



(51) International Patent Classification:
B29C 65/00 (2006.01)

(21) International Application Number:
PCT/IB20 12/0500 19

(22) International Filing Date:
3 January 2012 (03.01.2012)

(25) Filing Language: English

(26) Publication Language: English

(72) Inventor; and

(71) Applicant : AMIR, Alexander [IL/IL]; Balfour 27,
33 14 1 Haifa (IL).

(74) Agent: DR. MARK FRIEDMAN LTD.; Moshe Aviv
Tower, 54F 7 Jabotinsky, 52520 Ramat Gan (IL).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,

[Continued on nextpage]

(54) Title: TICKET GLUER

(57) Abstract: A ticket gluing method and apparatus for receiving and counting tickets, where single tickets are discarded after being counted and slips of at least two tickets are joined to a ream of tickets. The ream of tickets is stacked in layers for re-use.

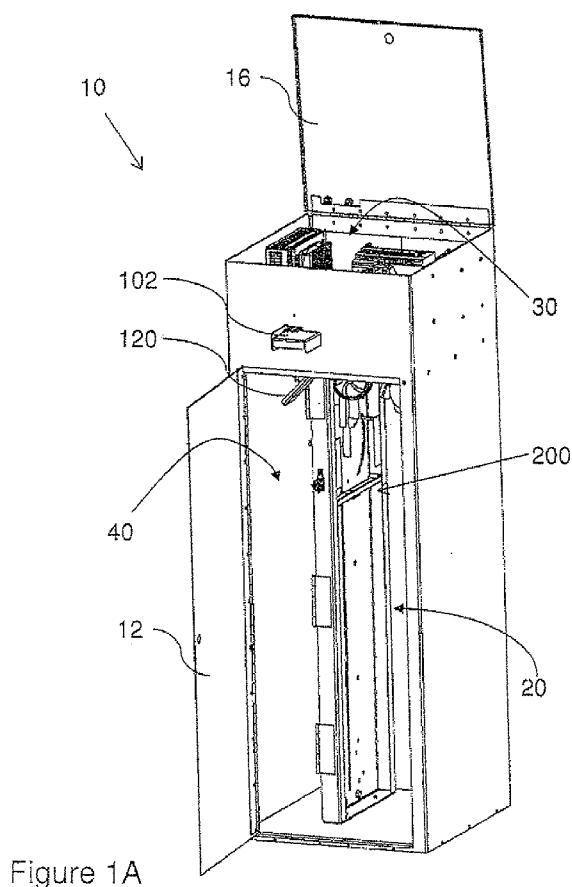


Figure 1A



TICKET GLUER

FIELD AND BACKGROUND OF THE INVENTION

The present invention relates to an apparatus for joining ticket slips and, more particularly, to an apparatus for receiving ticket slips and outputting a continuous ticket ream.

Paper tickets are commonly used in amusement arcades, video arcades, movie theatres, hotels, airports, and other facilities. Tickets must often be redeemed at a specified price for a given number of tickets, or for a prize in a given price range. It is therefore necessary to count the tickets presented. Currently, the convention in ticket counting is to destroy the tickets after counting, so that they cannot be improperly re-used.

Redemption games are typically arcade games of skill that reward the player proportionally to their score in the game. The reward most often comes in the form of tickets, with more tickets being awarded for higher scores. These tickets can then be redeemed (hence the name) at a central location for prizes.

Tearing tickets by hand or cutting them with hand-operated cutting devices is tedious, inconvenient, wasteful, time consuming and not at all practical for destroying large numbers of ticket in long strips. Also, the residue of the torn tickets is bulky, and requires storage space before being thrown away, not to mention the impact on the environment when the waste lands in a garbage landfill, especially if the torn tickets are not recycled. The great amount of harm brought to the environment from ticket waste product and the deforestation caused in order to produce the tickets in the first place can be greatly reduced, the world over, by recycling the tickets.

Various automated devices have been proposed to destroy the tickets after counting. One such mechanized device cuts a strip of tickets longitudinally in half. The device is shown in U.S. Pat. No. 5,211,093, the disclosure of which is hereby incorporated by reference herein. This device is efficient in invalidating the tickets, but the resulting wastage, both financial and environmental, are great. Unsubstantiated sources claim that a medium sized amusement arcade, which dispenses tickets that can be exchanged for prizes, can use up to one eight-foot long container of tickets in a year. If true, or even partially true, the financial expense as well as the environmental impact, is indeed great. Some amusement parks even purchase a container (which is a great expense) to store the tickets in bulk, due to the great number of tickets used and discarded at these parks.

It would be highly advantageous to have an apparatus for receiving strips of tickets, counting the tickets and rejoining the ticket strips to ticket strips subsequently fed into the

apparatus. With such an apparatus, ticket wastage is minimized and the tickets are recycled for subsequent reuse.

SUMMARY OF THE INVENTION

5 According to the present invention there is provided a ticket joining apparatus, including: (a) a ticket guide, adapted to receive at least one ticket; and (b) a ticket labeier assembly, configured to couple a first ticket of a ticket slip, received by the ticket guide, to a last ticket of a ticket ream, wherein the ticket slip includes at least to tickets.

10 According to further features in preferred embodiments of the invention described below the apparatus further includes: (c) a storage assembly, configured to stack and store the ticket ream; wherein the ticket guide is further operative to convey the ticket ream to the storage assembly.

According to still further features in the described preferred embodiments the apparatus further includes a mechanism configured to count each ticket received by the ticket guide. According to still further features the ticket guide is configured to discard a single ticket.

15 According to still further features the ticket labeier assembly includes: (i) a ticket labeier; (ii) a label dispensing assembly; and (iii) a charger assembly for causing the ticket labeier to dispense a ticket label received from the label dispensing assembly.

According to still further features the ticket labeier is configured to dispense a ticket label on adjacent edges of the first ticket of the ticket slip and the last ticket of the ticket ream.

20 According to still further features the ticket label is a pricing label.

According to still further features the storage assembly includes: (i) a lift shelf; and (ii) a layering arm configured to stack the ticket ream in layers of tickets on the lift shelf. According to still further features each layer of tickets includes five tickets.

25 According to still further features the storage assembly further includes: (iii) a flattening mechanism configured to cause the layers to lay substantially flat.

According to still further features the flattening mechanism includes a blowers assembly, including at least one blower configured to expel air onto the layers of tickets. According to still further features the flattening mechanism includes at least one solenoid assembly including a solenoid actuator, a flange and an elongated member, wherein the flange is operationally coupled to the solenoid actuator via a biasing element and the elongated member is operationally coupled to the flange, wherein the solenoid actuator is adapted to cause the elongated member to rest on the layers of tickets.

30

According to the present invention there is provided a method for recycling tickets, including the steps of: (a) receiving a ticket slip in a ticket guide assembly; (b) coupling a first ticket of the ticket slip to a last ticket of a ream of tickets; and (c) stacking and storing the ream of ticket.

According to still further features the first ticket of the ticket slip is coupled to the last ticket of the ream of tickets with a ticket label. According to still further features the stacking and storing is effected by a stacking said ticket ream in layers.

According to still further features the method further includes the step of flattening the layers. According to still further features the flattening is effected at least in part by blowing air on the layers. According to still further features the flattening is effected at least in part by resting an elongated member on the layers.

The present invention discloses an innovative ticket joiner apparatus for joining strips of tickets into a continuous ream of tickets and organizing the ream of tickets according to the packaging standard by which tickets are distributed to redemption machines.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments are herein described, by way of example only, with reference to the accompanying drawings, wherein:

FIG. 1A is a front isometric view of a preferred embodiment of a ticket gluer apparatus of the current invention;

FIG. 1B is a side view of the invention of Figure 1A with the walls deleted;

FIG. 1C is a right isometric view of the invention of Figure 1B;

FIG. 1D is a left isometric view of the invention of Figure 1B;

FIG. 2A is a partial top view of a preferred embodiment of ticket guide **100** of the current invention with ticket labeler assembly **300** partially deleted;

FIG. 2B is a bottom view of Figure 2A with ticket labeler assembly partially viewable;

FIGs. 2C-2D are isometric distal views of ticket gluing assembly **32**;

FIG. 2E is a schematic plan of the preferred embodiment of the invention;

FIG. 3A is a right side view of a ticket labeler, proximal view of ticket guide;

FIG. 3B is a left side view of a ticket labeler and distal view of ticket guide;

FIG. 3C is a front view of ticket labeler and a side view of ticket guide;

FIG. 3D is a magnified view of a selected section of Figure 3C;

FIG. 3E is a side view of a schematic representation of ticket labeler and label dispensing assembly;

FIG. 3F is an isometric view of label dispenser;

FIG. 3G is an isometric view of a ticket collector;

FIG. 3H is an exploded view of Figure 3G;

FIG. 4A is a view of storage assembly **200**;

5 FIG. 433 is a back view of storage assembly **200**;

FIG. 4C is a back view of a top section of storage assembly **200**;

FIG. 4D is an isometric view of Figure 4C with the partition removed;

FIG. 4E is a schematic representation of the motion of a step motor 7 M7;

FIG. 4F is an isometric view of a layering arm **202**;

10 FIG. 4G is an exploded view of Figure 4F;

FIG. 4H is an isometric view of an assembly of blowers **208**;

FIG. 4I is an exploded view of storage assembly **200**.

FIG. 5A is a front drive roller assembly;

FIG. 5B depicts rear drive roller assembly;

15 FIG. 5C is an isometric view of front top roller **108**.

FIG. 5D is a partially exploded view of Figure 5C;

FIG. 5E is an isometric view of rear top roller **114**;

FIG. 5F is an isometric view of "L" shaped charger **35**;

FIG. 5G is an isometric view of charger rod **346**.

20 FIG. 6 is a preferred embodiment of a basic program for the ticket joining apparatus of the current invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In general, the ticket coupling apparatus, of the current invention works as follows: A
 25 slip of tickets is fed into the feeder. The apparatus counts the tickets that are fed and advances the tickets through the feeder until the entire slip of tickets has been counted. Additional ticket slips can be fed into the apparatus. The new tickets will be counted and a "labeler" will join the new ticket slip to the last ticket slip that was fed into the machine with the aid of a sticker of the type usually used to label products with a price. Once the two slips have been coupled together
 30 the latest slip of tickets becomes part of the ream of tickets already stored in the machine. The ticket ream is fed via a guide shaft into a "cabinet" for organization and storage. A layering arm swings like a pendulum laying the tickets in layers. Three air blowers and two solenoid driven arms assist in the layering process. As the number of layers increases, the shelf upon which the tickets lie is lowered. A warning light flashes when the storage cabinet is nearly full and all

operations are stopped when the cabinet is full. An attendant can then open the service door and remove the layered tickets and reload the ticket dispensers with the used tickets, thereby recycling the tickets. Testing of the preferred embodiment of the current invention detailed herein has shown that standard tickets can be recycled at least fifteen times.

5

The principles and operation of an apparatus for coupling tickets slips according to the present invention may be better understood with reference to the drawings and the accompanying description.

HOUSING

10

Referring now to the drawings, Figure 1A is a front isometric view of a preferred embodiment of a ticket gluer apparatus **10** of the current invention with the door **12** open and the lid **16** raised. Figure 1B is a side view of the invention of Figure 1A with the walls deleted. Figure 1C is a right isometric view of the invention of Figure 1A with slight elevation, where the walls have been deleted. Figure 1D is a left isometric view of the invention of Figure 1A, where the walls have been deleted. Referring to all Figures 1, ticket gluer apparatus **10** includes two main compartments: a top compartment **30** and a cabinet **20**. Top compartment **30** houses the machinery and controllers for connecting the ticket slips into a continuous ream. Cabinet **20**, located beneath top compartment **30** houses a storage assembly **200** which contains the machinery for stacking the tickets which have been connected together and for storing the stacked tickets. In the current embodiment, 12,000 tickets can be stored in the depicted storage assembly **200**. Storage assembly **200** stacks the ticket in layers, where each layer includes five tickets. Conventional ticket redemption machines, such as those found in amusement arcades and video arcades, are generally stocked with tickets in layers of five tickets across (usually in groups of 400 layers of five tickets equaling two thousand tickets). The tickets stacked in the storage assembly **200** can be easily removed by an operator and loaded into a ticket redemption machine for reuse. The environmentally friendly recycling process for used tickets is also user-friendly, making the recycling of tickets easy and straightforward. A disposal area **40** is located on the left side of storage assembly **200**. This area is adapted to receive single tickets which are discarded via an ejection chute **120** once counted. Other waste products may also be stored in this area.

