longitudinal end of the conveyor mechanism 10 has an upper and lower pin wheel 72 and 73 respectively. Each pin wheel 72, 73 has seven sides and is mounted on a respective shaft 70, 71 that rotates within a respective pillow block linear bearing 60, 61. Pillow block linear bearing 60 is mounted on a mounting bracket assembly 74, while pillow block linear bearing 61 is mounted directly to the front of conveyor mechanism 10. The upper pin wheel 72 is protected from access by a stand-off load station guard 62. The pin wheels 72, 72 guide and rotate the conveyor plates 86 that travel the longitudinal length through the lateral center of the conveyor mechanism 10.

Referring now to FIGS. 3, 4 and 15, there are panels 90 on each side of the moving conveyor plates 86. These panels 90 are made from a product manufactured by E. I. du Pont de Nemours & Company of Wilmington, Delaware called CORIAN® that is traditionally used as a material for countertops and can be categorized as a type of plastic. However, a wide variety of materials may be used as a conveyor surface as well as a surface may be used underneath such as 6.4 mm (a quarter of one inch) of aluminum. These panels are attached to the top of the conveyor mechanism 10 by means of bolts 92 or other attachment means. The moving conveyor plates 86 have linear pillow block linear bearings 105, 106 mounted underneath the moving conveyor plates 86 that ride on and enclose cylindrical shafts 103, 104, as shown in FIG. 4. The longitudinal shafts 103, 104 are mounted on support rails 107, 108 that extends longitudinally with said shafts 103, 104. The conveyor plates 86 have numerous tapped holes with inserts 401 upon which can be attached a slat 402 or plurality thereof that extends across the width of the conveyor mechanism 10 and can accommodate a variety of product of various lengths, i.e., carpet tile.

The upper and lower pin wheels 72 and 73, respectively, have two parallel plates 53 and 57 that are separated by cylindrical spacers 58 attached by an associated screw and nut. There is an interconnection member 351 between adjacent spacers 58, as shown in FIG. 4. There is a pin wheel support bar 374, 375 located at each end of the conveyor mechanism 10 located at the rear and front of the conveyor mechanism respectively. There is also a left hand mounting bracket 380 and a right hand mounting bracket 381 for the upper pin wheel 72. As shown in FIG. 4, there is both a left hand drip shield 390 and right hand drip shield 391 positioned underneath the longitudinal shafts 103 and 104 respectively. Located at the rear of the conveyor mechanism 10 is a slat protector 342 and mounting angle 343.

Referring now to FIGS. 5 and 6, the mechanical lifter 110 is a means to flip objects from out the end of the bottom end of the conveyor mechanism 10. The lifter 110 is connected to a shaft 114 by means of an attachment mechanism 112. The attachment mechanism 112 is called a Trantorque® unit that is manufactured by Fenner Manheim of Manheim, Pennsylvania and is connected to the shaft 114. The attachment mechanism 112 will rotate in place around the shaft 114 if opposed by more than 100.8 m/kg (1800 inch/pounds)of torque. This will protect the lifters 110 if they come into contact with any slats 402 mounted to the conveyor plates 86. The shaft 114 is held in a fixed position by a combination of a two piece clamp collar 121 and thrust bearing 126. The shaft 114 is rotatively mounted in a sleeve bearing 120 having the trademark Rulon® and is manufactured by Dixon Industries Corporation of Bristol, Rhode Island that is connected to a mounting bracket 122 that is attached to the conveyor mechanism 10 by a series of four bolts 426 at an intermediate level 132. The conveyor mechanism 10 has a lower layer 135 that connects to the intermediate layer 132 by means of vertical support members 133. There are u-shaped members 128 with rectangular blocks 134 affixed thereto that is attached as a unit to the top of the intermediate layer 132. Please note that the upper layer 434 comprising of panels 90 on top of a 6.4 mm (one-quarter inch) of aluminum as shown in FIG. 7, is not shown in FIGS. 5 and 6. There is a flat cover plate 130 that conceals the middle of shaft 114.

There is a fiber optic sensor assembly generally indicated as numeral 532 comprising a fiber optic sensor

145 utilized to detect the presence of an object, such as a carpet tile, on the end of the conveyor 10 as shown in FIGS. 5 and 15. The sensor 145 is connected to a mounting plate 146 by means of a hex head cap screw and washers that is then attached to a spacer 149 that is attached to the conveyor mechanism 10 by means of a socket head cap screw. There is an adjustment rod 148 attached to the mounting plate 146 by means of cup point socket set screw that moves within an adjustment block 150 that is mounted to the side of the conveyor 10 by means of hex head cap screws and washers. This allows for positioning of the sensor by means of the longitudinal positioning of hexagonal nuts 151.

Referring now to FIG. 7, the mechanical lifter 110 is actuated by means of a cylinder 137 with preferably a 38.1 mm (one and one-half inch) bore and a 50.8 mm (two inch) stroke. The cylinder 137 is pivotally attached to the end of the conveyor mechanism 10 by means of a mounting bracket 139 and pivot pin 141. The lifter 110 is attached to the cylinder 137 by means of a clevis 143 using a hexagonal jam nut.

The conveyor assembly base generally indicated as numeral 155, as shown in FIG. 8, has dual longitudinal support members 56 between two end members 158 and 159. The conveyor mechanism support system 11 with interacting cross beams 161 allows the conveyor mechanism 10 to be able to move away from and underneath the gun bar assemblies 44. This movement is actuated by means of a motor 162, also shown in FIG. 1, such as a one horsepower, 1750 r.p.m., 240 volt d.c. motor operating in conjunction with a c-face, triple reduction, parallel reducer at a 129:1 ratio, which has a carriage drive pulley 163 that winds and unwinds a cable 164 that is stretched between two cable clips 165 and 166. There is an air cylinder 152 attached to cable clip 165 that is fastened to the longitudinal support member 56 by means of bracket 153. There are shock absorbers 260 and 261 mounted on L-mounting brackets and located at each end of relative travel of the conveyor support system 11. There are two members 167 and 168 that interconnect and are perpendicular to longitudinal support members 56. There are also three support members 170, 171 and 172 that interconnect members 168 and 159 and a horizontal support beam 360 that interconnects and is perpendicular to lateral support members 167 and 158.

Referring now to FIGS. 9, 10, and 15, the take-off conveyor is shown generally by numeral 174, as well as in FIGS. 1 and 15, is mounted to the end of the conveyor mechanism 10 by mating L-shaped mounting brackets 502. Tiles are sensed by fiber optic sensor 145, as shown in FIGS. 5 and 10, and then placed on the take-off conveyor 174 by mechanical lifter 110 in conjunction with a triangular tile transfer bar 501, with the lifter 110 being actuated by a cylinder 137 that is fixedly attached to the end of the conveyor by mounting bracket 139. The pin wheels 72, 73 guide the endless loop of conveyor plates 86 with linking pin joints 88 around the conveyor mechanism 10. The take-off conveyor 174 is powered by a pulley 175 driven by a one-fourth horsepower, 3-125 r.p.m., 90 volt DC motor (not shown) that is mounted by angle bracket 518 to the front end of the conveyor mechanism. The pulley 175 drives another pulley 177 by means of a continuous belt 176, as shown in FIGS. 9 and 10. Pulley 177 is connected to drive shaft 178 that traverses the width of the take-off conveyor 174 and is held in position by flange bearings 179 and 180 that are held in position by side plates 181 and 182 respectively. There is a flat face idler 184 that is used to maintain pressure on the belt 176 and is connected to a shaft by means of a tightener (not shown). Toward the center of the side plate 181 as well as side plate 182 is an idler shaft 183 that is rotatable held in position by flange bearings 185 and 186 respectively. Positioned on each side of the idler shaft 183 are positioning rods 187 that extends between side plates 181 and 182 and is connected only by bolts and not bearings. At the end of take-off conveyor 174 is a belt tensioning shaft 188 held in position by bearings 189 and 190 that are also mounted on side plates 181 and 182 respectively. There are eight continuous belts 191 that rotate around the take-off conveyor 174 by means of shafts 178 and 188 while rotating shaft 183. There are eight support ribs 192 positioned longitudinally along the width of the take-off conveyor 174. On both the front and back of the take-off conveyor 174 and from left to right, there are belt spacers 202, 193, 194, 195, 196, 197, 198, 199, 200, and 201. This allows the continuous belts 191 to travel in predefined paths.

Referring now to FIGS. 1, 11, 12, 13, and 14, the conveyor mechanism 10 can be adjusted to process various heights of carpet tile by moving the conveyor mechanism support system 11 to numerous fixed points underneath the slanting gun bar assemblies 44 by means of a locking assembly generally indicated as numeral 461. Conveyor mechanism support system 11 comprises vertical support members 24 and 26 mounted on the horizontal support I-beam 22 that is connected to Thomson® pillow block linear bearings 36 that ride on the cylindrical rail 31 that is attached to the rail support spacers 34 that are connected to the carriage I-beam track 99. A main component of the locking assembly 461 is a helical gear reducer 203 operated by a handwheel 209. The helical gear reducer 203 controls a locking cam 205 by encircling a bearing 207 that is attached to a hydraulic lubricating fitting and associated bar 206 by means of hex jam nuts 278. This encirclement of the bearing 207 is what locks the conveyor mechanism support system 11 in place. As shown in FIG. 14, the locking cam 205 has an elevated rim 208 around approximately three-quarters of its circumference. The locking cam is attached to the helical gear reducer by a socket set cup point 220. There is a cam lock switch target 234 attached to the side of the locking cam 205 by two socket head cap screws.

The helical gear reducer 203 is attached to the main cover mounting angle 210 that has Thomson® pillow

block linear bearings 211 attached to the underside thereof, which ride on dual index shafts 222 held in position on each side of their 76.2 mm (three (3) inch) length by support blocks 212 that are attached to an index block 213. The index block 213 is attached to a L-index base 214 that is connected to a lateral index support member 283 that connects vertical I-beam support 16 and ancillary vertical support 15. There is an outer index block 225 having fifteen (15) separate locations for varying heights of carpet or other processed articles that connect to holes in inner index block 226 by means of an expanding pin 223 that holds the locking assembly 461 in a fixed location with relation to the index shafts 222.

There is a sensor 270 that is triggered when a carriage sensor switch target 217 passes beneath it. The carriage sensor switch 217 is connected to the bar 206 and comprises a spacer and socket head cap screw. Sensor 270 is attached to a mounting bracket 267 that is attached to a mounting plate 265 that connects to a mounting post 266 that is connected to the lateral index support member 283. The signal from the sensor 270 goes to the control system that regulates by slowing down the motor 162 of FIG. 8. Closer to the helical gear reducer 203 is another sensor 271 which is also triggered by the carriage sensor switch target 217, but this time the control system stops the rotation of motor 162.

There is a cam unlock sensor 272 that is located on the right of the locking cam 205 in FIG. 11 and looks toward the cam 205. There is a cam unlock switch target 291 that is attached to the locking cam 205 that triggers the sensor 272. The cam unlock sensor 272 has a mounting bracket 253 attached to mounting angle 210. The mounting bracket 254 for sensor 271 is attached to mounting bracket 253. There is cam lock sensor 273 that is located on the left of the locking cam 205 and looks toward the cam and is triggered by the cam lock switch target 234. Cam lock sensor 273 is mounted on mounting bracket 286.

Referring now to FIGS. 1, 15 and 16, that disclose the transport link return guidance assembly 66, in which there are two dual wheels 230 on the underside of the conveyor mechanism 10 to hold the conveyor plates 86 in horizontal alignment with respect to the longitudinal axis of the conveyor mechanism 10. Both wheels 230 are mounted on a wheel guide base plate 307. Each wheel 230 has a bearing assembly 231 with a shaft 309 within a bearing housing 310 and attached by means of a bolt 311 to the base plate 307. The guide wheel base plate 307 is attached to the conveyor mechanism 10 by means of bolt and nut combination 312. There are two ball bearings 316 and 314 with ball bearing 314 being held in place by retaining rings 313 and 315 on each side. On the upper part of the conveyor mechanism 10 is a series of five guide rollers (not shown) to maintain the longitudinal alignment of the conveyor plates 86. FIG. 16 also reveals a conveyor plate 86 with associated slat 402 being aligned by a wheel 230.