25

30

In top compartment **30** three main components are visible: a ticket guide-labeler assembly **32**, a power unit **34** and a controller unit **150**. Ticket guide-labeler assembly **32** includes: a ticket guide **100** and a ticket Sabeler assembly **300**.

Figure 6 is a preferred embodiment of a basic program for the ticket joining apparatus of the current invention. Figure 6 describes a number of scenarios according to the motor activity and state of sensors for each scenario. The program of Figure 6 will be referred to throughout the disclosure.

Numerous sensors are described herein. A sensor has two states 'open' i.e. not blocked, and 'closed' i.e. blocked. For micro switches a 'closed' switch means that the switch is in contact with another component and 'open' means that the switch is not in contact with any other element. In the current disclosure the annotation NO=open and NC=closed.

TICKET GUIDE

Figure 2A is a partial top view of a preferred embodiment of ticket guide **100** of the current invention with ticket labeler assembly **300** partially deleted. Figure 2B is a bottom view of Figure 2A with ticket labeler assembly **300** partially visible. Figure 2C is an isometric distal view of ticket gluing assembly **32**. Figure 2D is another isometric distal view of ticket gluing assembly **32**. Figure 2E is a schematic plan of the preferred embodiment of the ticket guide **100** and storage assembly **200** of the current invention. Referring now at least to Figures 2, guide insert shelf **102** (see also Figure 1A) extends beyond the front panel of the apparatus and includes a feeder mouth for receiving tickets **90** which are fed into the device.

There are two general states for feeding tickets: a new ream state and an existing ream state. A new ream state is when the ticket gluer is empty. The existing ream state is when there already exists a ream of tickets in the device. Referring now to the new ream state: When a sensor **1 S1** is blocked, sensor **S1-NC** and the sensor registers that a ticket **90** has entered the feedway of ticket guide **100**. Sensor **S1** sends a pulse to a controller **150** which activates a motor **M1** (scenario 2 in Figure 6), which in turn actuates ring belt and pulley arrangement **104** which is coupled to front drive roller **106** (see Figure 2B). Front drive roller **106** advances a ticket **90** (Fig 2), but in order to prevent slippage and increase traction between ticket **90** and front drive roller **106**, a second, weighted, front top roller **108** lies on top of the ticket, exerting gravitational/weighted force on the ticket and thereby enhancing the efficiency of front drive roller **106** in controlling the movement of the ticket through the guide. When more than one ticket is fed into the feeder then the ticket slip (at least two tickets are called a 'ticket slip') advances to block a sensor **2 S2** (i.e. **S2=NC**) and then to block a sensor **3 S3** (i.e. **S3=NC**) then two pulses are sent (scenario 2 in Figure 6) to controller **150** which advances a counter (not shown) by two points (for the two tickets) and sends the counter information to a display (not shown). When **S1=NC** and **S2=NC** and **S3-NC** then an electrical pulse is sent to controller **150**

and the controller activates a step motor **M3**. Once motor **M3** is activated, motor **M1** ceases activity. Step motor **M3** is a much more powerful motor and better adapted for controlling the feed of tickets. Step motor **M3** has a further feature whereby the motor is adapted to work at two separate speeds. Step motor **M3** works at an initial slow speed for 3 seconds thereafter moving at a higher speed. See the section below 'Motors, Sensors And Miscellaneous Parts' for additional technical details regarding the motors and sensors mentioned herein. Motor **M3** is coupled to a timing belt and pulley arrangement **110** which controls the movement of a rear drive roller **112** (see Figure 2B). Rear drive roller **112** now controls the movement of the ticket ream. A top rear roller **114** lies atop the ticket ream improving traction with rear drive roller **112**. Top rear roller **114** is not weighted, rather two angled flanges **116** depress top rear roller **114**, ensuring a continual downward pressure on the ticket ream. As long as sensor 2 **S2=NC**, the rollers (**106** or **112**) keep the ticket slip/ream moving through the ticket guide. Tickets move through a curved guide assembly **118** down into cabinet **20** for layering and storage (more on this below). Rear drive roller **112** continues to advance tickets in ticket guide **100** until reaching a state where Sensor **SI-NO** indicating the end of a ticket slip. At this point motor **M3** slows down and when sensor 2 **S2=NO** and sensor 3 **S3~NC** motor **M3** stops completely. Ticket gluer is now is on Standby waiting for a new ticket slip to be entered.

At this stage, there is now a ticket ream in the device and the apparatus moves to existing ream state. When a new ticket slip is fed into apparatus **10**, ticket labeler assembly **300** couples the new ticket slip to the existing ticket ream by means of applying a sticky label to the adjacent edges of the first ticket in the new ticket slip and the last ticket of the ticket ream. Once the labeling cycle is complete, motor **M3** is restarted. The ticket labeling process is described in fuller detail below. In order to clarify some of terminology used herein, a 'ticket slip' generally refers to a set of at least two tickets joined together and situated in ticket guide **100** before sensor 3 **S3**. Tickets situated beyond sensors 3 **S3** are generally considered to be part of a 'ticket ream'.

Each ticket **90** has specific ridges and indentations along the edges of the ticket including quarter-moon indentations on the corners of tickets **90**. Two tickets joined together create a half-moon indentation from the quarter moon indentation on the top left-hand corner of the first ticket and the top right-hand corner of the second ticket. When motor **M3** is ON and feeding tickets through the guide then a sensor 4 **S4** is initially open (before the arrival of a 0rst ticket or between two tickets) and then closed (i.e. **S4~NC**) when the sensor registers a/another ticket. As sensor 4 **S4** registers a ticket one pulse is sent to the counter, advancing the counter by one point, and another pulse is sent to a step motor **M7** which controls a layering arm. When

motor M7 receives the pulse, the motor is advanced one increment. The layering process is discussed in further detail below.

SINGLE TICKET

5 When a single ticket is fed into ticket gluer **10**, the single ticket must be counted, but for the sake of proficiency, single tickets, at least in the current embodiment of the invention, are not joined to the ticket ream. When a single ticket is entered, sensor 1 **S1=NC** and motor **M1** is activated to advance the ticket. The distance between sensor 1 **S1** and sensor 2 **S2** is larger than the length of a ticket **90**. Therefore sensor 1 **S1** will be open when sensor 2 **S2=NC**, so that at
10 this point motor **M1** is halted and a motor 2 **M2** is activated in the opposite direction, reversing the direction of ring belt and pulley arrangement **104** and hence the direction of roller **106**, thereby sending the single ticket back in the direction of the ticket guide insert shelf **102**. The single ticket is prevented from exiting through the ticket insert guide shelf **102** by a unidirectional flange (not shown) which instead channels the single ticket through an ejection
15 chute **120** to disposal area **40** which is positioned beneath gluer **100**. When motor 2 **M2** is activated, a pulse is sent to the counter, advancing the counter by one point (scenarios 6, 7a and 7b). In some embodiments of the invention, motor **M1** fulfills the function of motor **M2** by reversing motor **M1**.

The counter can be reset by pushing a reset button **14**. Alternatively, once a ticket holder
20 has finished feeding all the slips in his possession into ticket gluer **10**, a Print and Reset button **13** can be pushed, resulting in a summary of the amount of tickets inserted into the device being printed on a paper ticket for the ticket holder to use in place of the tickets now inserted into the device. When Print and Reset button **13** is pushed, the counter is reset.

25 TICKET LABELER

Referring now to Figures 3, Figure 3A is a right side view of a ticket labeler **302** and proximal view of ticket guide **100**. Figure 3B is a left side view of a ticket labeler **302** and distal view of ticket guide **100**. Figure 3C is a front view of ticket labeler **302** and a side view of ticket guide **100**. Figure 3D is a magnified view of a selected section of Figure 3C. Figure 3E is
30 a side view of a schematic representation of ticket labeler **302** and a label dispensing assembly **310**. Figure 3F is an isometric view of a label dispenser **322**. Figure 3G is an isometric view of a ticket collector **328**. Figure 3H is an exploded view of Figure 3G. Reference is now made to Figures 3A-3G. Ticket labeler assembly **300** includes three main sections: ticket labeler **302**, label dispensing assembly **320** and a charger assembly **340**. Ticket labeler assembly **300** is

configured to apply a label (such as a price marking label) to two adjacent ticket edges, thereby joining a new ticket slip to an existing ticket ream. Ticket labeler 302 is mounted on ticket guide 100, having a transverse orientation to ticket guide 100. Ticket labeler 302 is constructed from a semi-deconstructed pricing gun such as an Aactiva® K.48 Hand Labeler manufactured by Aactiva Labeler Industries Ltd. Kfar Saba, Israel. Ticket labeler 302 applies labels lifted from a roll of labels 324 which is loaded on a label dispenser 322. Label dispenser 322 is mounted on a bracket 326, and is configured to hold the labels which are dispensed by ticket labeler 302. A sensor 6 S6 is also mounted on bracket 326. The ream of ticket labels 324 is threaded from dispenser 322 over two nylon spacer pipes 327 and into ticket labeler 302. Sensor 6 S6=NC as long as the ticket label ream has not ended. When the ticket label ream 324 comes to an end, sensor S6-NO and sends a pulse to controller 150 to register an error indicating that the ticket label ream 324 must be replaced with a new ream. Referring back to the threaded ream 324, the ream is inserted in ticket labeler 302 through entry area 306 and threaded over a sprocket 308, over, around the edge and back under a printing plate 310 and fed along bottom cover 312 and out exit area 314. Sticking roller 316 lifts a label from label ream 324, when actuated, and propels the label onto a surface. In place, ticket labeler 302 propels/dispenses a label onto the two adjacent ticket edges in ticket guide 100, joining a ticket slip to the ticket ream. Following the progress of the label ream, the now label-less ream, after exiting exit area 314 is threaded through an opening in the floor of top compartment 30 and onto ticket collector 328 for later disposal. Ticket collector 328 is coupled to a motor M6 and both ticket collector 328 and motor M6 are mounted on either side of a bracket 330. Bracket 330 is mounted on the underside of the floor of top compartment 30. Motor M6 rotates ticket collector 328 in order to collect up the spent ream of label ream 324. Ticket collector 328 includes a gear 332, a rubber bracket 334, a ring tape 336 and a disk 338.

Ticket labeler 302 is actuated by charger assembly 340. Charger assembly 340 includes a motor M5 mounted on a bracket 342, a sensor 5 S5 also mounted on bracket 342, a flange 344 coupled to motor M5, a charger rod 346 coupled to a U-profile 348, a spring 350 connecting said flange 344 to said U-profile 348 and a charger 352 attached to the left side of ticket guide 100. Charger 352 is "L" shaped and non-moving. As motor M5 performs a complete revolution, flange 344 rotates in a cyclic pattern, exerting a cyclic force on U-profile 348 pulling labeler 302 in the direction of charger 352 the bottom leg of which extends into the body of labeler 302. Charger 352 simulates the loading action of squeezing the lever of a labeler gun. When charged, a ticket label is partially dispensed ready to be stuck down. The cyclic motion of ticket labeler 302 brings the exposed label into contact with the ticket edges and movement of

two return springs 354 causes ticket labeler 302, to continue to perform the sticking motion (similar to the sticking movement a shop attendant uses to stick a price tag on a product). During the last part of the cyclic movement, flange 344, rod 346 and spring 350 pull ticket labeler 302 back to the initial state of readiness. A sensor 5 S5 stops motor M5 when SS^NC after a revolution. Motor M5 is synchronized with motor M6 so that when motor MS is actuated, motor M6 is also actuated to collect the spent ticket label ream. After completing a labeling cycle, motor M3 is activated to progress the ticket ream into storage assembly 200.

STORAGE ASSEMBLY

Referring now to Figures 4, Figure 4A is a front view of storage assembly 200. Figure 4B is a back view of storage assembly 200. Figure 4C is a back view of a top section of storage assembly 200. Figure 4D is an isometric view of Figure 4C with the partition (storage assembly 200) removed. Figure 4E is a schematic representation of the motion of a step motor 7 M7. Figure 4F is an isometric view of a layering arm 202. Figure 4G is an exploded view of Figure 4F. Figure 4H is an isometric view of an assembly of blowers 208. Figure 4I is an exploded view of storage assembly 200.

Tickets progressed by roller 112 enter into cabinet 20 via curved guide shaft 118 for the purposes of layering and storage. Storage assembly 200 resides inside cabinet 20 and is secured to the underside of the floor of top compartment 30. All of the moving parts in cabinet 20 are mounted on storage assembly 200. A layering arm 202 stacks the tickets in layers. Each layer consists of five tickets. Conventionally, tickets for ticket redemption machines are sold in stacks of two thousand tickets, which include a single ream of tickets stacked in four hundred layers with five tickets per layer. In a likewise manner, a ticket ream is stacked, in a preferred embodiment of the current invention, in layers of five tickets per layer. Layering arm 202 is coupled to step motor 7 M7. An isometric view of layering arm 202 assembly is depicted in Figure 4F and an exploded view is depicted in Figure 4G. Referring to Figures 4F-4G, a timing pulley 230 is coupled to a ticket layer 232 which includes two parallel arms. An angled spring sheet 234 is coupled to one arm of ticket layer 232 and a spring sheet 236 is coupled to the other arm of ticket layer 232 defining a channel 238 therebetween. A ticket ream is fed through channel 238. Timing pulley 230 is coupled to step motor 7 M7, the latter controlling the movement of the timing pulley and thereby the movement of layering arm 202.

The operation of step motor 7 M7 is schematically depicted in Figure 4E. Referring now to Figure 4E, when sensor S4 registers that a ticket has passed, the sensor sends a pulse to step motor 7 M7. Controller 150 sends a command to a step driver of motor M7. Each pulse from

sensor 4 **S4** turns stepping motor one increment (each step of the motor equals a 1.8 degree rotation, therefore each increment equals 10 steps of the motor). One increment of motor **M7** equals a rotation of 18 degrees. Every sixth pulse starts to move the motor in reverse. Stepping motor 7 **M7** rotates layering arm **202** in a pendulum movement traversing a total of 90 degrees before the motor reverses direction. Sensor 15 **S15** is a side sensor which initially resets/recalibrates layering arm **202** to a start position by sensor 15 **S15**. Furthermore, each time layering arm **202** passes sensor 15 **S15** stepping motor 7 **M7** resets/recalibrates in case the motor has gone out of synchronization and reverses direction. On the other end of the 90 degree rotation, a pin stopper **204** stops layering arm **202**, preventing the arm from continuing to rotate in the same direction (e.g. if some increments contained more than 10 steps, the motor would continue to rotate the layering arm for the remainder of the steps, which is prevented by pin stopper **204**). When layering arm **202** reaches pin stopper **204** motor **M7** reverses direction. Layering arm **202** rotates across the area in five incremental movements in each direction, laying the first five tickets on an elevator shelf **206** and thereafter laying the next five tickets on top of the first five by folding the sixth ticket back over the fifth ticket and continuing to lay down four more tickets until the eleventh ticket is likewise folded back onto the tenth ticket and so on.

In order to ensure that the tickets lay flat in an orderly fashion an assembly of three blowers **208** (Figure 4H) blow air on the stacked tickets in order to cause the tickets to lie substantially flat. Blowers **208** are mounted on a bracket **209** which, in turn, is mounted on the underside of the floor of top compartment **30**. When motor **M3** is ON then blowers **208** are activated. An additional mechanism is also employed to ensure that the tickets fold properly and lay flat. Two solenoid actuator assemblies **SoL13** and **SoL14** are operationally coupled to two flanges **216** by biasing elements such as spring arrangements **218**. Near the external edge of each of flanges **216** a screw **220** (such as a pan head cross recess screw) or some other similar elongated element, is coupled to each flange **216**. After motor **M7** has reversed direction and folded a ticket $5*n+1$ back over a ticket $5*n$, solenoid actuator **SoL13** or **SoL14** (depending which side has been folded) contracts, pulling the coupled flange **216** down on the folded ticket so that the shaft of screw **220** flattens the just-now-folded ticket against the existing layer(s) of tickets. Solenoid **SoL13/SoL14** remains in place until the second solenoid assembly is actuated, at which time the first solenoid **SoL13/SoL14** releases spring arrangement **218** which expands while a return spring **222** (one for each flange **216**), which was previously expanded, now contracts, pulling flange **216** back into the initial, elevated, idle position. The solenoid

assemblies work like a see-saw so that when one is up the other is down. But, when motor **M3** is inactive, both solenoid assemblies return to the initial, elevated, idle position.

The tickets are stacked on elevator shelf **206**. Once the stack of tickets reaches a sufficient height so as to obscure a sensor 8 **S8** (i.e. **SS^NC**), Sensor 8 **S8** sends a pulse to controller **150** which then activates a motor 10 **M10** which is coupled to a ball screw **210**. Elevator shelf **206** is coupled to a nut arrangement **212**. Nut arrangement **212** is operationally coupled to ball screw **210**. Motor 10 **M10** causes ball screw **210** to revolve, thereby causing nut arrangement **212** and elevator shelf **206** to descend down the shaft of ball screw **210**. Elevator shelf **206** descends until a sensor 7 **S7** is cleared i.e. **S7=NO**. When Sensor 7 **S7~NO**, the sensor sends a pulse to controller **150** which then deactivates motor 10 **M10** causing elevator shelf **206** to stop descending. As this cycle is repeated storage assembly **200** fills up. When storage area **224** is close to being full, elevator shelf **206** comes into contact with a Micro Switch **N10** (i.e. **N10=NC**) activating an LED which starts to blink to notify the operator that the cabinet is nearly full. As storage area **224** fills to capacity, elevator shelf **206** activates a Micro Switch **N11** (i.e. **N11 - NC**) causing all motors to stop as the storage cabinet is full. The operator is alerted with an audio signal that the cabinet must be emptied. When a door **226** is opened, a door Micro Switch **N12** registers this fact (i.e. **N12~NO**) and prevents the apparatus from being stalled. Door **226** must be closed for operation to continue/restart. Once door **226** has been closed, the elevator/lift resets, activating a motor 11 **M11** (which may be motor 10 **M10** which can function in reverse) which causes the elevator to rise as long sensor 8 **S8=NO**. Once sensor 8 **S8=NC** or switch **N12=NO** (i.e. door **226** is open) then motor 11 **M11** ceases activity. If storage area **224** has been emptied then elevator **206** will return to the original elevated position.

25 MOTORS, SENSORS AND MISCELLANEOUS PARTS

Various motors, sensors and parts are mentioned in the disclosure and are listed here with preferred technical specifications.

M1/2, M5, M10/11 - 12V DC Gear Motor ser. no. AB35100PH-291260

M3, M7 - Stepping Motor model 57H5605 with miniature integrated stepper motor controller UIM24002

M6 - Carbon-brush motor ser. no. RS-365SH manufactured by Mabuchi Motor, Japan.

SoL 13 / 14 - Industrial Solenoids, item number SH-1253 manufactured by Shin Shin Technology, Taiwan.

SI, S2, S3, S6, S7, S8 - Reflective Optoswitch. Sensor VTR17D1 combines an infrared emitting diode (IRED) with an NPN phototransistor (VTR17D1) in a one piece, sealed, IR transmitting plastic case. The sealed construction improves resistance to moisture and debris.

S4 - Black Sensor OPB828B - is a Slotted Optical Switch. The OPB828 sensor consists of an infrared emitting diode and an NPN silicon phototransistor mounted on opposite sides of a 0.125" (3.18 mm) wide slot. OPB828B has an IR transmissive housing with an 0.010" (0.25 mm) aperture located in front of the phototransistor. Phototransistor switching takes place whenever an opaque object passes through the slot. Two OPB828B sensors **S4** are mounted side by side on a bracket.

S5, S15 - Sensor OPB742 - is a Reflective Object Sensor. The sensor consists of an infrared emitting diode and an NPN silicon phototransistor mounted side by side on converging optical axes in a black plastic housing. The phototransistor responds to radiation from the emitter only when a reflective object passes within the field of view.

N10 - Micro Switch KW3 series manufactured by KLS Electronic, China

N11, N12 - Micro Switch MN series

Controller 150 - a Programmable Logic Controller, serial no. DVP ES2 manufactured by Delta Electronics Inc., Taiwan.

Schurter Filter 36 (see Fig. 1C) - a Power Entry Module serial no. FKSB2-55-10-M5 is an IEC Appliance Inlet C14 with Filter, Fuseholder, Line Switch and Voltage Selector, manufactured by Schurter Electronic Components, headquarters in Luzern, Switzerland.

Various parts/components are mentioned above and detailed further here. Figures 5 depict the detailed components. Figure 5A depicts a front drive roller assembly including belt pulley **104**, front drive roller **106** and connecting pieces. Figure 5B depicts rear drive roller assembly including timing pulley **110**, rear drive roller **112** and connecting pieces. Figure 5C is an isometric view of front top roller **108**. Figure 5D is a partially exploded view of Figure 5C with a plurality of washers **109** stacked on front top roller **108** for added weight. Figure 5E is an isometric view of rear top roller **114**. Figure 5F is an isometric view of "L" shaped charger **352**. Figure 5G is an isometric view of charger rod **346**.