Referring now to FIGS. 3, 15, 17, 18, 19, and 25, there are a pair of effector switch sensors 240 mounted underneath the conveyor mechanism 10 and held to the underside of the conveyor mechanism 10 by means of a clamp and associated cap assembly 341 and held into position by a series of screws and washers 388 and is directed upward on each side of the conveyor to detect the presence of carpet tiles or any other processed article and thereby feed this information into the control system of the processing equipment. The location of sensors the 240 is toward the rear of the conveyor mechanism 10, as shown in FIGS. 3 and 15. There is a start print sensor assembly is generally indicated at numeral 250 that actuates the control system in order to enable the computerized dyeing process. This start print sensor assembly 250 utilizes a high speed reflective sensor 382 and has a surrounding guard 299 to protect it and is mounted to the conveyor mechanism 10 by means of a base and clamp combination 345 that is attached to a mounting bracket 298 by means of conventional hardware 344 such as a shoulder bolts and/or cap screws. The mounting bracket 343 has oval holes through which shoulder bolts and cap screws connect to the conveyor mechanism 10. The mounting bracket 343 can be positioned by means of an adjustment rod 347 that is threadedly connected to an adjustment block 346. The adjustment block 346 is bolted to the side of the conveyor mechanism 10. The adjustment rod 347 is connected to extension of the mounting bracket by means of a set screw 348. There are nuts on each side of the adjustment rod 347 that alters the position of the mounting bracket 343.

The conveyor plates 86 travel along a defined path along the center of the longitudinal path of the conveyor mechanism 10. As shown in FIGS. 20, 21, and 22, the conveyor plate is shown in detail with numerous tapped holes with assorted inserts 401 for the attachment of slats 402 at various positions depending on the size of carpet tile being processed. There is a longitudinal row of button head cap screws 503 positioned slightly off-center and to the right on the conveyor plate 86, in FIG. 20, that holds a rack gear 507 onto the underside of the conveyor plate 86. There are a pair of pillow block linear bearings 105, 106 that were previously disclosed in FIG. 4. There is also a retainer 505 that is held in place by a hex head screw and washer or equivalents thereof. There are linking and protruding interconnection portions 504 that are held in place by cup point socket set screws and serve to interconnect the conveyor plates 86 by linking pin joints 88. The rack gear 507 is an integral part of the drive means for the conveyor mechanism 10.

Referring now to FIGS. 23 and 24, the conveyor plates 86 are powered by a drive gear 520 that is located toward the rear of the conveyor mechanism 10, as shown in FIG. 2 and interconnects with the rack gear 507 to power the conveyor mechanism 10. The drive gear 520 is fixedly attached to a drive shaft 522 by means of a retaining ring 521. There are a pair of bearings 523 mounted in bearing housings 524 on each side of the

drive gear 520. The housings 524 are bolted 534 or equivalent means thereof to the intermediate level 132 of the conveyor. The bearings 523 are lubricated by a series of conduits 526 which run from the bearing housings 524 to a grease fitting generally indicated as numeral 525 including a block 527 and male connectors 528. The drive shaft 522 is also connected to an optical incremental encoder 529 with a rawhide seal 530 and encoder seal 531, from left to right as shown on FIG. 23. The encoder 529 also has a mounting bushing 561 as well as cover 533 and torque arm 535. The opposite side of shaft 522 is connected to a gear reducer 543 that has a 60:1 ratio with a guard bracket 542 and a lower mounting bracket 540 that is attached by means of bolts 541 to the conveyor mechanism 10 and the gear reducer 543. There is a motor 550, preferable a 240 volt, 2 horsepower, 1750 r.p.m. electric motor, which is connected to the gear reducer 543 by means of an adaptor 551 and partially housed in a main drive cover 552.

Referring now to FIG. 24, the optical encoder 529 has a mounting base 570 as well as an o-ring 560 to mount thereon. The encoder 529 has a spring stud 562 with a spring 563 attached thereto that connects to and controls the torque arm 595. There is also an encoder junction box 565 as well as a torque arm stud 535.

Therefore, it is not intended that the scope of the invention be limited to the specific embodiment illustrated and described. Rather, it is intended that the scope of the invention be defined by the appended claims and their equivalents.

Claims

1. A conveyor apparatus (10) for transporting material comprising a first endless flexible element having first and second longitudinal axes;
   characterised by:

   (a) a first planar portion (90) having a longitudinal axis adjacent said first endless flexible portion and coplanar therewith;
   (b) a second planar portion (90) having a longitudinal axis adjacent said first endless flexible element and coplanar therewith;
   (c) wherein said first planar portion (90) and said second planar portion (90) are located on the left and right sides respectively of said first endless flexible element; and
   (d) at least one slat (402) removedly attached upon said first endless flexible element for movement therewith and extending across said first planar portion (90) and transverse to the longitudinal axis thereof as well as extending across said second planar portion (90) and transverse to the longitudinal axis thereof, for transporting said material which is supported by said first planar portion (90), said first endless flexible element and said second planar portion (90) and which is in direct contact therewith.

2. Apparatus as claimed in Claim 1, in which said endless flexible element comprises a series of pivotally interconnecting plates (86) disposed in side-by-side relation.

3. Apparatus as claimed in Claim 2, in which said plurality of plates (86) are aligned underneath said conveyor apparatus (10) by means of at least one pair of rotatable, circular flanged members (230) which are adapted to be received within said plurality of plates (86).

4. Apparatus as claimed in any preceding Claim, in which a plurality of said slats (402) are removedly attached parallel to one another upon said first endless flexible element.

5. Apparatus as claimed in any preceding Claim, in which said conveyor apparatus (10) has first and second longitudinal end portions and includes means (110, 174) for removing articles from one of said end portions.

6. Apparatus as claimed in Claim 5, in which said means (110, 174) for removing articles comprises at least one second endless flexible element (191).

7. Apparatus as claimed in Claim 6, in which said second endless flexible element (191) encircles a plurality of cylindrical rolls (178,188).

8. Apparatus as claimed in Claim 5, in which said means (110,174) for removing articles comprises at least one elongate finger (110) that moves between a first position and a second position.

9. Apparatus as claimed in Claim 8, in which each said elongate finger (110) is adjacent to a corresponding second endless flexible element (191).

10. Apparatus as claimed in Claim 9, in which said elongate finger (110) contacts at least one of said articles to be removed when in said first position and lifts said article from said conveyor apparatus (10) onto said second endless flexible element (191) when said elongate finger (110) moves to said second position, the apparatus further including means (532) for detecting the presence of at least one of said articles that activates said elongate finger.

11. Apparatus as claimed in Claim 10, in which said means (532) for detecting the presence of at least one of said articles includes a fibre optic sensor (145).

12. Apparatus as claimed in any one of Claims 8 to 11, including a plurality of said elongate fingers (110).

13. Apparatus as claimed in any one of Claims 5 to 12, in which said means (110) for removing articles is actuated by a cylinder (137).

14. Apparatus as claimed in any preceding Claim, in which linear pillow block bearing means (105,106) are mounted underneath said first endless flexible element and enclose cylindrical shafts (103,104) for movement thereon.

15. An apparatus for applying liquids to a moving material, comprising a liquid applicator means (44) having a row of outlets extending across and positioned above the substrate path for discharging a corresponding row of generally parallel, undeflected primary streams of liquid on a trajectory of said primary streams of liquid directed toward the substrate path, a source of electrically encoded pattern data, gas passage means positioned adjacent to said row of outlets and aligned with the discharge axes of the outlets for selectively deflecting, in accordance with pattern data from said data source, the trajectory of said primary streams of liquid emerging from said outlets with streams of gas from said gas passage means which intersect said primary streams of liquid, a liquid collection chamber positioned adjacent to said outlets and opposite from said gas passage means, said liquid collection chamber having an opening that extends along said row of outlets and that is positioned to receive said gas streams and primary liquid streams deflected by said gas streams;

characterised in that:

the apparatus further includes a conveyor apparatus (10) as claimed in any preceding Claim for conveying the material in a predetermined path of travel.

16. An apparatus for applying liquids to a moving substrate as claimed in Claim 15, in which said first endless flexible element of said conveyor apparatus (10) comprises a series of pivotally interconnecting plates (86) and has a plurality of parallel slats (402) removedly secured thereon and adjacent said first planar portion (90), and a means (110, 174) for removing articles from said conveyor apparatus (10) comprising at least one second endless flexible element (191) encircling a pair of cylindrical rolls (178,188) onto which the moving substrate is lifted by means of an elongate finger (110).

17. Apparatus as claimed in Claim 15 or Claim 16, in which said conveyor apparatus (10) is moveable and is inclined, further including a frame assembly 914) and means (11, 30) for moving said inclined conveyor apparatus (10) underneath and away from said liquid applicator means (44) for processing various heights of said material and means (461) for locking said inclined conveyor apparatus (10) into at least one of a plurality of positions.

18. Apparatus as claimed in Claim 17, in which said means (11, 30) for moving said inclined conveyor apparatus (10) underneath and away from said liquid applicator means (44) further comprises a motor (162) attached to said frame assembly (14), said motor (162) having a rotating shaft with a pulley (163) attached thereto which winds and unwinds a cable (164) attached to said conveyor apparatus (10) for moving said conveyor apparatus (10) underneath and away from said liquid applicator means (44).

19. Apparatus as claimed in Claim 17 or Claim 18, in which said means (461) for locking said conveyor apparatus (10) into at least one of said plurality of positions further comprises a locking means including a first means (222) to receive a pin (223) located in said conveyor apparatus (10) and a second means (225) to receive said pin (223) located in said frame assembly (14).

20. Apparatus as claimed in Claim 17 or Claim 18, in which said means (461) for locking said conveyor apparatus (10) into at least one of said plurality of positions further comprises a cam means (205) and a cam holding means (207) to hold said cam means (205) in a fixed position, and at least one sensor (270-273) to detect if said cam means (205) is located within said cam holding means (207).

21. Apparatus as claimed in any one of Claims 17 to 20, further including at least one sensor (270-273) for determining the relative position of said conveyor apparatus (10) in relation to said frame assembly (14).

22. Apparatus as claimed in any one of Claims 17 to 21, in which said means (11, 30) for moving said conveyor apparatus (10) underneath and away from said liquid applicator means (44) further comprises a plurality of linear bearings (36) attached to said conveyor apparatus (10) which engage and are supported by cylindrical shafts (31) mounted to said frame assembly (14) to provide movement of said conveyor apparatus (10).

23. Apparatus as claimed in any one of Claims 15 to 22, in which said material is detected by at least one sensor means (240, 250) prior to treatment by said undeflected primary streams of liquid.

Patentansprüche

1. Eine Fördereinrichtung (10) zum Transportieren von Material, das ein erstes endloses flexibles Element mit ersten und zweiten Längsachsen umfaßt;
gekennzeichnet durch:

(a) einen ersten ebenen Teil (90) mit einer Längsachse angrenzend an den ersten endlosen flexiblen Teil und in derselben Ebene wie dieser;
(b) einen zweiten ebenen Teil (90) mit einer Längsachse angrenzend an das erste endlose flexible Element und in derselben Ebene wie dieses;
(c) wobei sich der erste ebene Teil (90) und der zweite ebene Teil (90) jeweils auf der linken und rechten Seite des ersten endlosen flexiblen Elements befinden; und
(d) wenigstens eine Leiste (402), die auf dem ersten endlosen flexiblen Element zur Bewegung mit diesem abgesetzt befestigt ist und sowohl über den ersten ebenen Teil (90) und transversal zur dessen Längsachse verläuft als auch über den zweiten ebenen Teil (90) und transversal zur dessen Längsachse verläuft, zum Transportieren des Materials, das durch den ersten ebenen Teil (90), das erste endlose flexible Element und den zweite ebenen Teil (90) gestützt wird und in direktem Kontakt damit steht.

2. Vorrichtung wie in Anspruch 1, bei der das endlose flexible Element eine Reihe von als Drehpunkt dienenden Verbindungsplatten (86) umfaßt, die Seite an Seite angeordnet sind.

3. Vorrichtung wie in Anspruch 2, bei der die Vielzahl von Platten (86) unter der Fördereinrichtung (10) mittels wenigstens eines Paares drehbarer kreisförmiger geflanschter Glieder (230) ausgerichtet werden, die geeignet sind, in der Vielzahl von Platten (86) aufgenommen zu werden.

4. Vorrichtung wie in jedem der vorangehenden Ansprüche, bei der eine Vielzahl von Leisten (402) parallel zueinander auf dem ersten endlosen flexiblen Element abgesetzt befestigt sind.

5. Vorrichtung wie in jedem der vorangehenden Ansprüche, bei der die Fördereinrichtung (10) erste und zweite in Längsrichtung verlaufende Endteile besitzt und eine Einrichtung (110, 174) zum Entfernen von Gegenständen von einem der Endteile enthält.

6. Vorrichtung wie in Anspruch 5, bei der die Einrichtung (110, 174) zum Entfernen von Gegenständen wenigstens ein zweites endloses flexibles Element (191) umfaßt.

7. Vorrichtung wie in Anspruch 6, bei der das zweite endlose flexible Element (191) eine Vielzahl von zylindrischen Rollen (178, 188) umgibt.

8. Vorrichtung wie in Anspruch 5, bei der die Einrichtung (110, 174) zum Entfernen von Gegenständen wenigstens einen länglichen Finger (110) umfaßt, der sich zwischen einer ersten Stellung und einer zweiten Stellung bewegt.