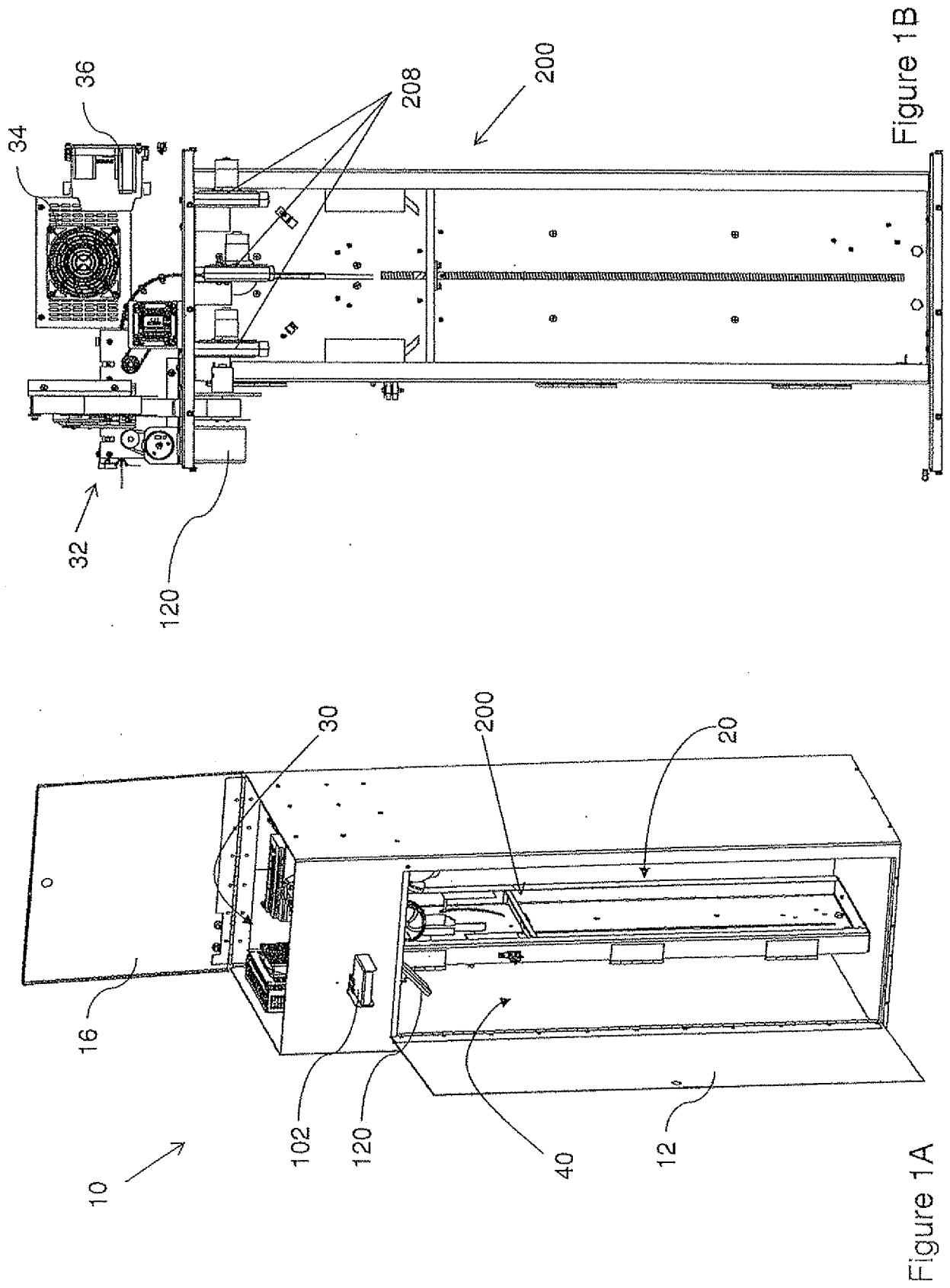
While the invention has been described with respect to a limited number of embodiments, it will be appreciated that many variations, modifications and other applications of the invention may be made. Therefore, the claimed invention as recited in the claims that follow is not limited to the embodiments described herein.

WHAT IS CLAIMED IS

1. A ticket gluer apparatus, comprising:
 - (a) a ticket guide, adapted to receive at least one ticket; and
 - (b) a ticket labeler assembly, configured to couple a first ticket of a ticket slip, received by said ticket guide, to a last ticket of a ticket ream, wherein said ticket slip includes at least to tickets.
2. The ticket gluer apparatus of claim 1, further comprising:
 - (c) a storage assembly, configured to stack and store said ticket ream; wherein said ticket guide is further operative to convey said ticket ream to said storage assembly.
3. The ticket gluer apparatus of claim 1, further including a mechanism configured to count each said ticket received by said ticket guide.
4. The ticket gluer apparatus of claim 1, wherein said ticket guide is configured to discard a single ticket.
5. The ticket gluer apparatus of claim 1, wherein said ticket labeler assembly includes:
 - (i) a ticket labeler;
 - (ii) a label dispensing assembly; and
 - (iii) a charger assembly for causing said ticket labeler to dispense a ticket label received from said label dispensing assembly.
6. The ticket gluer apparatus of claim 5, wherein said ticket labeler is configured to dispense a ticket label on adjacent edges of said first ticket of said ticket slip and said last ticket of said ticket ream.
7. The apparatus of claim 5, wherein said ticket label is a pricing label.
8. The ticket gluer apparatus of claim 1, wherein said storage assembly includes:
 - (i) a lift shelf; and
 - (ii) a layering arm configured to stack said ticket ream in layers of tickets on said lift shelf.

9. The ticket gluer apparatus of claim 8, wherein each said layer of tickets includes five tickets.
10. The ticket gluer apparatus of claim 8, wherein said storage assembly further includes:
(iii) a flattening mechanism configured to cause said layers to lay substantially fiat.
11. The ticket gluer apparatus of claim 10, wherein said flattening mechanism includes a blowers assembly, including at least one blower configured to expel air onto said layers of tickets.
12. The ticket gluer apparatus of claim 10, wherein said flattening mechanism includes at least one solenoid assembly including a solenoid actuator, a flange and an elongated member, wherein said flange is operationally coupled to said solenoid actuator via a biasing element and said elongated member is operationally coupled to said flange, wherein said solenoid actuator is adapted to cause said elongated member to rest on said layers of tickets.
13. A method for recycling tickets, comprising the steps of:
(a) receiving a ticket slip in a ticket guide assembly;
(b) coupling a first ticket of said ticket slip to a last ticket of a ream of tickets; and
(c) stacking and storing said ream of ticket.
14. The method of claim 13, wherein said first ticket of said ticket slip is coupled to said last ticket of said ream of tickets with a ticket label.
15. The method of claim 13, wherein said stacking and storing is effected by a stacking said ticket ream in layers.
17. The method of claim 13, further comprising the step of flattening said layers.
18. The method of claim 17, wherein said flattening is effected at least in part by blowing air on said layers.

19- The method of claim 17, wherein said flattening is effected at least in part by resting an elongated member on said layers.



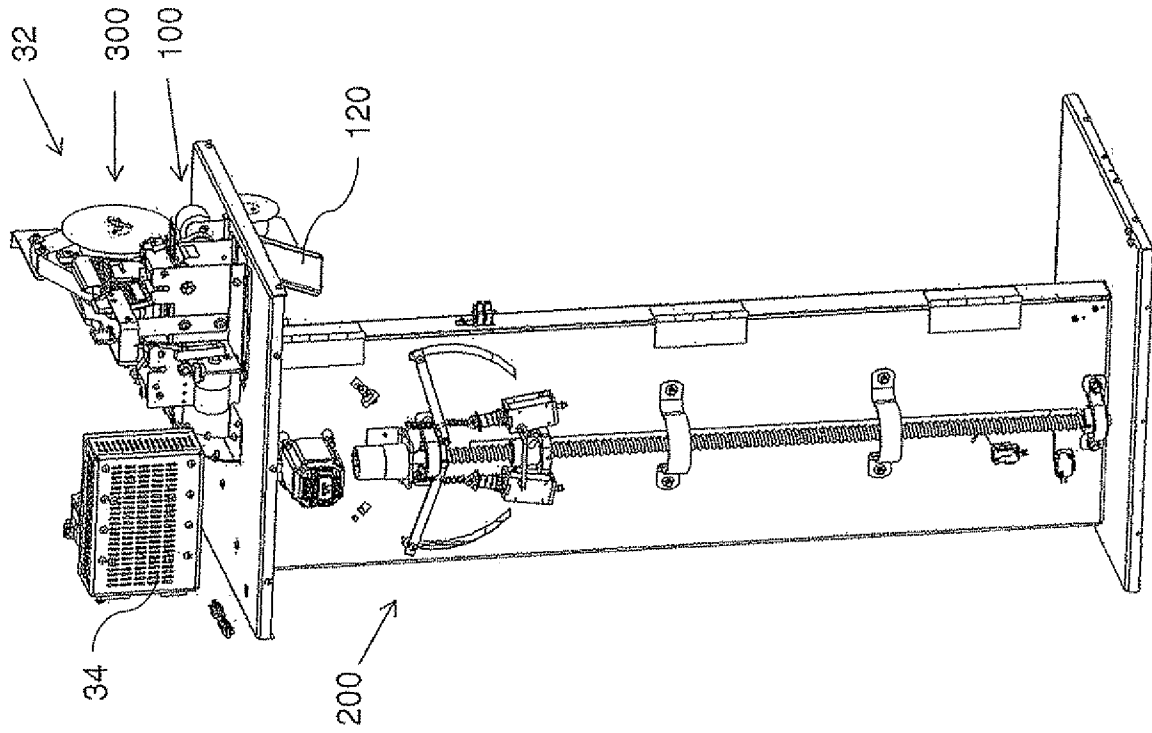


Figure 1D

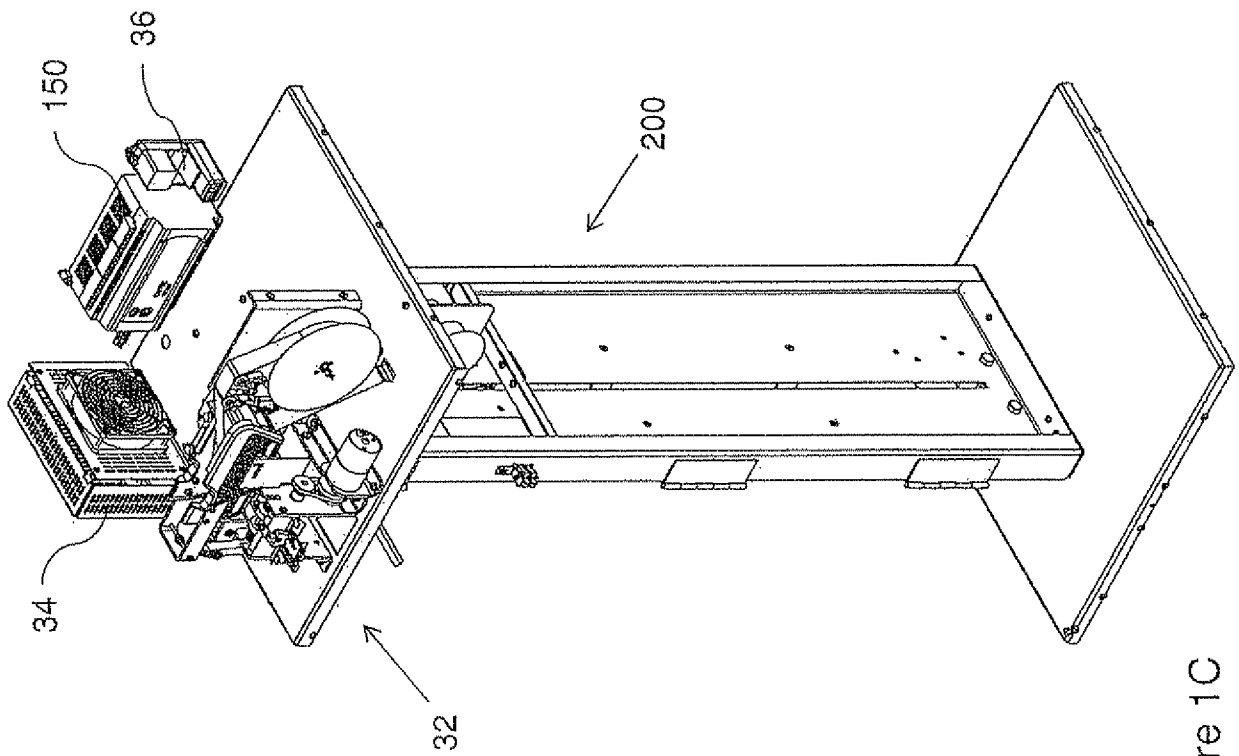
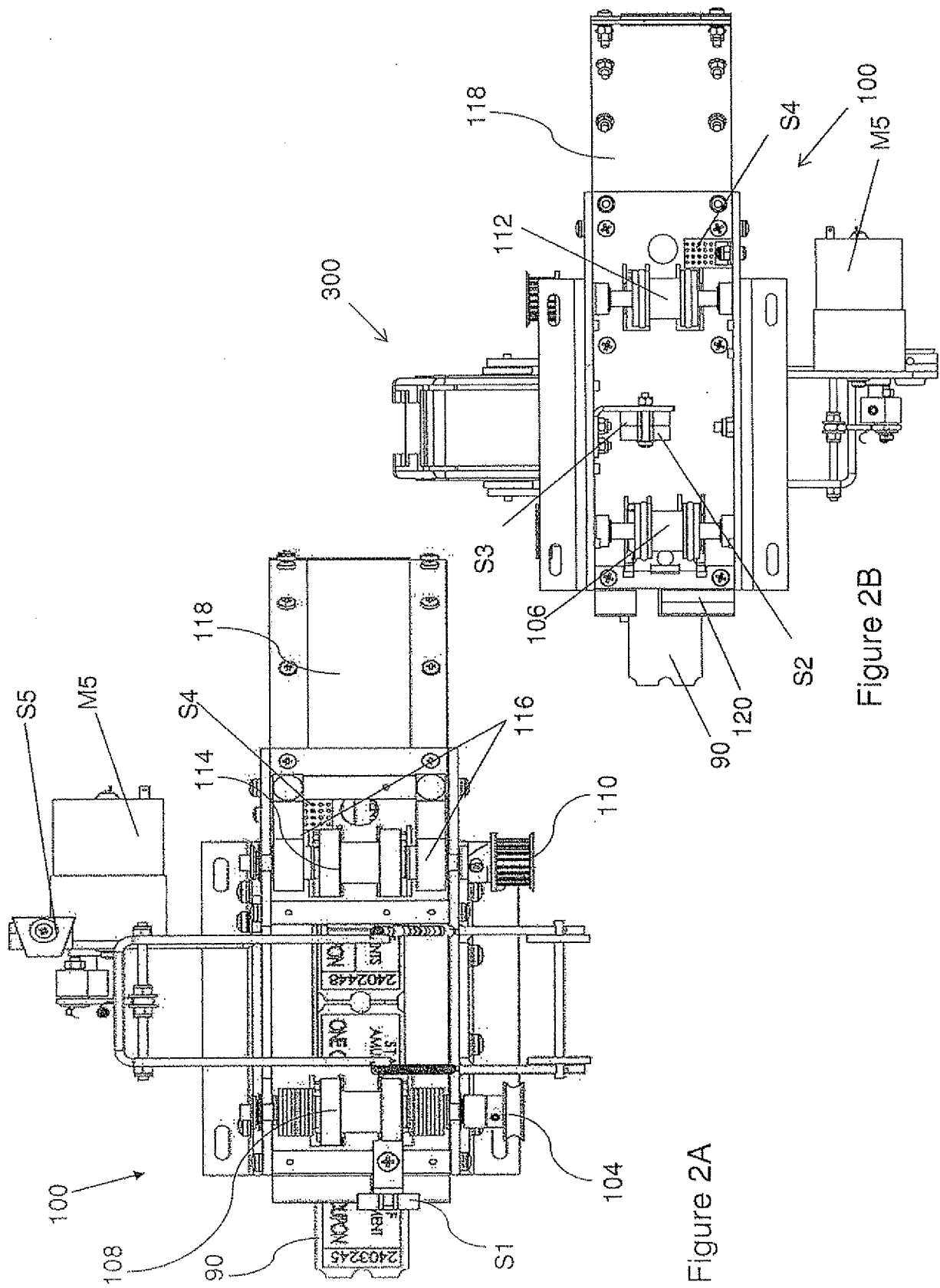


Figure 1C



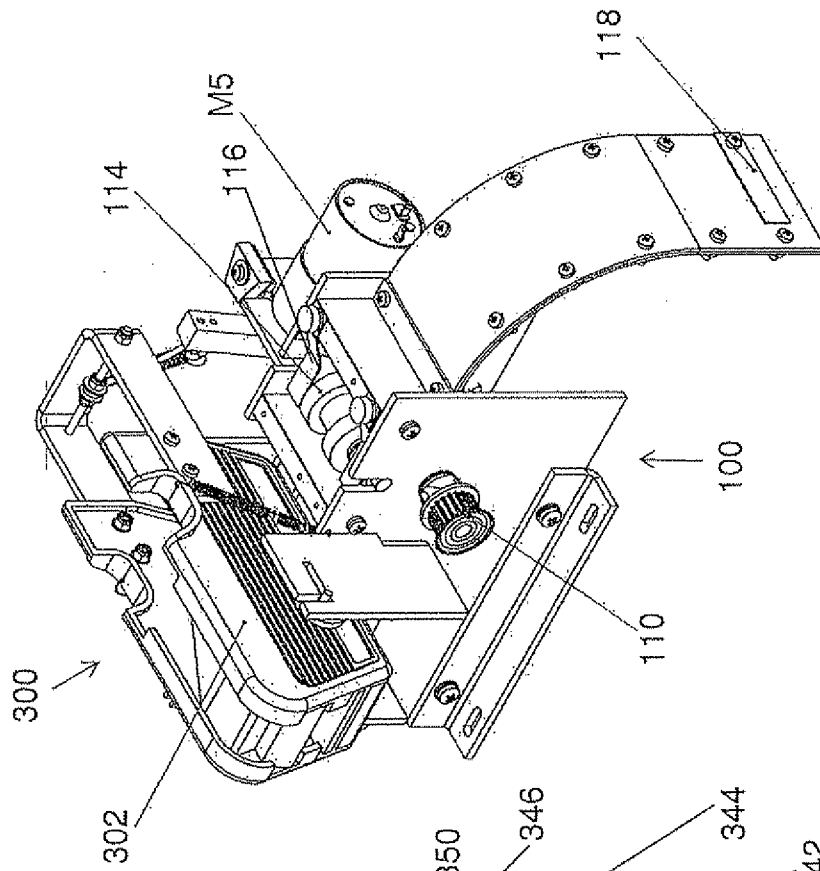


Figure 2D

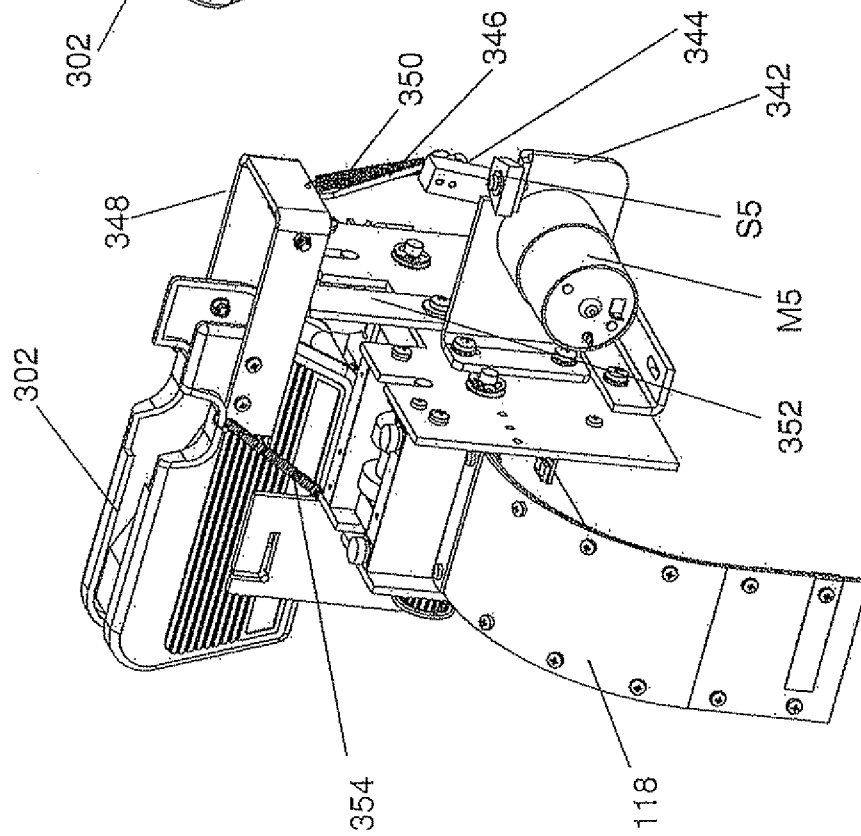


Figure 2C

114

340

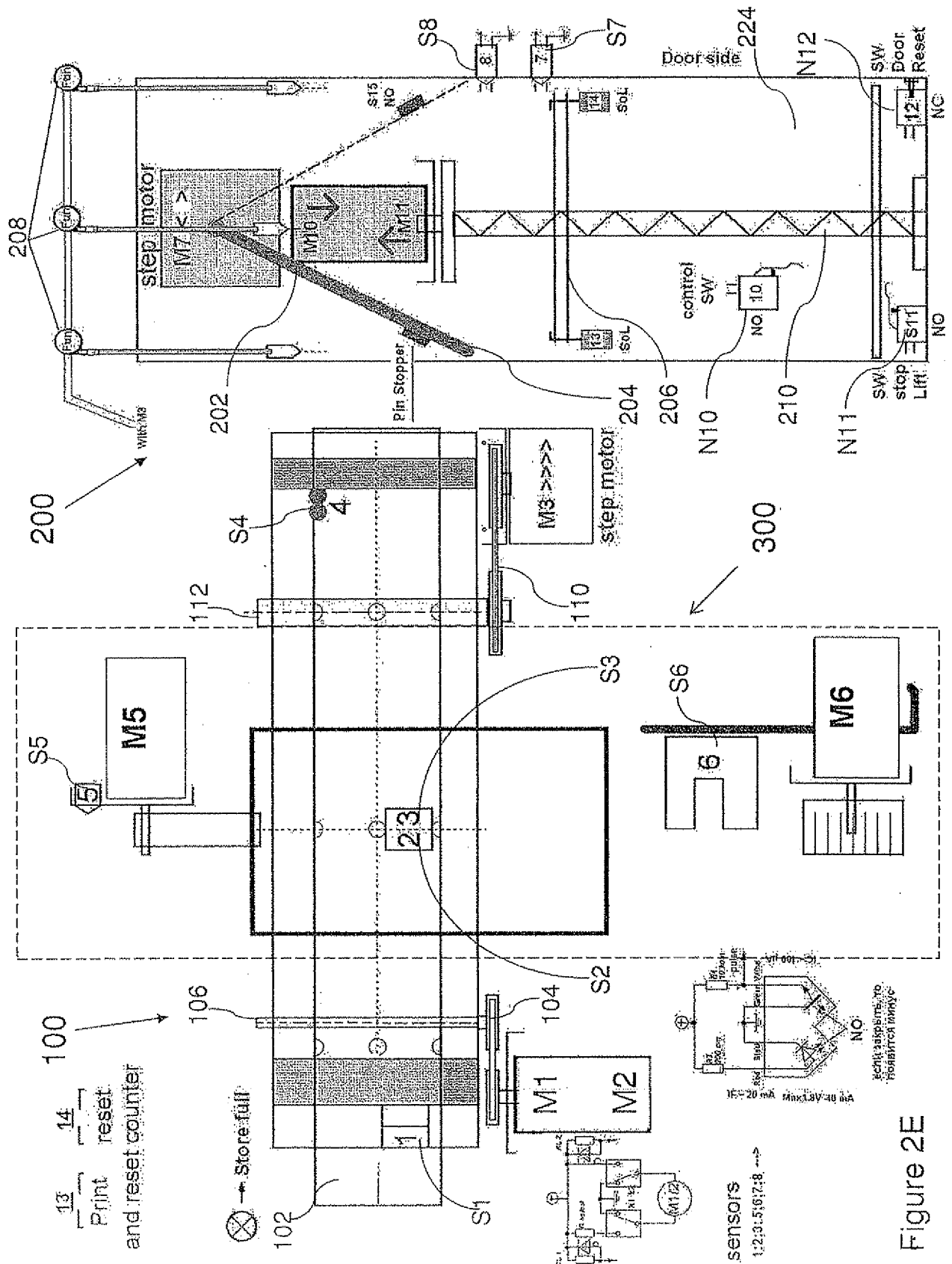