9. Vorrichtung wie in Anspruch 8, bei der jeder längliche Finger (110) an ein entsprechendes zweites endloses flexibles Element (191) angrenzt.

10. Vorrichtung wie in Anspruch 9, bei der der längliche Finger (110) in Berührung mit wenigstens einem der zu entfernenden Gegenstände steht, wenn er in seiner ersten Stellung ist, und den Gegenstand von der Fördereinrichtung (10) auf das zweite endlose flexible Element (191) hebt, wenn sich der längliche Finger (110) in die zweite Position bewegt, wobei die Vorrichtung weiter eine Einrichtung (532) zum Detektieren des Vorhandenseins wenigstens eines Gegenstandes enthält, die den länglichen Finger aktiviert.

11. Vorrichtung wie in Anspruch 10, bei der die Einrichtung (532) zum Detektieren des Vorhandenseins wenigstens eines Gegenstandes einen faseroptischen Fühler (145) enthält.

12. Vorrichtung wie in jedem der Ansprüche 8 bis 11, die eine Vielzahl von länglichen Fingern (110) enthält.

13. Vorrichtung wie in jedem der Ansprüche 5 bis 12, bei der die Einrichtung (110) zum Entfernen von Gegenständen durch einen Zylinder (137) betätigt wird.

14. Vorrichtung wie in jedem der vorangehenden Ansprüche, bei der unter dem ersten endlosen flexiblen Element lineare Stehlagereinrichtungen (105, 106) angebracht sind und zylindrische Wellen (103, 104) zur Bewegung auf diesen umgeben.

15. Eine Vorrichtung zum Aufbringen von Flüssigkeiten auf ein sich bewegendes Material, die eine Auftrageeinrichtung für Flüssigkeit (44) mit einer Reihe von Auslässen, die quer über dem Pfad des Substrats verläuft und sich über diesem befindet, zum Entladen einer entsprechenden Reihe von im allgemeinen parallelen, nicht abgelenkten primären Flüssigkeitsströmen auf einer Trajektorie der primären Flüssigkeitsströme, die auf den Pfad des Substrats gerichtet ist, eine Quelle für elektrisch codierte

Musterdaten, eine Gas-Durchlaßeinrichtung, die sich neben der Reihe von Auslässen befindet und mit den Entladungsachsen der Auslässe ausgerichtet ist, zum selektiven Ablenken der Trajektorie der aus den Auslässen kommenden primären Flüssigkeitsströme mit Gasströmen aus der Gas-Durchlaßeinrichtung, welche die primären Flüssigkeitsströme kreuzen, gemäß Musterdaten von der Datenquelle, eine Sammelkammer für Flüssigkeit, die sich neben den Auslässen und gegenüber von der Gas-Durchlaßeinrichtung befindet, wobei diese Sammelkammer für Flüssigkeit eine Öffnung besitzt, die entlang der Reihe von Auslässen verläuft und die so angeordnet ist, daß sie die Gasströme und die von den Gasströmen abgelenkten primären Flüssigkeitsströme aufnimmt, umfaßt;

dadurch gekennzeichnet, daß:

die Vorrichtung weiter eine Fördereinrichtung (10) wie in jedem der vorangehenden Ansprüche zum Befördern des Materials auf einem vorherbestimmten Pfad enthält.

16. Eine Vorrichtung zum Aufbringen von Flüssigkeiten auf ein sich bewegendes Substrat wie in Anspruch 15, bei der das erste endlose flexible Element der Fördereinrichtung (10) eine Folge von als Drehpunkt dienenden Verbindungsplatten (86) umfaßt und eine Vielzahl von parallelen Leisten (402), die darauf abgesetzt befestigt sind und an den ersten ebenen Teil (90) angrenzen, und eine Einrichtung (110, 174) zum Entfernen von Gegenständen von der Fördereinrichtung (10) besitzt, die wenigstens ein zweites endloses flexibles Element (191) umfaßt, das ein Paar zylindrischer Rollen (178, 188) umgibt, auf das das sich bewegende Substrat mittels eines länglichen Fingers (110) gehoben wird.

17. Vorrichtung wie in Anspruch 15 oder 16, bei der die Fördereinrichtung (10) beweglich ist und geneigt ist und weiter eine Rahmenanordnung (14) und eine Einrichtung (11, 30) zum Bewegen der geneigten Fördereinrichtung (10) unter die und weg von der Auftrageeinrichtung für Flüssigkeit (44) zum Verarbeiten verschiedener Materialhöhen und eine Einrichtung (461) zum Festhalten der geneigten Fördereinrichtung (10) in wenigstens einer aus einer Vielzahl von Stellungen enthält.

18. Vorrichtung wie in Anspruch 17, bei der die Einrichtung (11, 30) zum Bewegen der geneigten Fördereinrichtung (10) unter die und weg von der Auftrageeinrichtung für Flüssigkeit (44) weiter einen mit der Rahmenanordnung (14) verbundenen Motor (162) umfaßt, wobei der Motor (162) eine rotierende Welle (163) mit einer daran befestigten Rolle (163) besitzt, die ein an der Fördereinrichtung (10) befestigtes Kabel (164) aufwickelt und abwickelt, um die Fördereinrichtung (10) unter die und weg von der Auftrageeinrichtung für Flüssigkeit (44) zu bewegen.

19. Vorrichtung wie in Anspruch 17 oder Anspruch 18, bei der die Einrichtung (461) zum Festhalten der Fördereinrichtung (10) in wenigstens einer aus der Vielzahl von Stellungen weiter eine Festhalteeinrichtung umfaßt, die eine erste Einrichtung (222) zur Aufnahme eines in der Fördereinrichtung (10) befindlichen Stifts (223) und eine zweite in der Rahmenanordnung (14) befindliche Einrichtung (225) zur Aufnahme des Stifts (223) enthält.

20. Vorrichtung wie in Anspruch 17 oder Anspruch 18, bei der die Einrichtung (461) zum Festhalten der Fördereinrichtung (10) in wenigstens einer aus der Vielzahl von Stellungen weiter eine Nockeneinrichtung (205) und eine Nocken-Halteeinrichtung (207) zum Halten der Nockeneinrichtung (205) in einer festen Stellung und wenigstens einen Fühler (270-273) zum Detektieren, ob sich die Nockeneinrichtung (205) in der Nocken-Halteeinrichtung (207) befindet, umfaßt.

21. Vorrichtung wie in jedem der Ansprüche 17 bis 20, die weiter wenigstens einen Fühler (270-273) zum Bestimmen der relativen Stellung der Fördereinrichtung (10) gegenüber der Rahmenanordnung (14) enthält.

22. Vorrichtung wie in jedem der Ansprüche 17 bis 21, bei der die Einrichtung (11, 30) zum Bewegen der Fördereinrichtung (10) unter die und weg von der Auftrageeinrichtung für Flüssigkeit (44) weiter eine Vielzahl von an der Fördereinrichtung (10) befestigten Linearlagern (36) umfaßt, die mit an der Rahmenanordnung (14) befestigten zylindrischen Wellen (31) ineinandergreifen und durch diese gestützt werden, um für die Bewegung der Fördereinrichtung (10) zu sorgen.

23. Vorrichtung wie in jedem der Ansprüche 15 bis 22, bei der das Material vor der Behandlung durch die nicht abgelenkten primären Flüssigkeitsströme durch wenigstens eine Fühlereinrichtung (240, 250) detektiert wird.

Revendications

1. Appareil transporteur (10) destiné à transporter une matière et comprenant un premier élément souple sans fin ayant un premier et un second axe longitudinaux,

caractérisé par :

(a) une première partie plane (90) ayant un axe longitudinal adjacent à la première partie souple

sans fin et coplanaire à celle-ci,
(b) une seconde partie plane (90) ayant un axe longitudinal adjacent au premier élément souple sans fin et coplanaire à celui-ci,
(c) la première partie plane (90) et la seconde partie plane (90) étant disposées à gauche et à droite respectivement du premier élément souple sans fin, et
(d) au moins une latte (402) fixée de façon amovible au premier élément souple sans fin afin qu'elle se déplace avec lui et placée transversalement à la première partie plane (90) et transversalement à son axe longitudinal et disposée aussi transversalement à la seconde partie plane (90) et transversalement à son axe longitudinal, pour le transport de la matière qui est supportée par la première partie plane (90), l'élément souple sans fin et la seconde partie plane (90) et qui est directement à leur contact.

2. Appareil selon la revendication 1, dans lequel l'élément souple sans fin comporte une série de plaques (86) placées bout à bout et interconnectées afin qu'elles puissent pivoter.

3. Appareil selon la revendication 2, dans lequel les plaques (86) sont alignées sous l'appareil transporteur (10) à l'aide d'au moins une paire d'organes circulaires rotatifs (230) munis de joues qui sont destinées à se loger à l'intérieur des plaques (86).

4. Appareil selon l'une quelconque des revendications précédentes, dans lequel plusieurs lattes (402) sont fixées de façon amovible parallèlement les unes aux autres sur le premier élément souple sans fin.

5. Appareil selon l'une quelconque des revendications précédentes, dans lequel l'appareil transporteur (10) possède une première et une seconde partie longitudinales d'extrémité et comprend un dispositif (110, 174) destiné à retirer les articles de l'une des parties d'extrémité.

6. Appareil selon la revendication 5, dans lequel ledit dispositif (110, 174) destiné à retirer les articles comporte au moins un second élément souple sans fin (191).

7. Appareil selon la revendication 6, dans lequel le second élément sans fin (191) entoure plusieurs rouleaux cylindriques (178, 188).

8. Appareil selon la revendication 5, dans lequel ledit dispositif (110, 174) destiné à retirer les articles comporte au moins un doigt allongé (110) qui se déplace entre une première position et une seconde position.

9. Appareil selon la revendication 8, dans lequel chaque doigt allongé (110) est adjacent à un second élément souple sans fin correspondant (191).

10. Appareil selon la revendication 9, dans lequel le doigt allongé (110) est au contact de l'un au moins des articles retirés lorsqu'il est dans la première position, et soulève l'article de l'appareil transporteur (10) sur le second élément souple sans fin (191) lorsque le doigt allongé (110) se déplace vers la seconde position, l'appareil comprenant en outre un dispositif (532) destiné à détecter la présence de l'un au moins des articles qui active le doigt allongé.

11. Appareil selon la revendication 10, dans lequel ledit dispositif (532) de détection de la pression d'au moins l'un des articles comprend un capteur (145) à fibre optique.

12. Appareil selon l'une quelconque des revendications 8 à 11, comprenant plusieurs doigts allongés (110).

13. Appareil selon l'une quelconque des revendications 5 à 12, dans lequel le dispositif (110) destiné à retirer les articles est commandé par un vérin (137).

14. Appareil selon l'une quelconque des revendications précédentes, dans lequel des douilles de glissières linéaires (105, 106) sont montées sous le premier élément souple sans fin et entourent des arbres cylindriques (103, 104) afin qu'elles se déplacent sur ceux-ci.

15. Appareil d'application de liquide à une matière mobile, comprenant un dispositif (44) applicateur de liquide ayant une ligne de sorties placée transversalement au trajet d'un substrat et au-dessus de celui-ci afin qu'il évacue une ligne correspondante de courants principaux non déviés et parallèles de façon générale d'un liquide sur une trajectoire des courants primaires de liquide dirigés vers le trajet du substrat, une source de données de motifs codés électriquement, un dispositif à passages de gaz placé près de la ligne de sorties et aligné sur les axes d'évacuation des sorties afin qu'il assure la déviation sélective, d'après les données de motifs de la source de données, de la trajectoire des courants primaires de liquide provoquant des sorties par des courants de gaz du dispositif à passages de gaz qui recoupent les courants primaires de liquide, une chambre collectrice de liquide disposée près des sorties et en face du dispositif à passages de gaz, la chambre collectrice de liquide ayant une ouverture qui est placée le long de la ligne de sorties et a une position lui permettant de recevoir les courants de gaz et les courants de liquide primaires déviés par les courants de gaz,
caractérisé en ce que :
l'appareil comporte en outre un appareil trans-

porteur (10) selon l'une quelconque des revendications précédentes, destiné à transporter la matière suivant un trajet prédéterminé de déplacement.

16. Appareil d'application de liquide à un substrat mobile selon la revendication 15, dans lequel le premier élément souple sans fin de l'appareil transporteur (10) comporte une série de plaques (86) interconnectées afin qu'elles puissent pivoter et plusieurs lattes parallèles (402) fixées de façon amovible sur lui et près de la première partie plane (90), et un dispositif (110, 174) destiné à retirer les articles de l'appareil transporteur (10) et comprenant au moins un second élément souple sans fin (191) qui entoure une paire de rouleaux cylindriques (178, 188) sur lequel le substrat mobile est soulevé à l'aide d'un doigt allongé (110).

17. Appareil selon la revendication 15 ou 16, dans lequel l'appareil transporteur (10) est mobile et est incliné, et comprenant en outre un ensemble à châssis (14) et un dispositif (11, 30) destiné à déplacer l'appareil transporteur incliné (10) sous le dispositif applicateur de liquide (44) et à distance de celui-ci pour le traitement de diverses hauteurs de la matière, et un dispositif (461) de blocage de l'appareil transporteur incliné (10) à l'une au moins de plusieurs positions.

18. Appareil selon la revendication 17, dans lequel le dispositif (11, 30) destiné à déplacer l'appareil transporteur incliné (10) sous le dispositif applicateur de liquide (44) et à distance de celui-ci comporte en outre un moteur (162) fixé à l'ensemble à châssis (14), le moteur (162) ayant un arbre rotatif portant une poulie (163) qui lui est fixée et qui enroule et déroule un câble (164) fixé à l'appareil transporteur (10) pour le déplacement de l'appareil transporteur (10) sous le dispositif applicateur de liquide (44) et à distance de celui-ci.

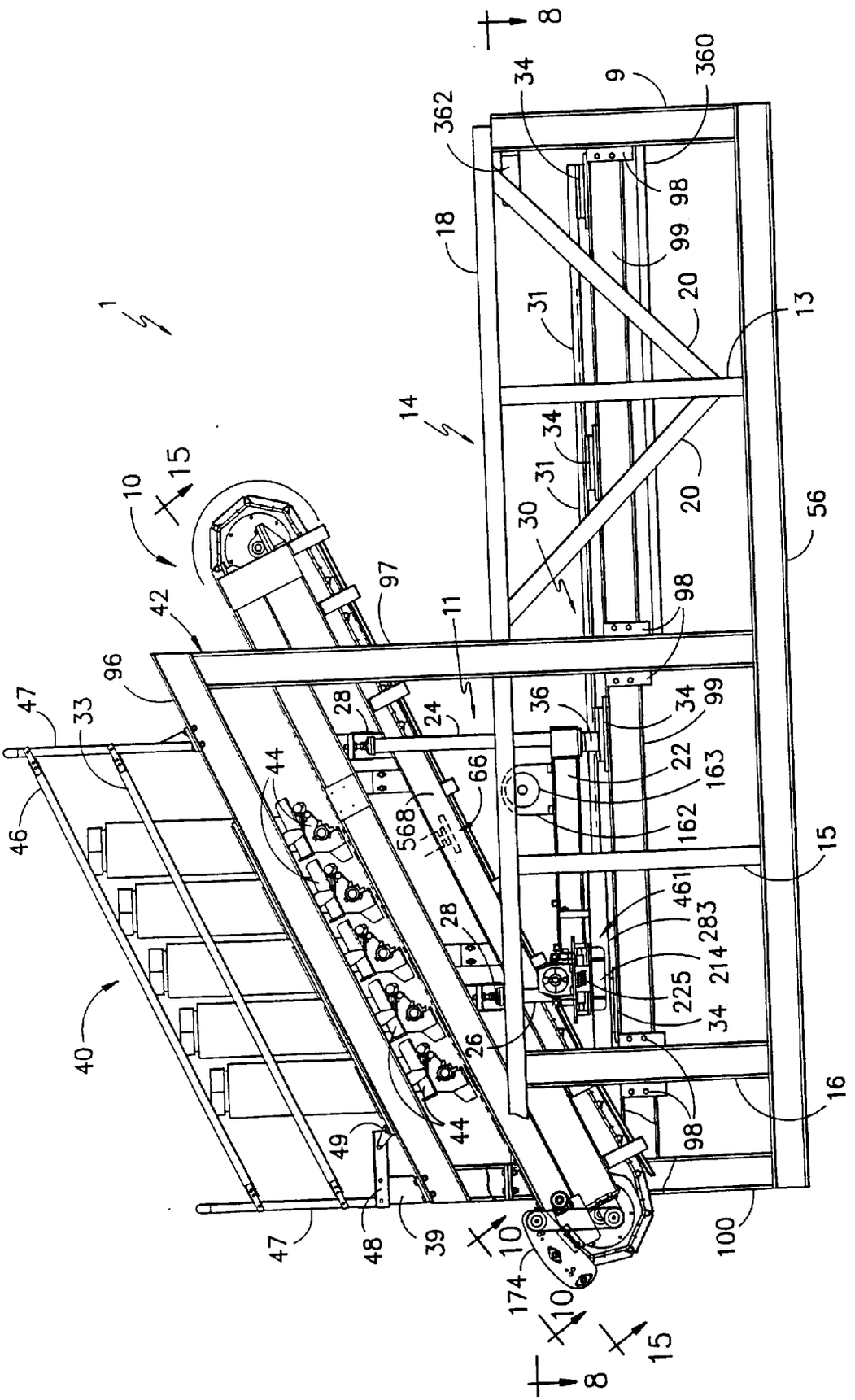
19. Appareil selon la revendication 17 ou 18, dans lequel le dispositif (461) de blocage de l'appareil transporteur (10) à l'une au moins de plusieurs positions comporte en outre un dispositif de blocage comprenant un premier dispositif (222) destiné à loger une broche (223) placée dans l'appareil transporteur (10), et un second dispositif (225) destiné à loger la broche (223) placée dans l'ensemble à châssis (14).

20. Appareil selon la revendication 17 ou 18, dans lequel le dispositif (461) de blocage de l'appareil transporteur (10) à l'une au moins de plusieurs positions comporte en outre un dispositif à came (205) et un dispositif (207) de support de came destiné à maintenir le dispositif à came (205) dans une position fixe, et au moins un capteur (270-273) destiné à détecter si le dispositif à came (205) est placé dans le dispositif (207) de support de came.

21. Appareil selon l'une quelconque des revendications 17 à 20, comprenant en outre au moins un capteur (270-273) destiné à déterminer la position relative de l'appareil transporteur (10) et de l'ensemble à châssis (14).

22. Appareil selon l'une quelconque des revendications 17 à 21, dans lequel le dispositif (11, 30) destiné à déplacer l'appareil transporteur (10) sous le dispositif applicateur de liquide (44) et à distance de celui-ci comporte en outre plusieurs glissières rectilignes (36) fixées à l'appareil transporteur (10) et qui coopèrent avec des arbres cylindriques (31) qui les supportent et qui sont montés sur l'ensemble à châssis (14) pour assurer le déplacement de l'appareil transporteur (10).

23. Appareil selon l'une quelconque des revendications 15 à 22, dans lequel la matière est détectée par au moins un dispositif capteur (240, 250) avant son traitement par les courants primaires non déviés du liquide.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15
461
283
214
225
34
26
16
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FIG. -1-

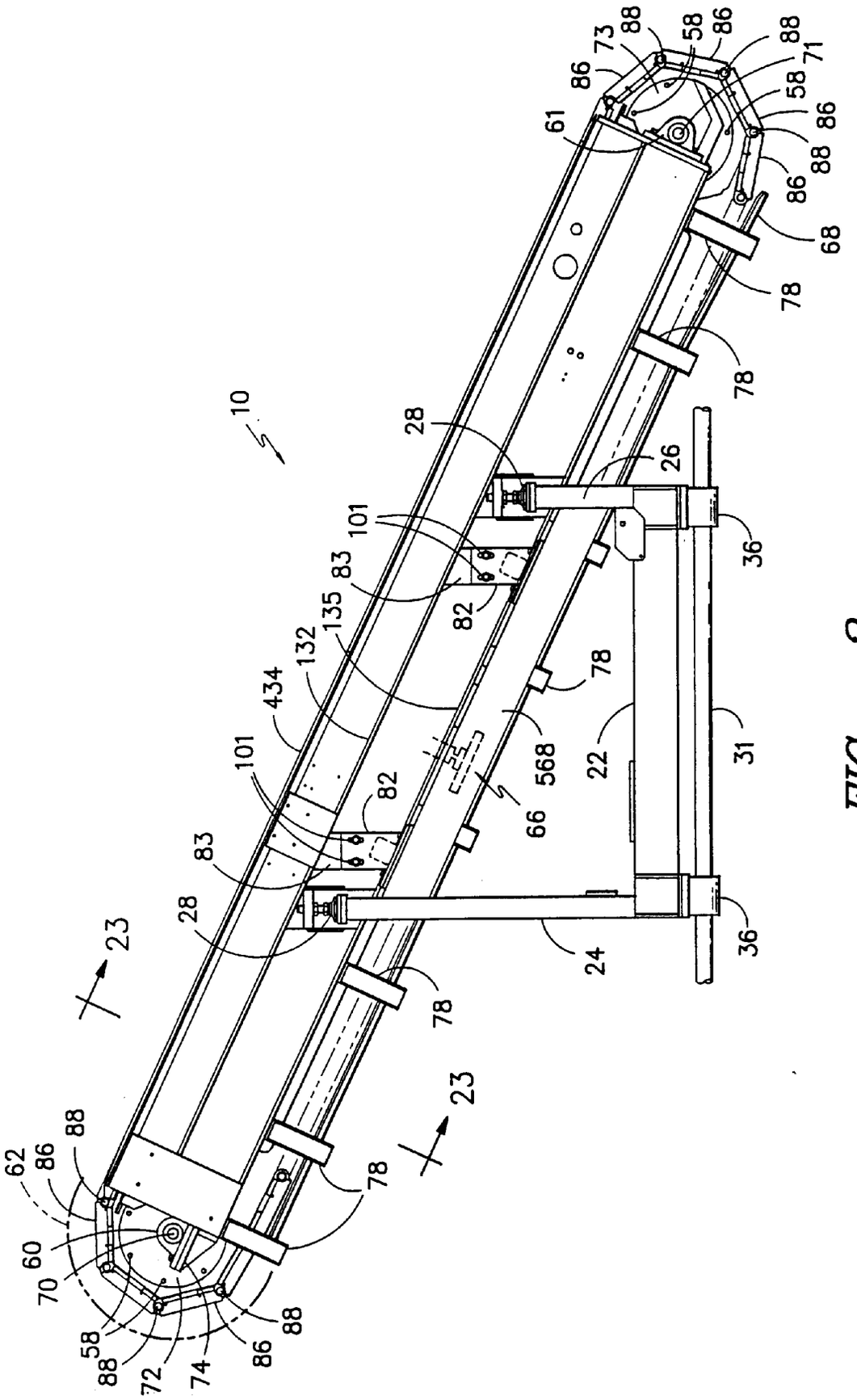
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FIG. -2-

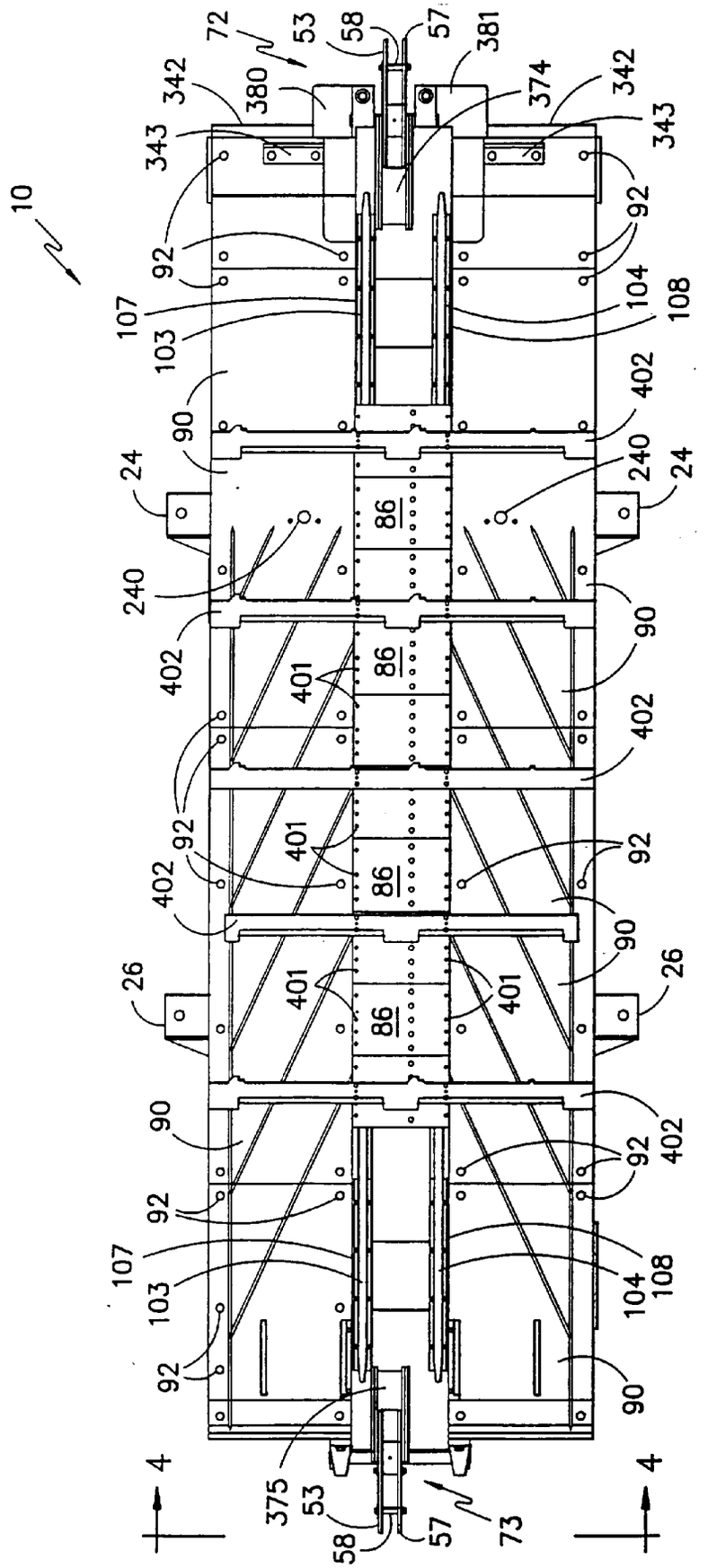
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FIG. -3-