Figure 2E

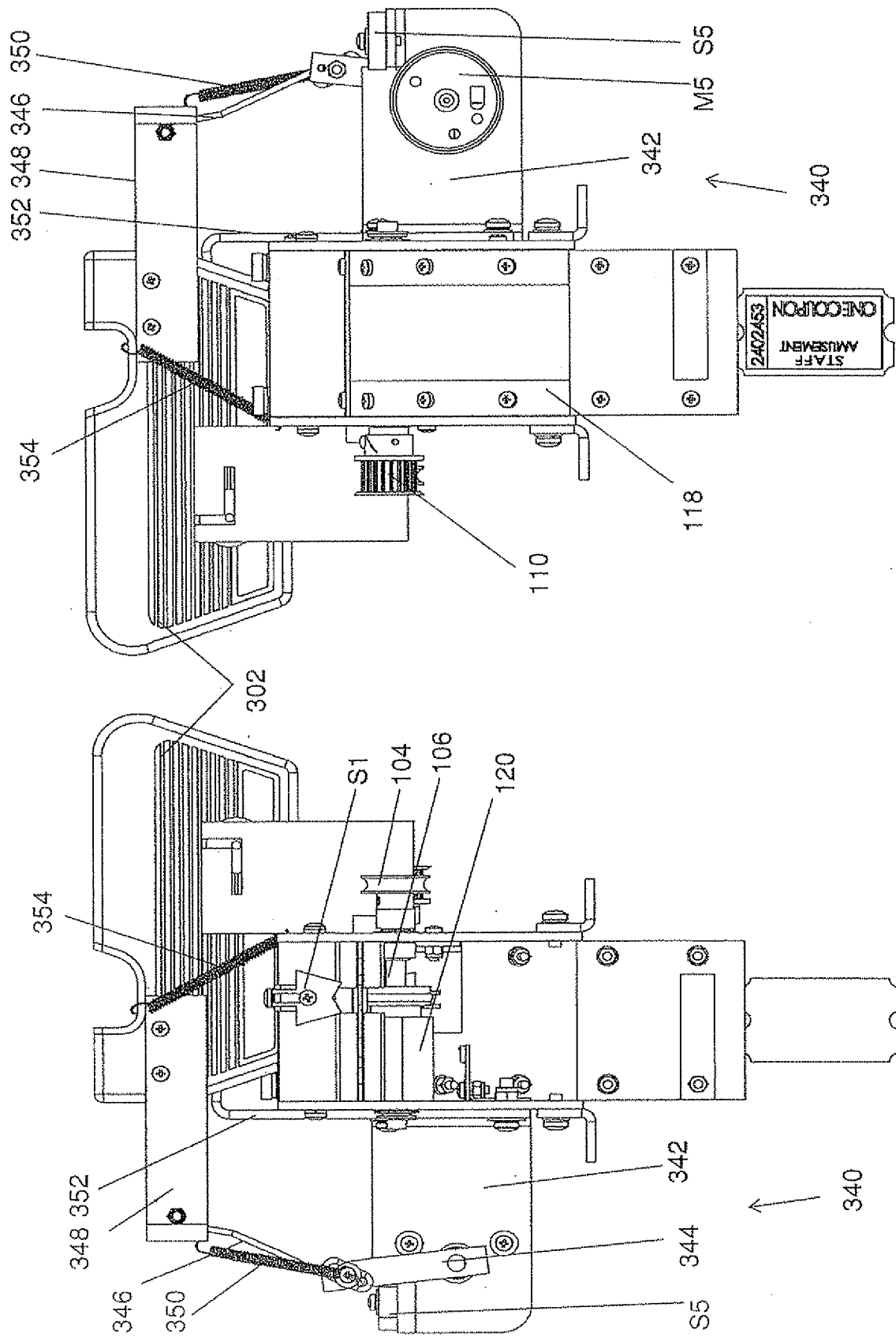
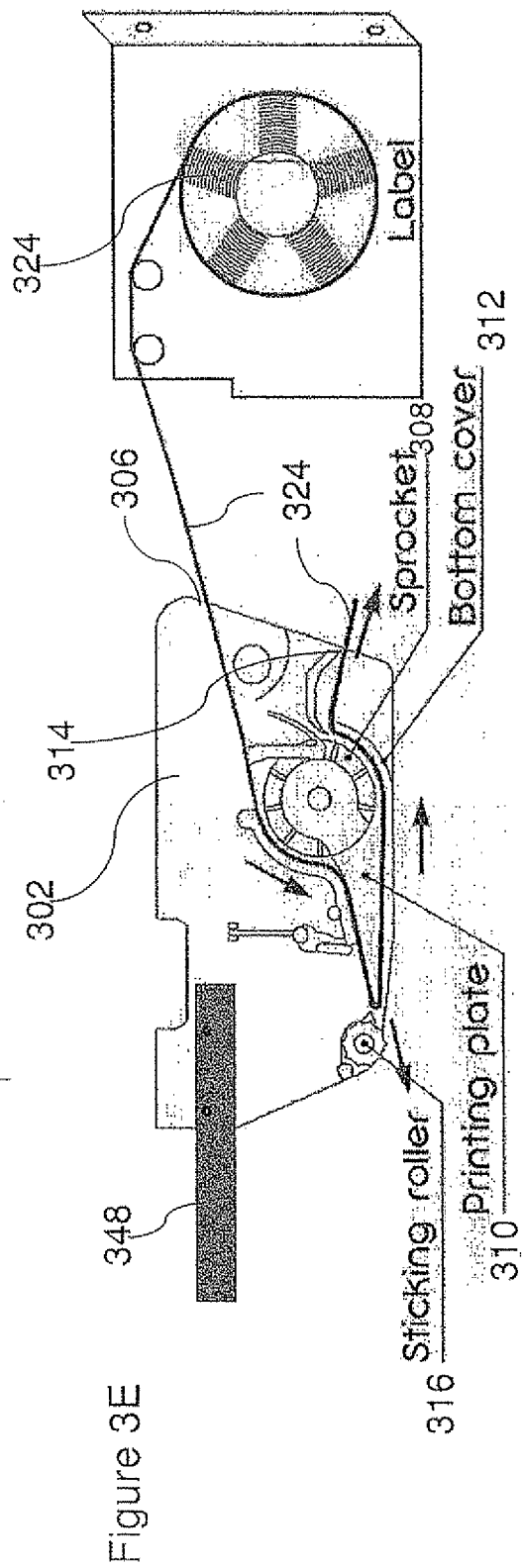
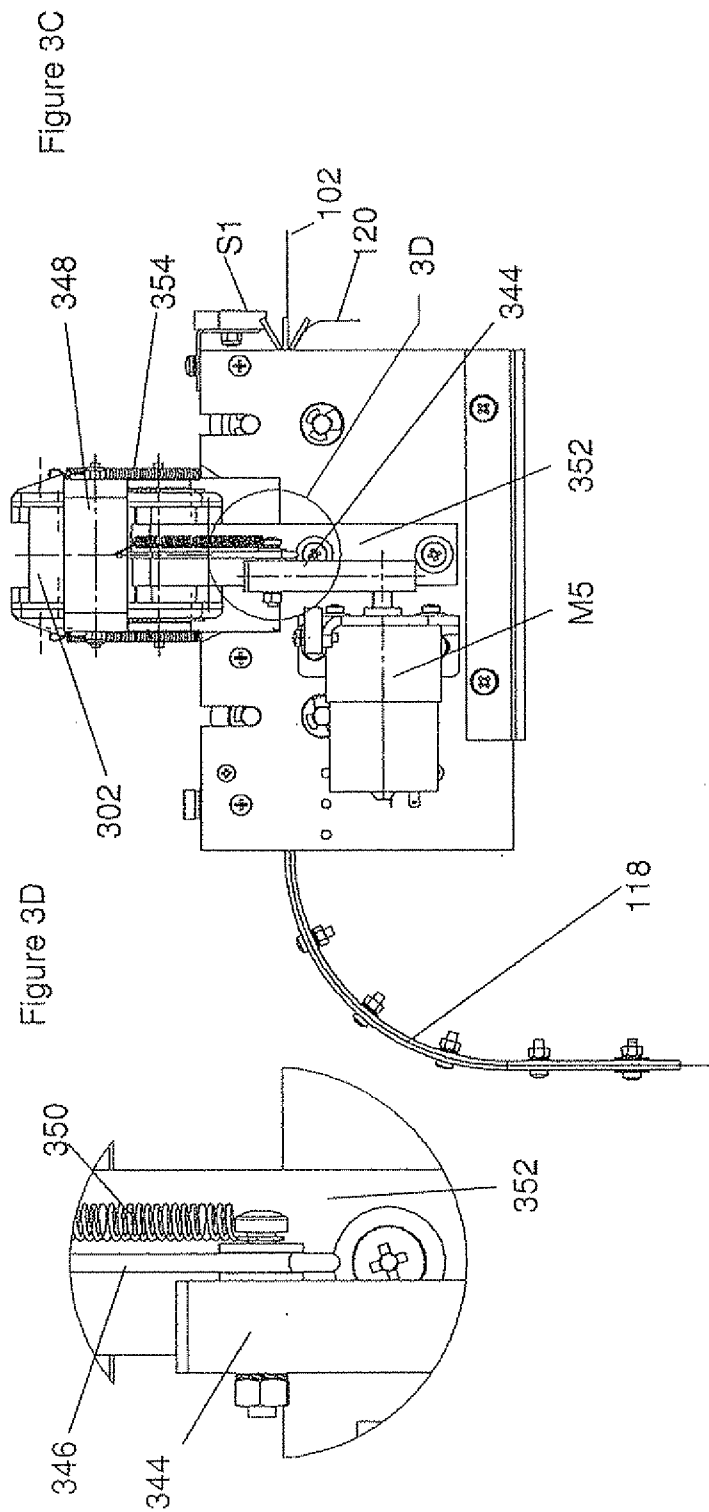
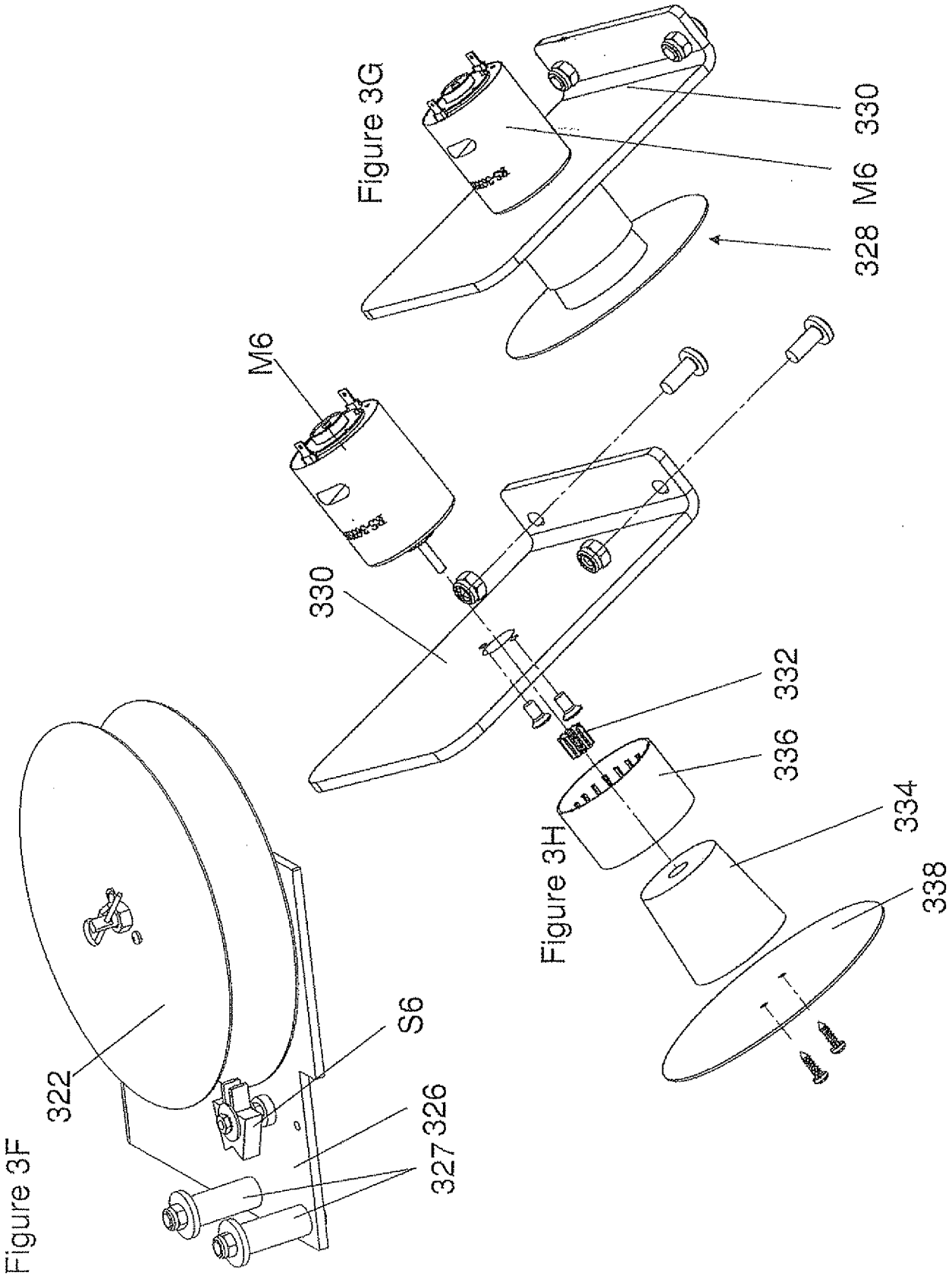