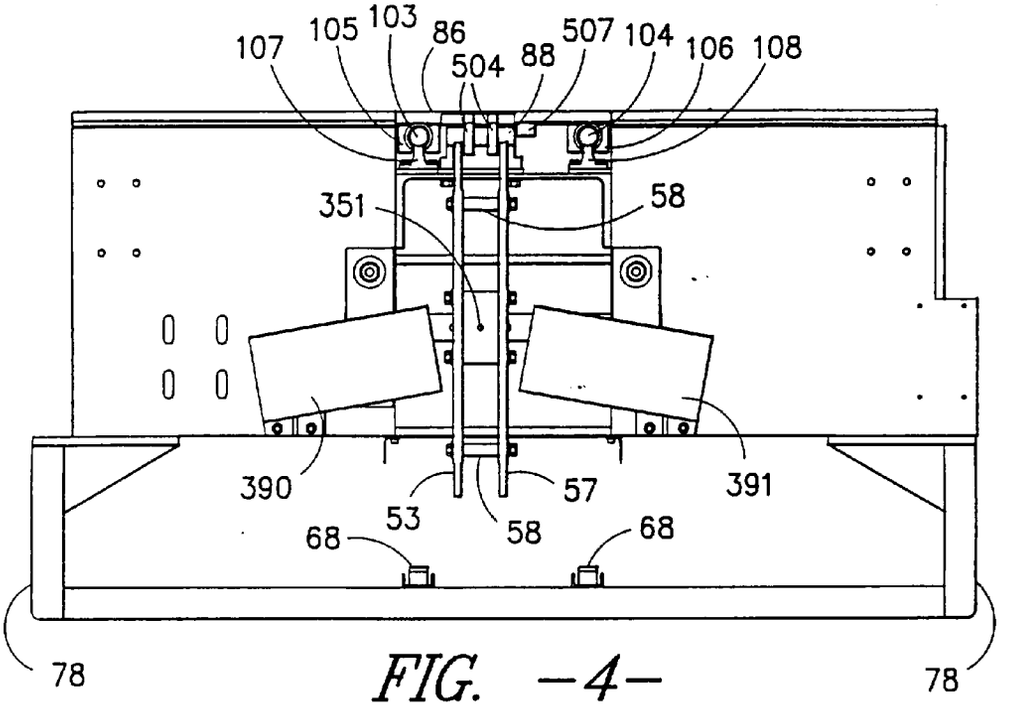
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FIG. —4—

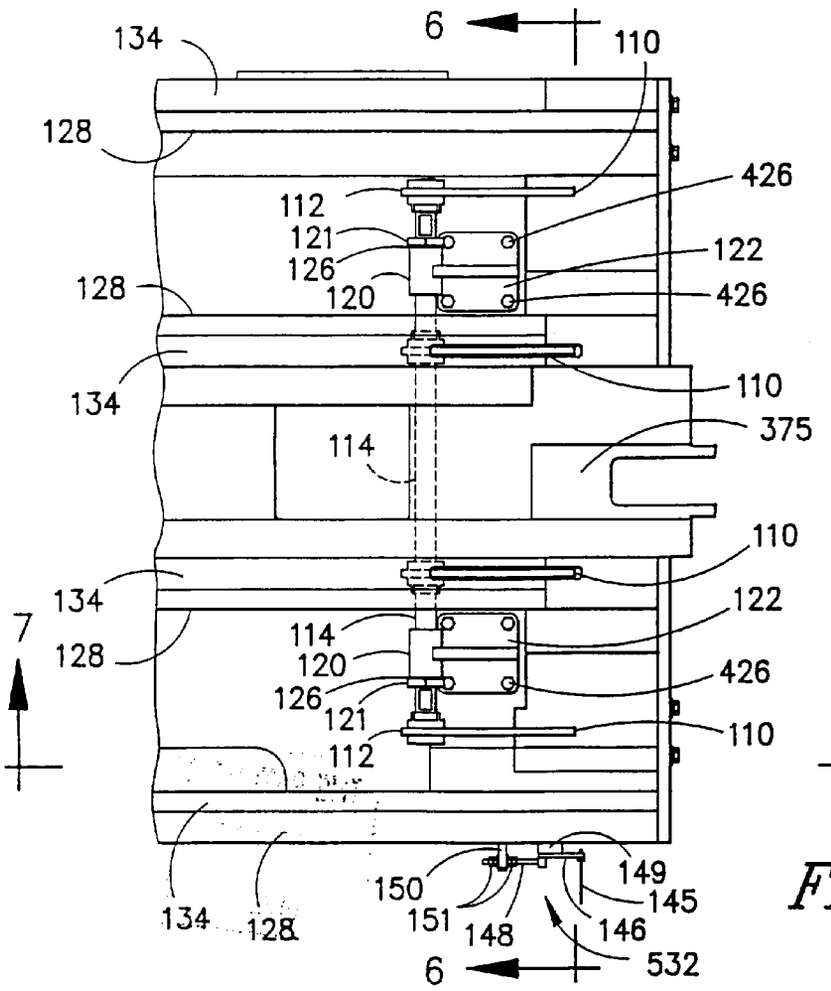
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FIG. —5—

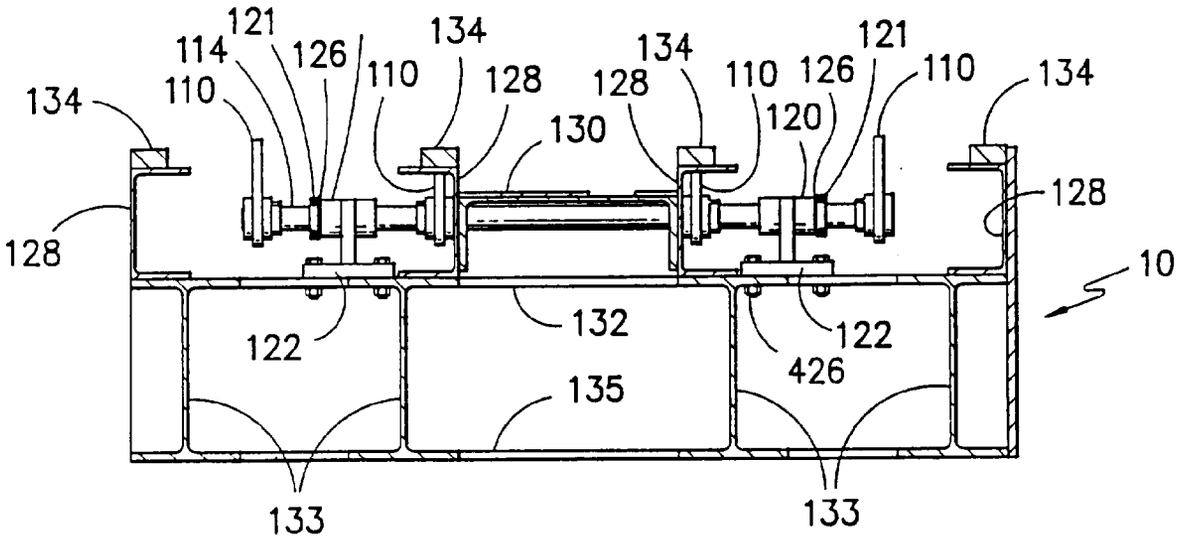
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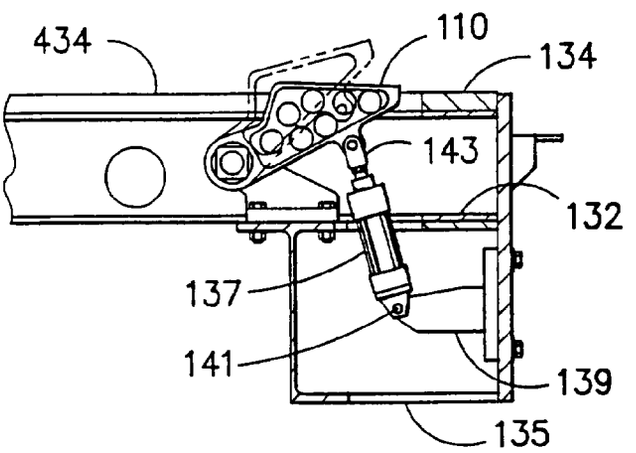
FIG. —6—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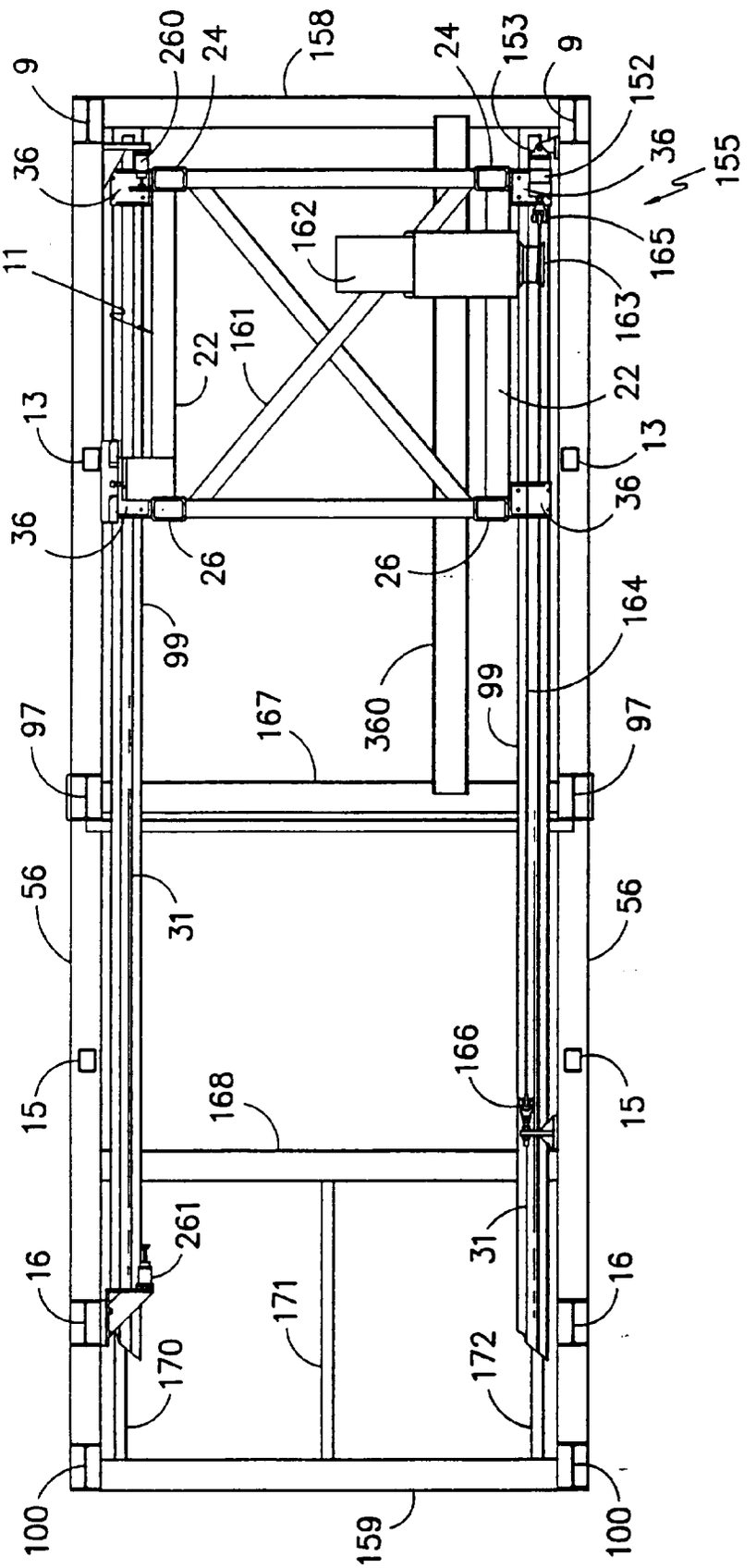
135

FIG. —7—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159
100

FIG. -8-

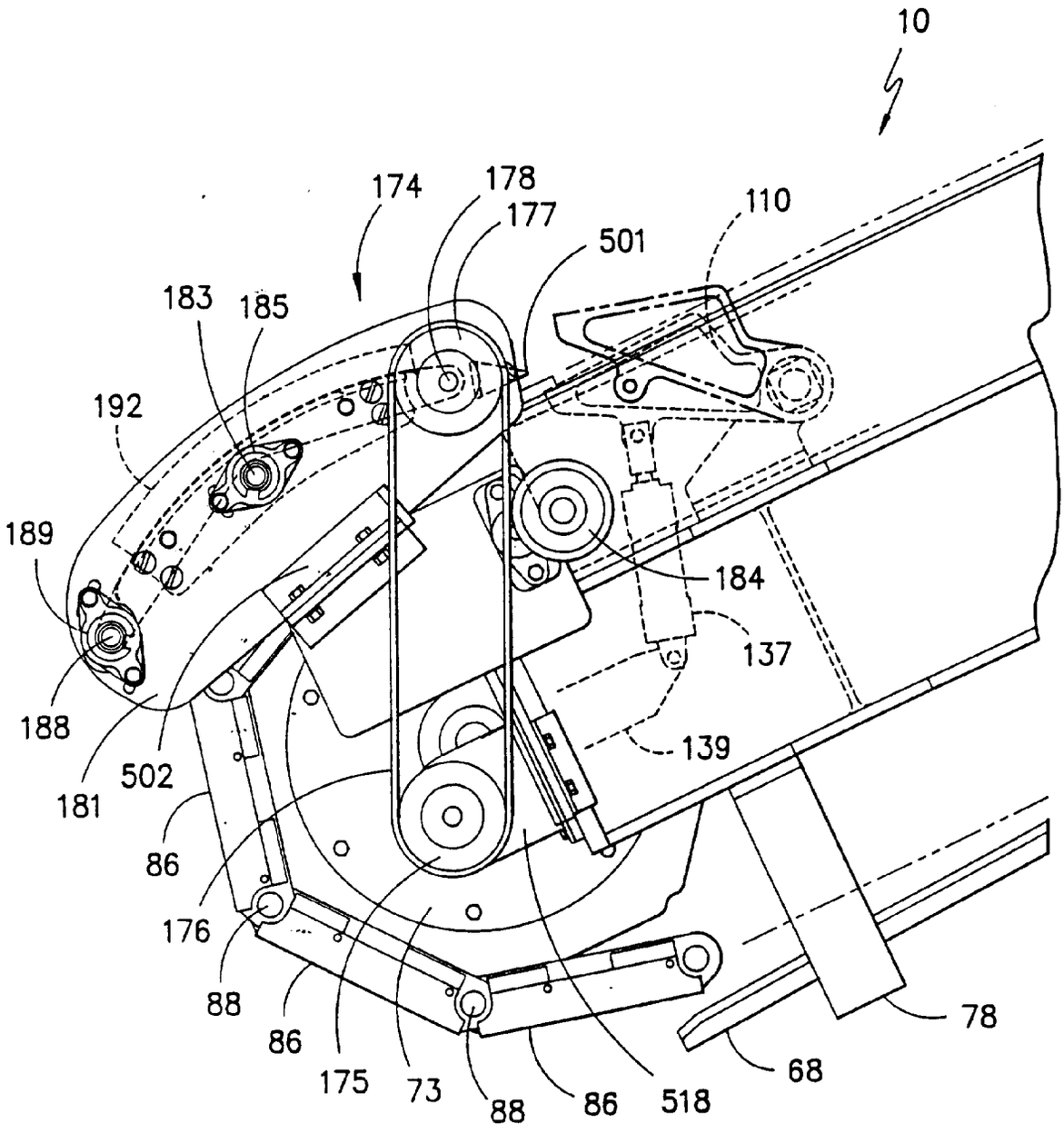
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FIG. —9—

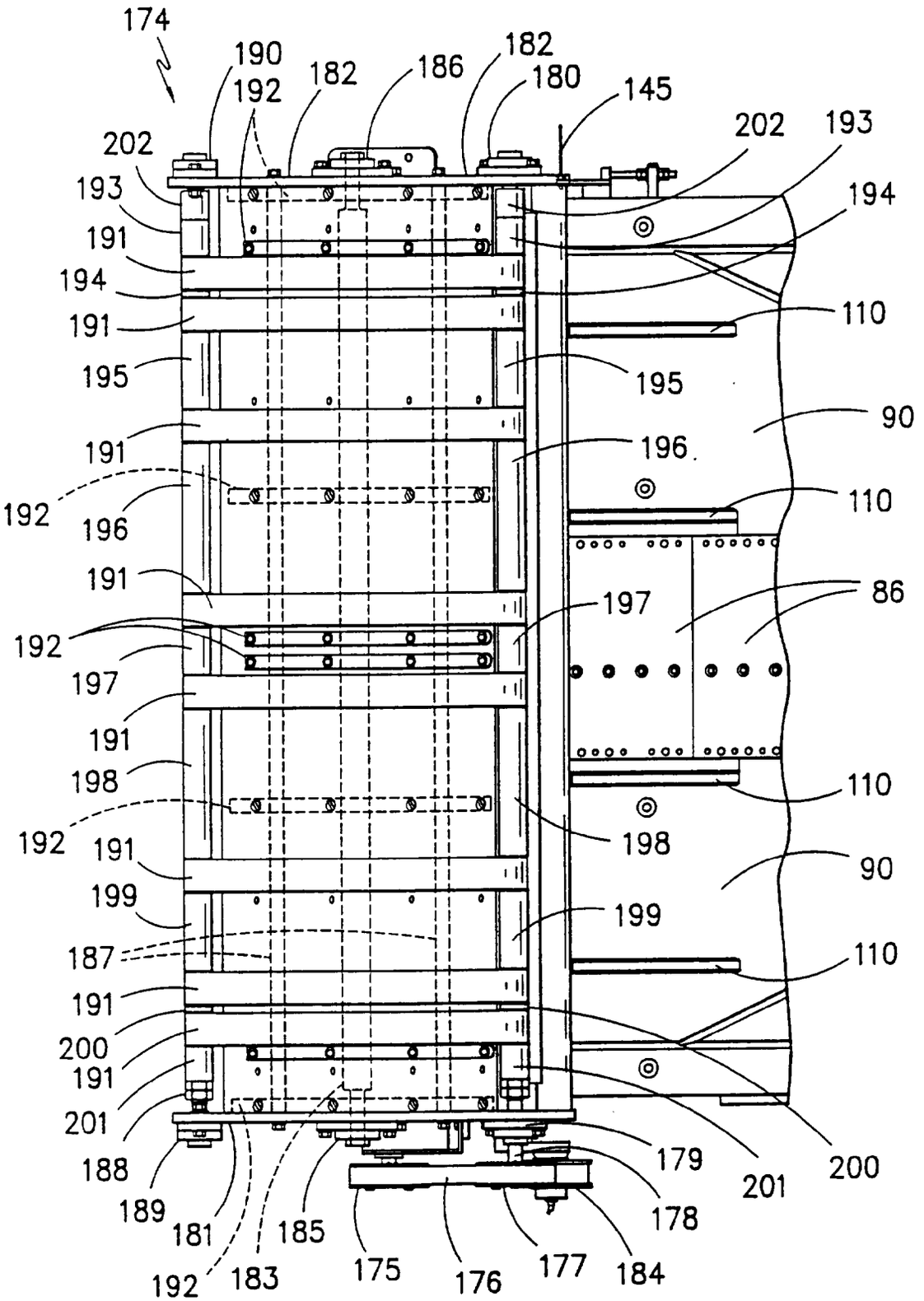
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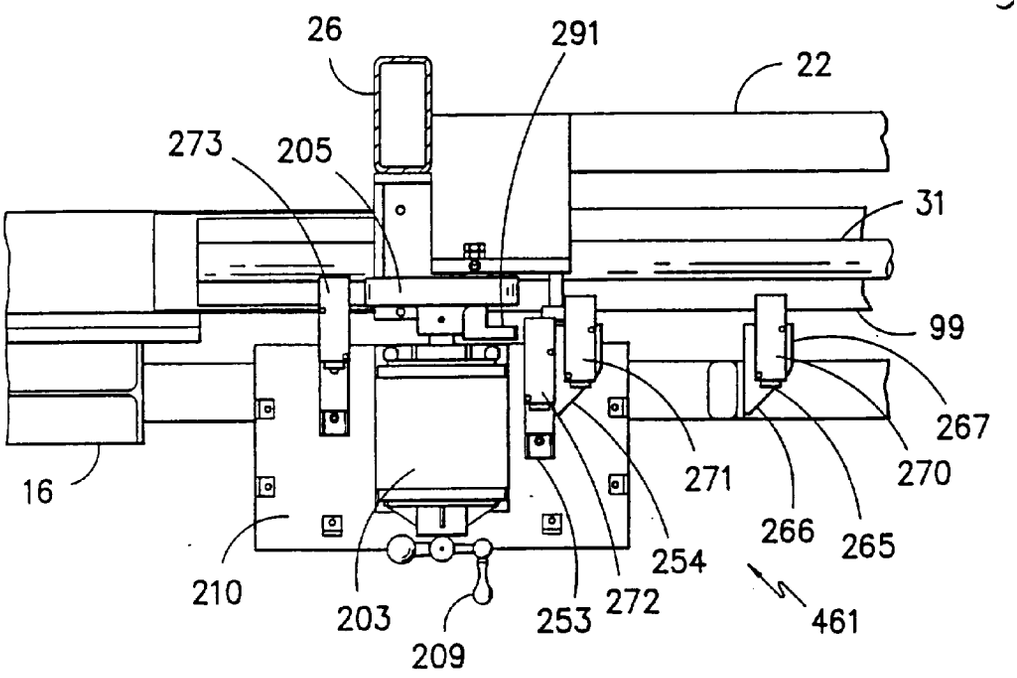
FIG. —10—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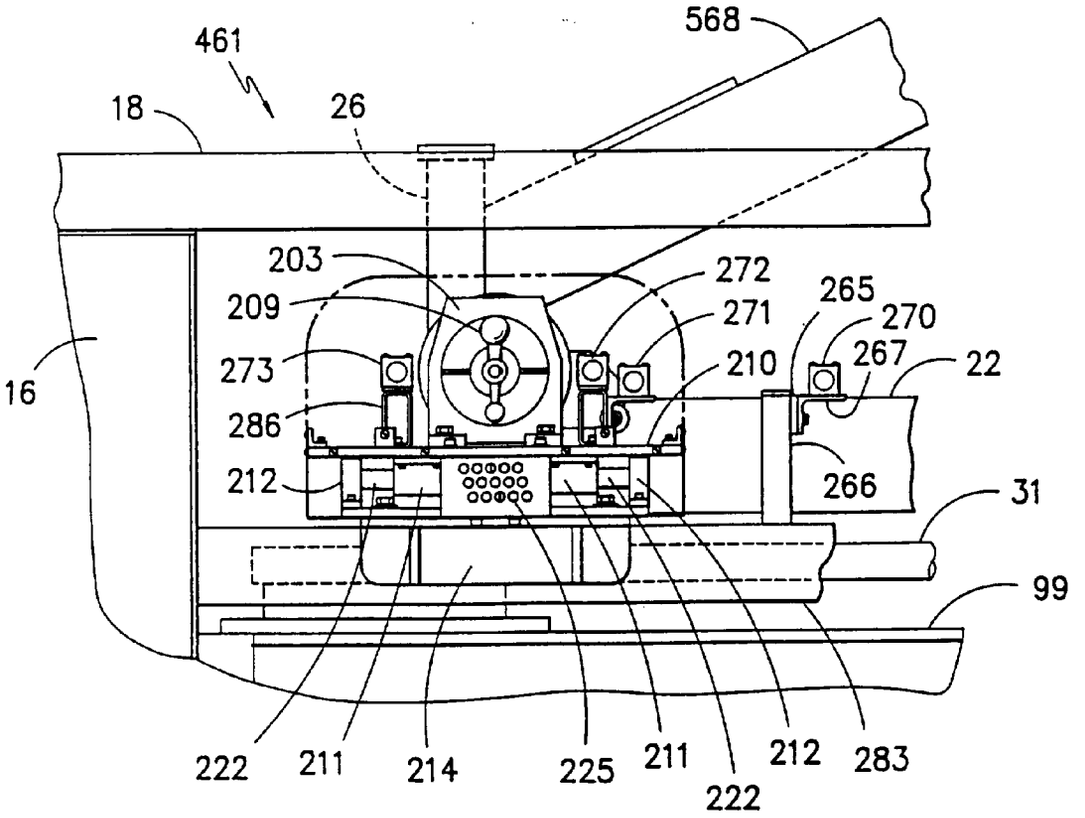
209