Figure 3B

Figure 3A





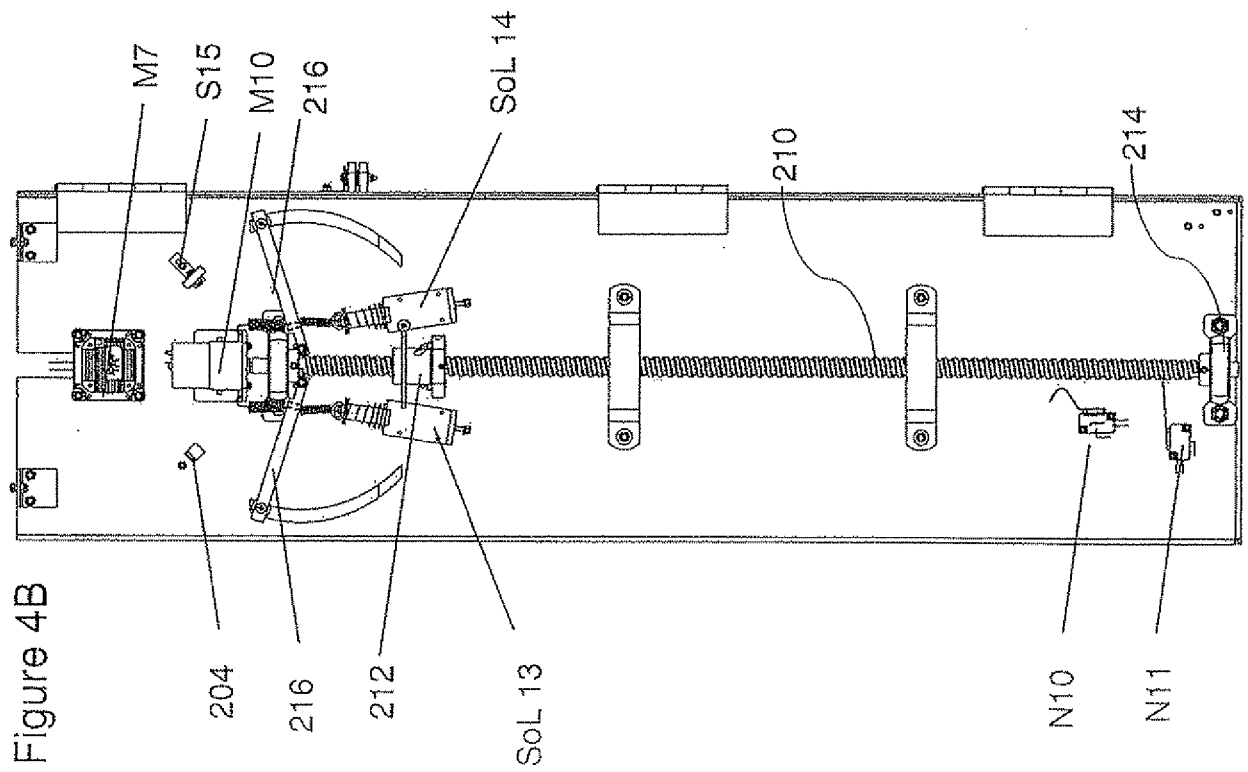
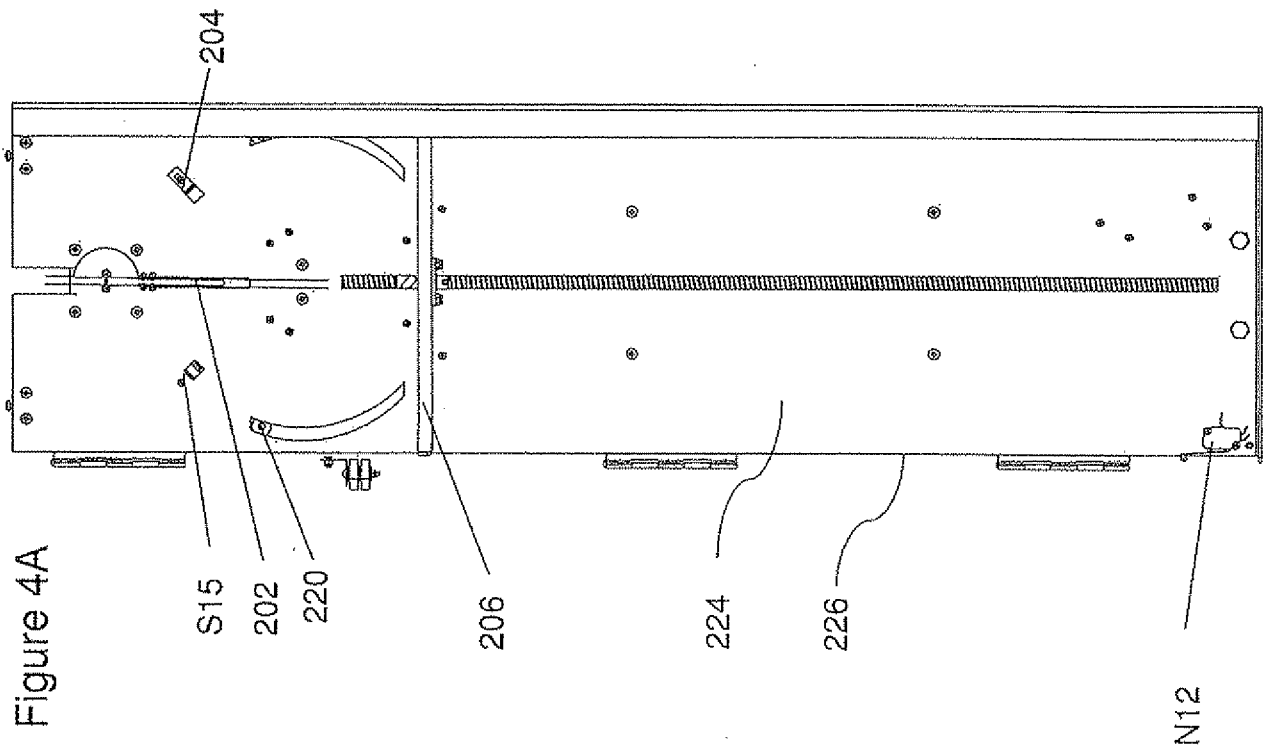


Figure 4G

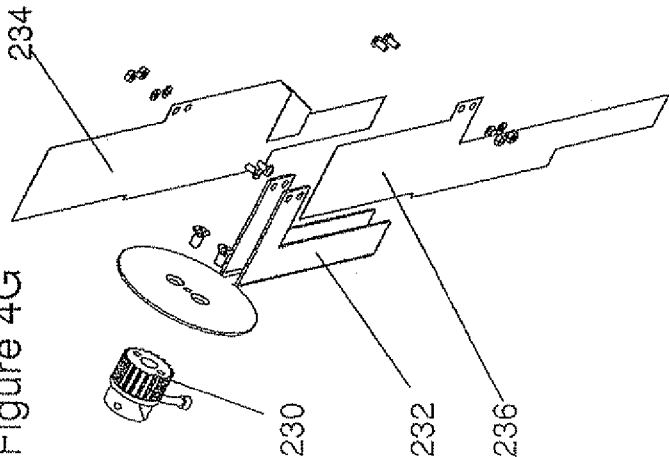
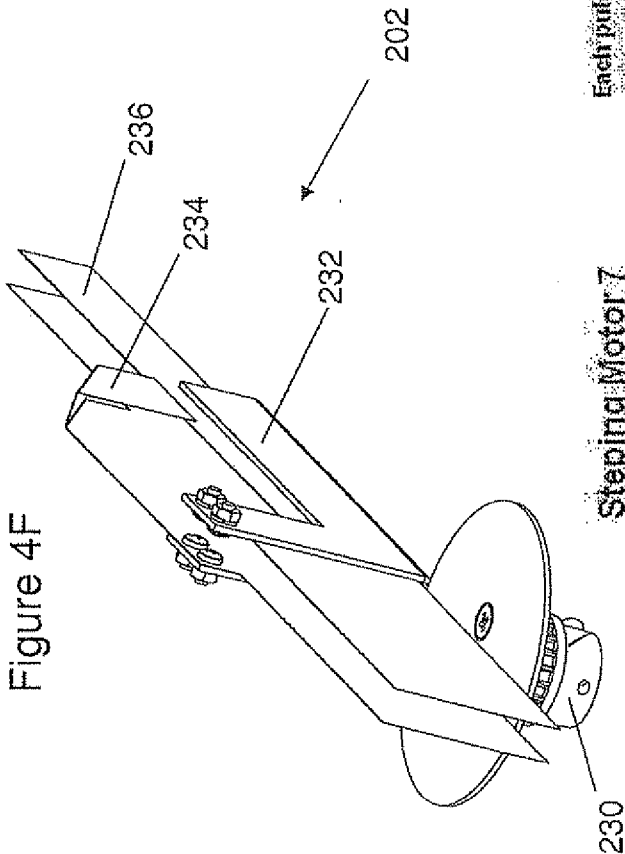