FIG. -11-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222

FIG. -12-

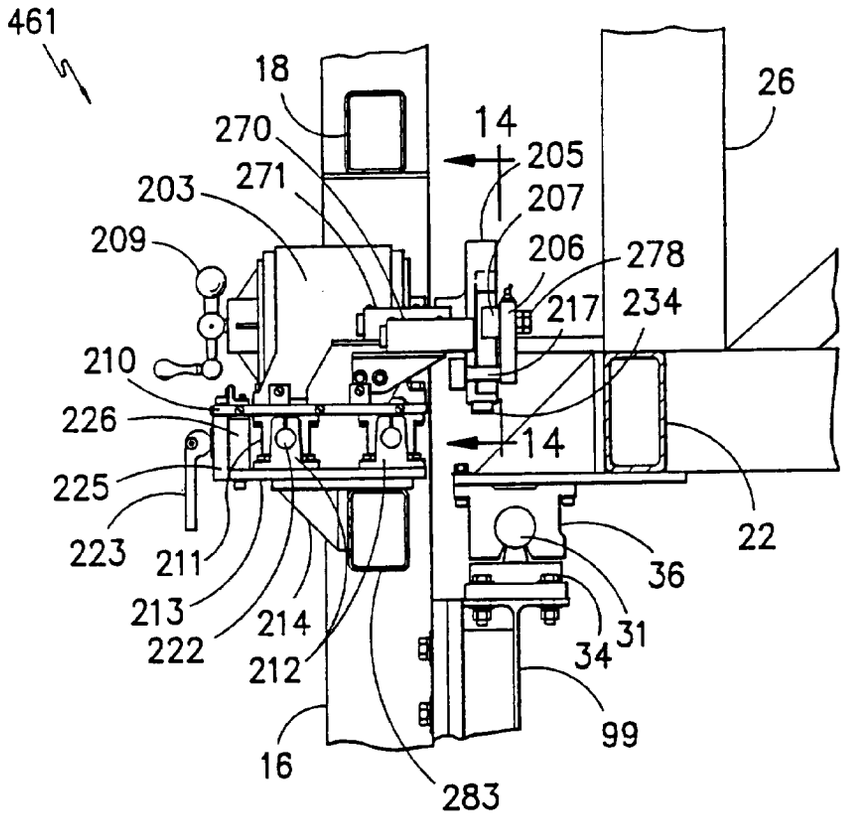
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FIG. —13—

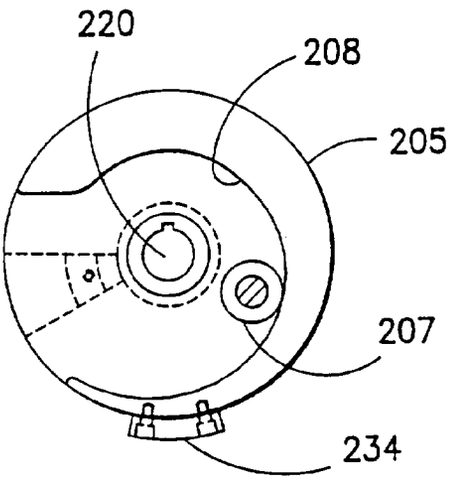
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FIG. —14—

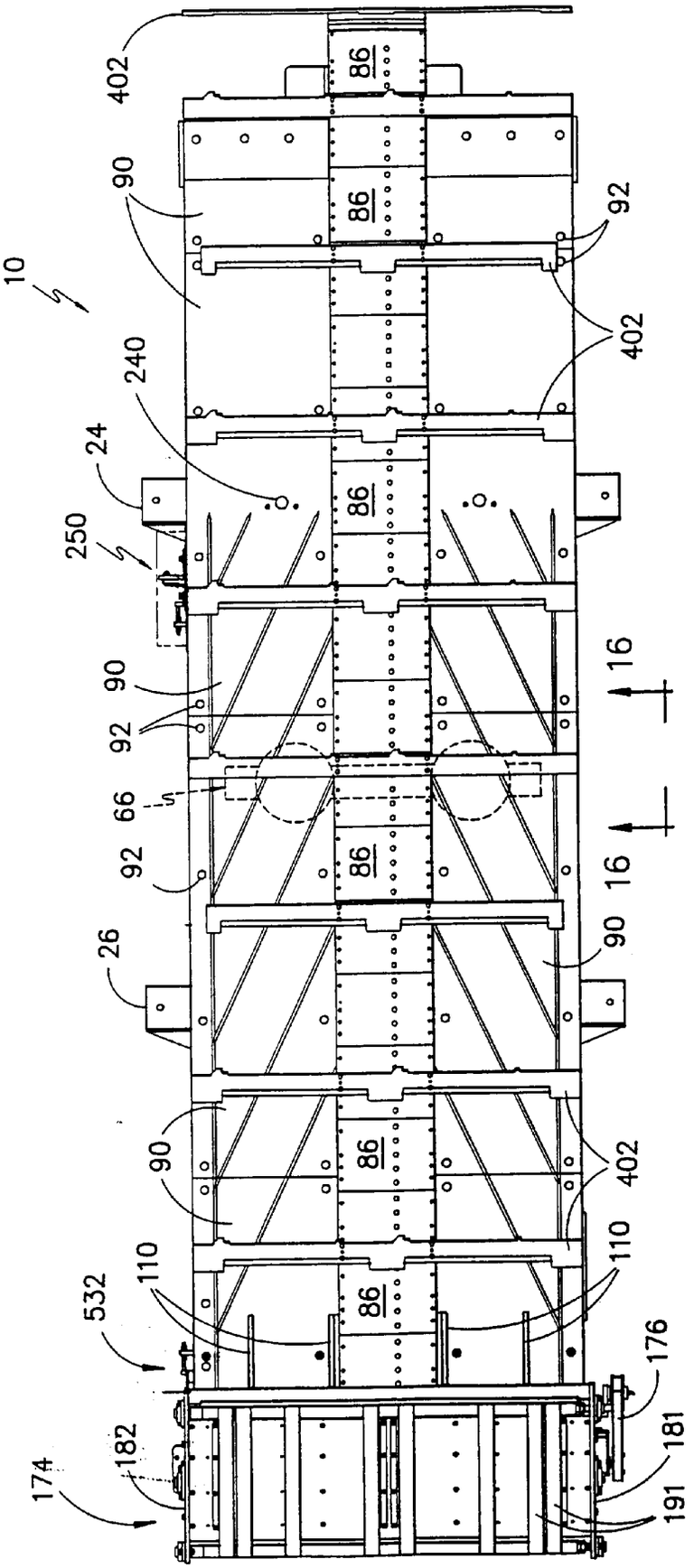
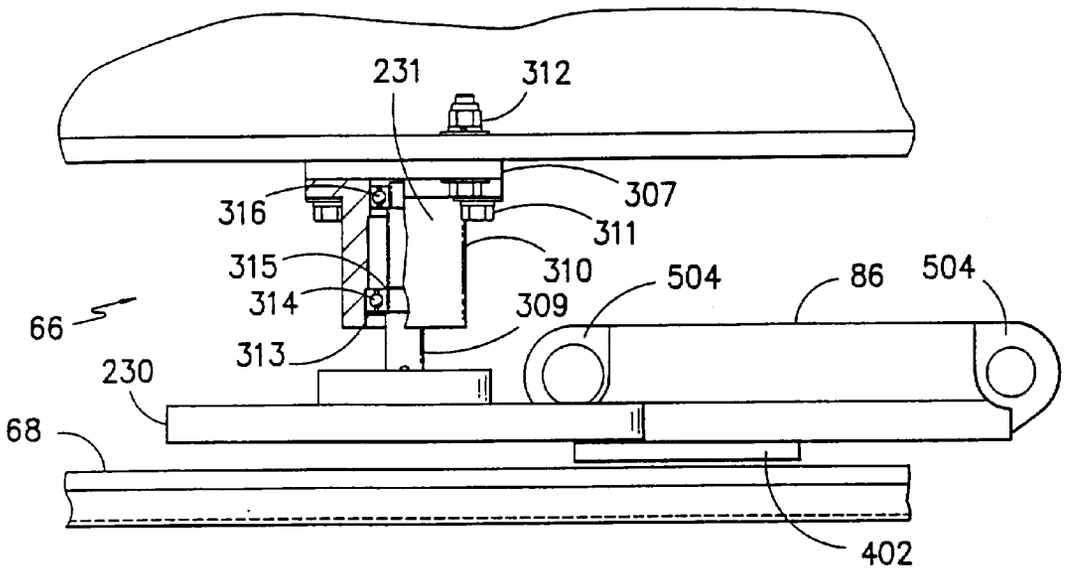


FIG. -15-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230
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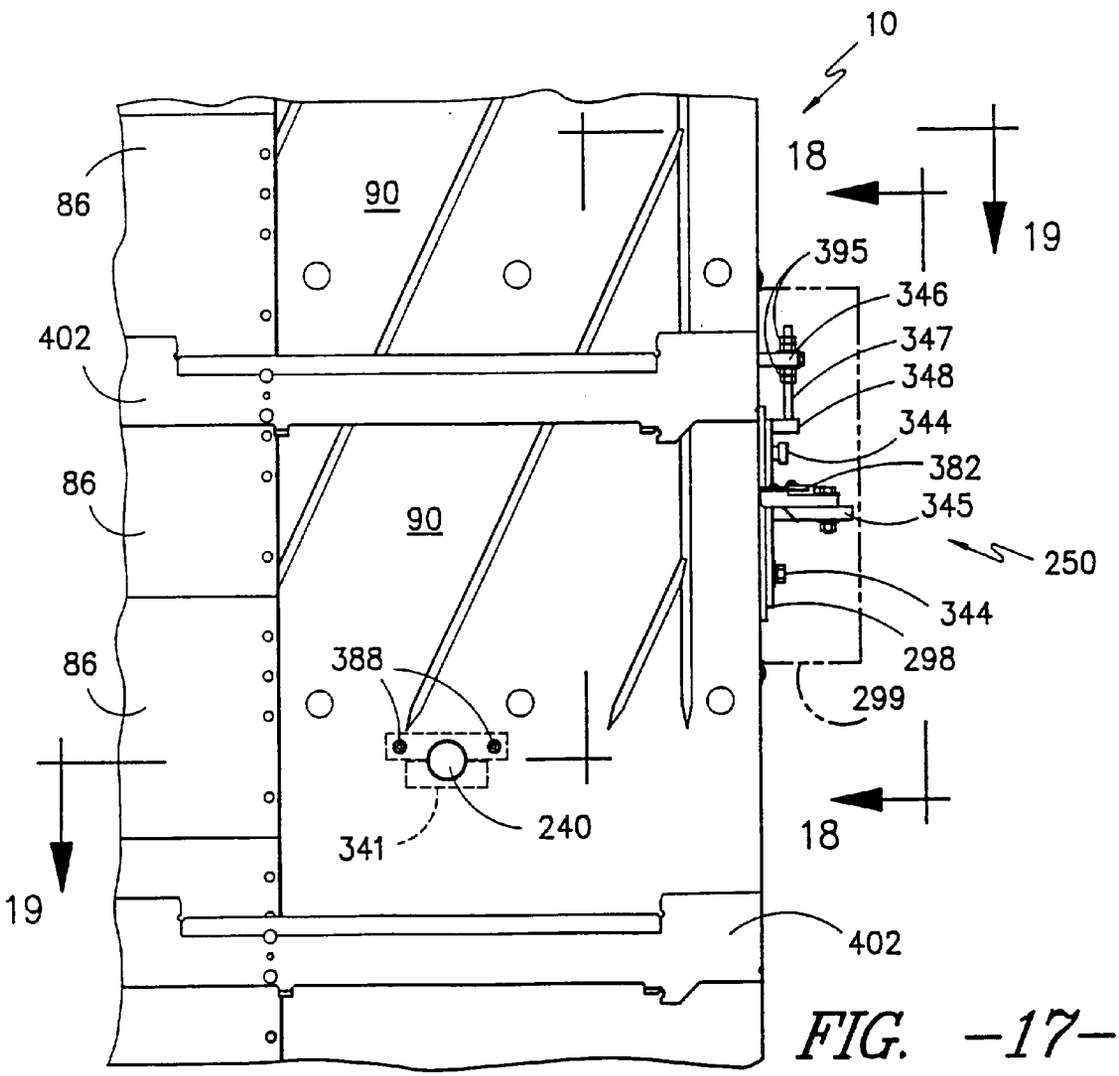
FIG. -16-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402