Figure 4F



Stepping Motor 7

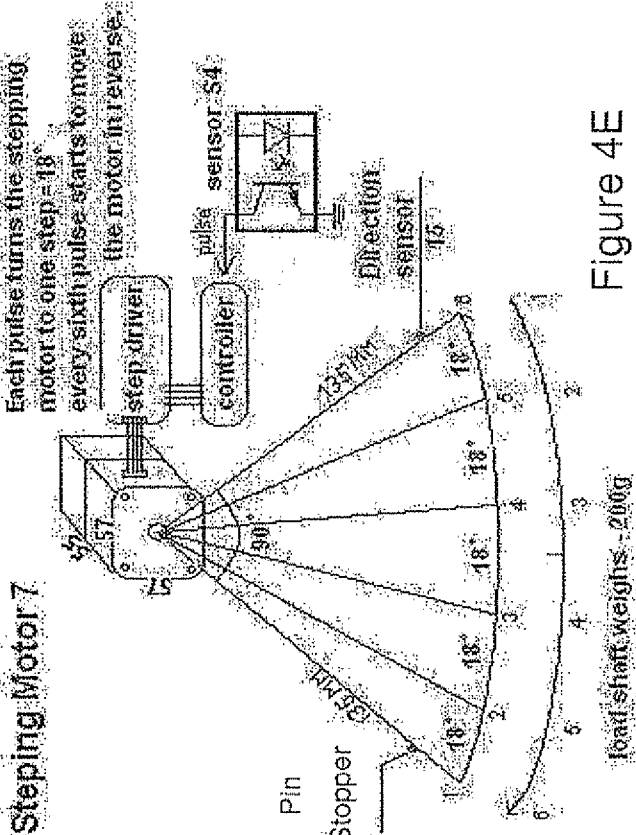


Figure 4E

209

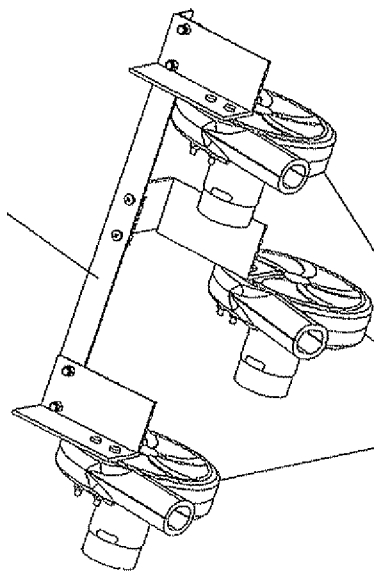
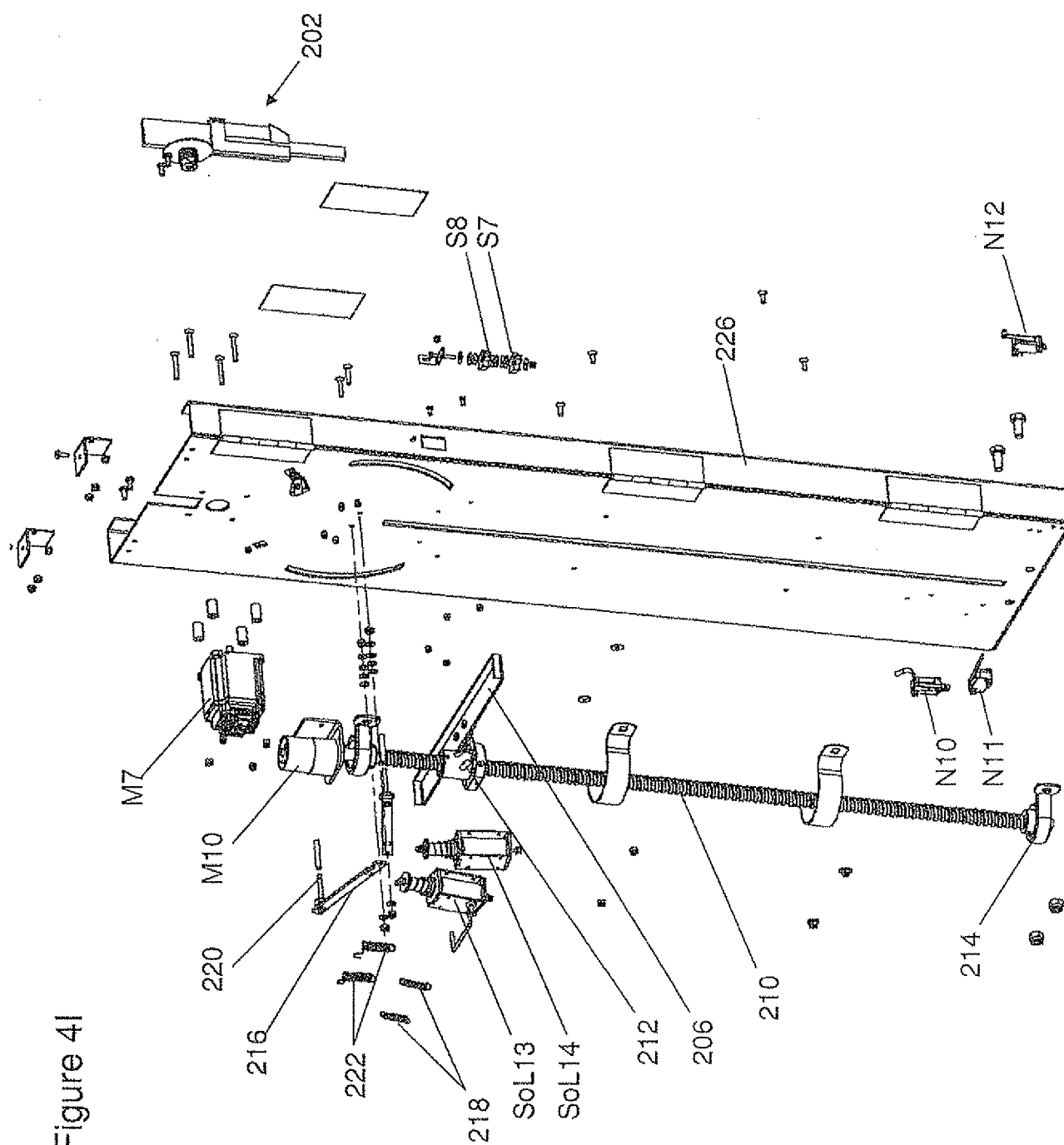
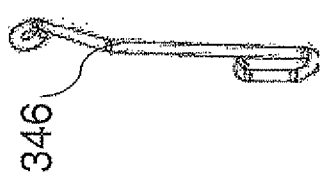
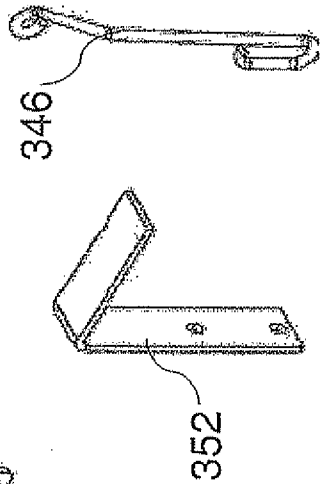
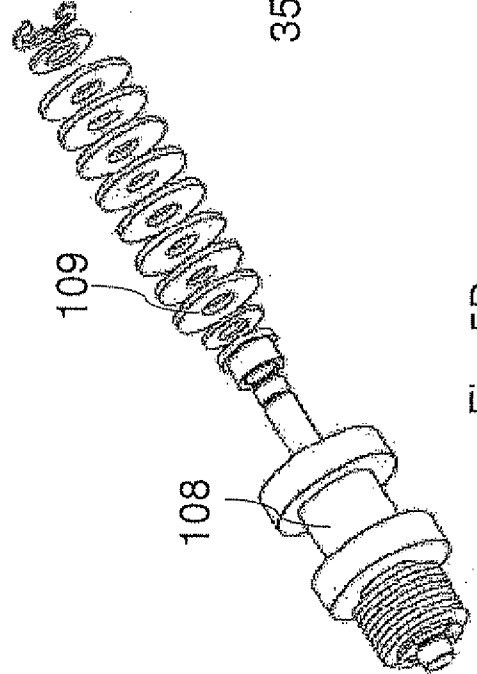
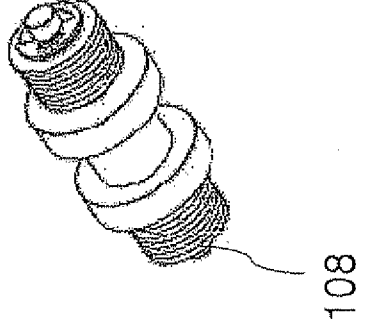
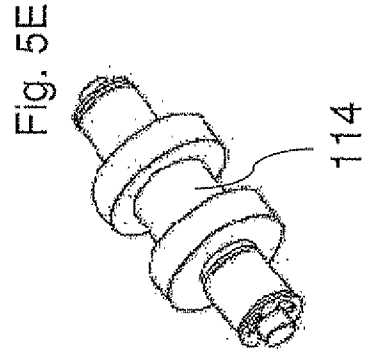
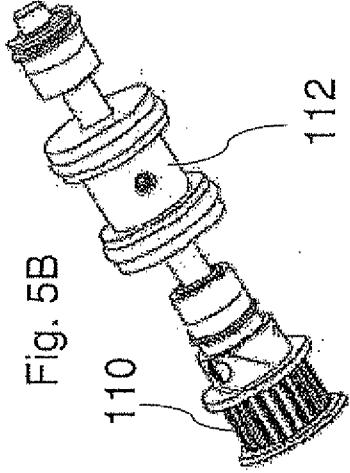
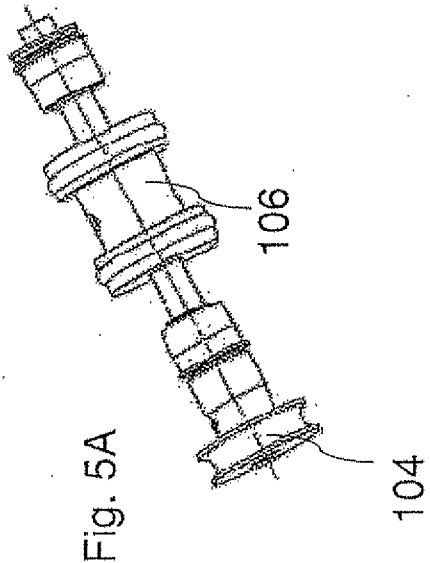


Figure 4H

208





1	2	3	4	5	7 b	7 a
0	M1=ON Max 3sec	M1=OFF After 2 sec M3=ON After 0.5 sec If S11 NO If S12 NC + 2 pulse to counter	Slow M4=ON Lamp red ON Sol 6=ON Max 2sec	M3=OFF M4=OFF Sol 6=OFF	One ticket M1=ON Max 3 sec	One ticket M1=OFF Sol 6=ON Max 3sec M2=ON Max 3sec + 1 pulse to counter
S1 NO	S1 NC	S1 NC	S1 NO	S1 NO	S1 NO	S1 NO
S2 NO	S2 NO	S2 NC	S2 NC	S2 NO	S2 NO	S2 NC
S3 NO	S3 NO	S3 NC	S3 NC	S3 NC	S3 NO or S3 NC	S3 NO or S3 NC

NO = () NC = ()

8	9	10	11	12	13	14	15	16	17
Label	Label	Label	counter	lift	lift	lift Reset	lift	Print and Reset	Store full
M1 ON After 3sec	M1=OFF Sol 6=ON Max 3sec If S6 NC If S2 NC S5=ON After 0.5 sec	M5=OFF Sol 6=OFF M3=ON If S11 NO If S12 NC	move the step motor to one step + 1 pulse to counter	M10 ON	M10=OFF	After empty >>> M11 ON The location lift Reset works rest for 2 second after >>>	M11 OFF	finish all reset counter and Print By Push Button S13 NC	Lamp Flash
S1 NC	S1 NC		S4 NO	S7 NC S8 NC S11 NO S12 NC	or S8 NO or S11 NC or S12 NO	12 NC > NO > NC S8 NO	or S8 NC or S12 NO	Reset By Push Button S14 NC	S10 NC
S2 NO	S2 NC	S5 NO > NC > NO or S5 NC > NO							
S3 NC	S3 NC								

Figure 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 12/50019

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B29C 65/00 (201 2.01)

USPC - 156/295

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
156/295

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 156/1, 60, 278, 295, 304.1, 307.1, 307.7, 510; 83/42 (keyword limited; terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Thomson Innovation [USGrant, GB App, USApp, FR App, WO App, DE Util, EP Grant, DE Grant, EP App, DE App, JP Util, JP Grant, JP App, CN Util, CN App, KR Util, KR Grant, KR App]; Google Scholar; Ticket, ream, strip, stack, roll, web, attach, connect, join, link, adhere, bond, glue, guide, feed

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007/0209752 A 1 (Rygol et al.) 13 September 2007 (13.09.2007) entire doc	1-19
A	US 6,346,163 B 1 (Mizota) 12 February 2002 (12.02.2002) entire doc	1-19
A	US 2008/0190563 A 1 (Haga et al.) 14 August 2008 (14.08.2008) entire doc	1-19
A	US 2,559,828 A (Ogden) 10 July 1951 (10.07.1951) entire doc	1-19
A	US 2,739,431 A (Griswold) 27 March 1956 (27.03.1956), entire doc	1-19



Further documents are listed in the continuation of Box C.



* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

04 May 2012 (04.05.2012)

Date of mailing of the international search report

11 MAY 2012

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774