FIG. -17-

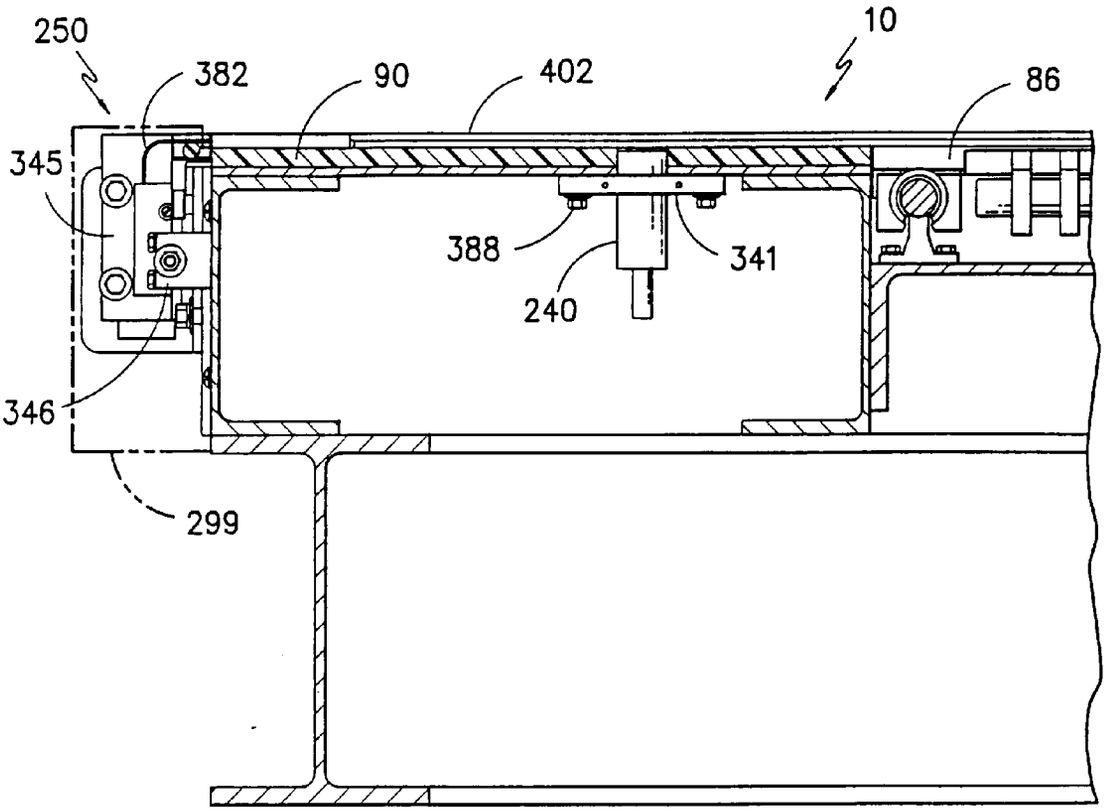
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FIG. -18-

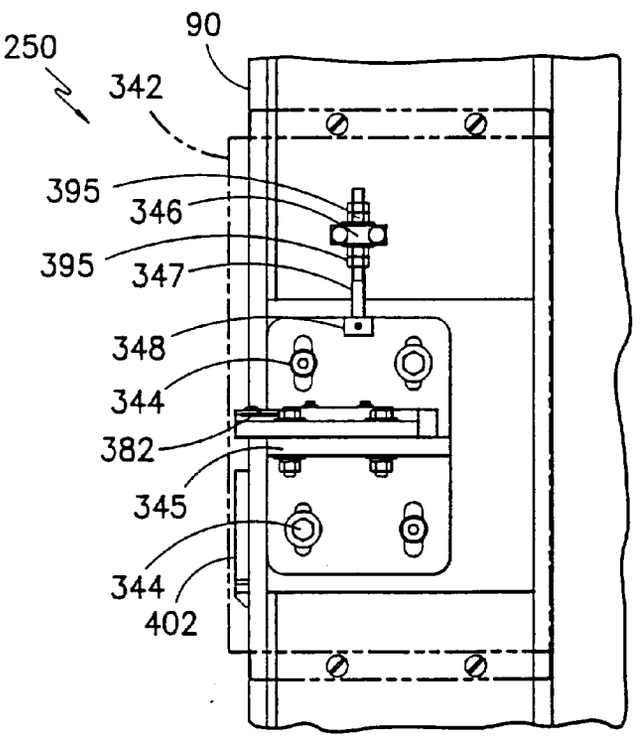
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FIG. -19-

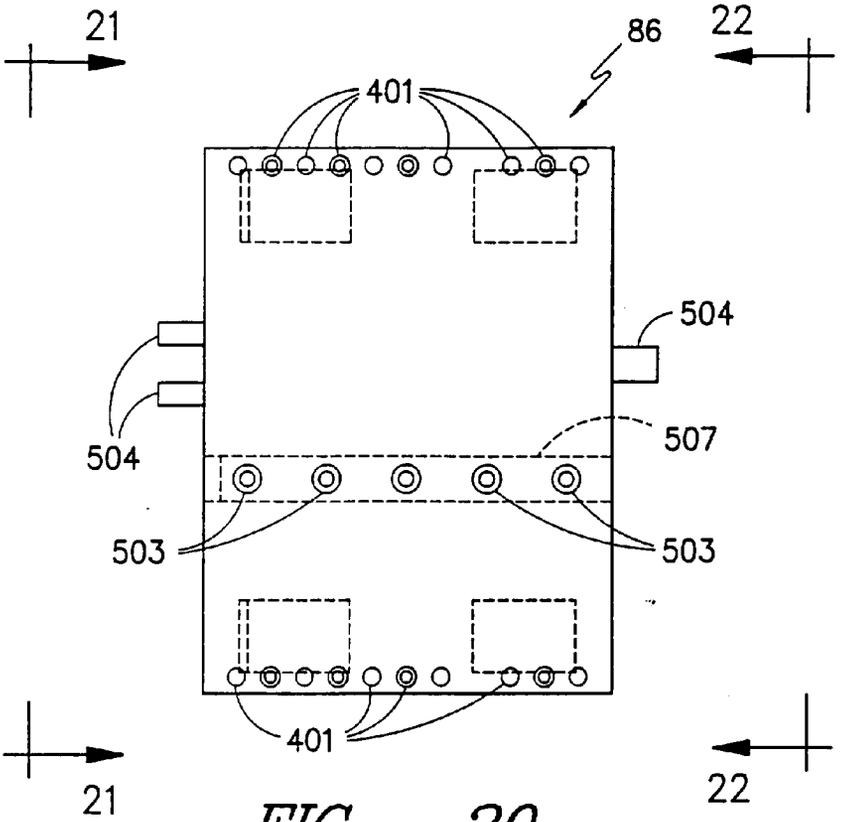

FIG. -20-

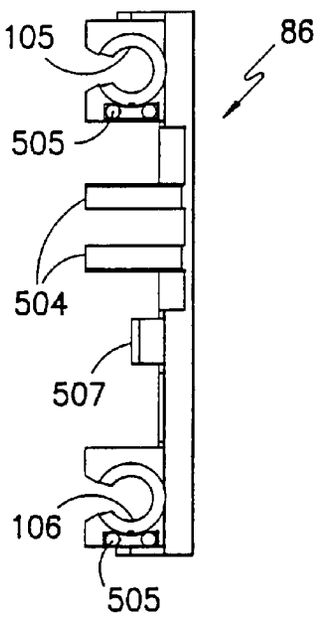

FIG. -21-

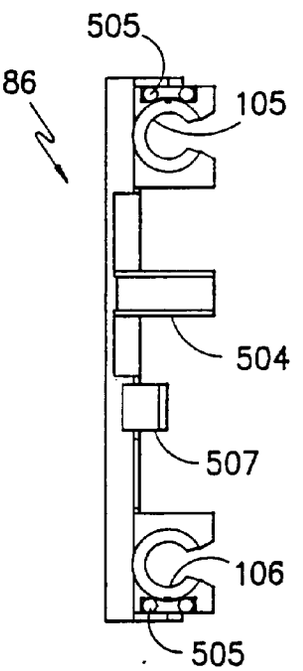

FIG. -22-

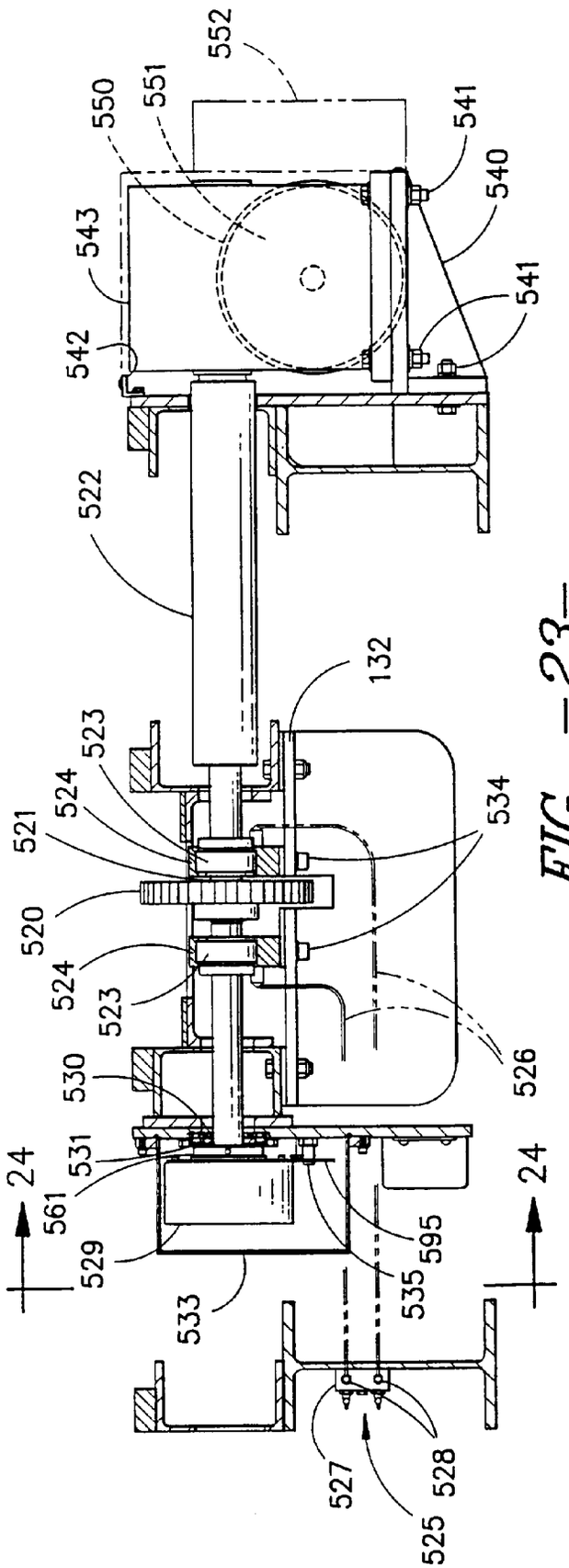
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FIG. -23-

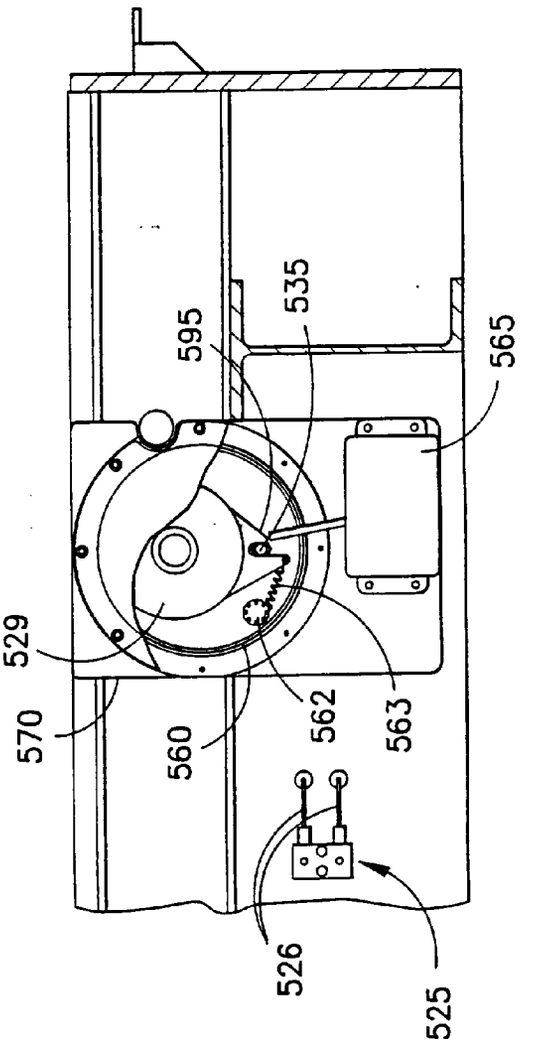
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FIG. -24-