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(54) **Security arrangement for a money handling device.**

(57) A security cabinet for a money handling device has a physically secure housing in which the device is mounted on an elevator device which elevator device can move into either of two positions, an operable position and a stored position in which in the operable position, the device is fully usable and in the stored position the device is physically secure and unusable.

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Security arrangement for a money handling device

The present invention concerns a security arrangement for a cash till or other money handling device.

If a money handling device has to be left in place, perhaps containing money, it needs to be secure. Simple locking may not be thought sufficient, particularly if the device itself is complete and costly, since it may be damaged in an attempt to find money or merely from spite. Moreover, it may be damaged so as to destroy a record it holds in order to facilitate fraud. As examples of the type of money handling device concerned, reference can be made to British Patent Specifications 2088609A, 2088610A and 2088611A.

Accordingly, the invention proposes a security cabinet for a money handling device comprising vault means for safely storing a money handling device with a removable top member, elevator means for moving the device into and out of the vault means, and securing means for locating and securing the top member over the device within said vault means.

Thus security is achieved by enabling the handling device to nest in a locked vault. In order to facilitate use of the nesting capability it is useful if the effort required to lower and raise a heavy device such as a coin and bill handler be easily within the capability of a young, light weight clerk. The present invention may achieve that result through the use of a servomechanism or a stored energy system.

One embodiment of the present invention achieves its beneficial results by using a pantograph like structure in which the source of stored energy is a resilient device such as one or more springs which effectively act as a counterbalance and source of stored energy.

Another embodiment of the present invention uses an electrically powered actuator to raise and lower the money handler into and out of the vault.

While other earlier inventors have invented various structures to make secure the storage of one-armed bandits, jewelry cases and even teller's cages, none of those devices have the ease of use or the functional simplicity of the present invention.

In order that the invention shall be clearly understood, several exemplary embodiments thereof will now be described with reference to the accompanying drawings, in which:

Figure 1 shows a top perspective view of one embodiment of the present invention,

Figure 2 shows a section of the embodiment shown in Figure 1 taken along the lines 2-2 shown in Figure 1.

Figure 3 shows a sectional view of the embodiment shown in Figure 2 with the money handler in the secure position.

Figures 4 and 5 show sectional views of the device shown in Figure 1 taken along the lines 4-4 and 5-5 shown in Figure 1 respectively.

Figure 6 shows a perspective view of the elevator structure which forms a part of one embodiment of the present invention.

Figures 7 and 8 show two additional embodiments of the present inventions having different elevator member structures.

Figures 9 and 10 show a still further embodiment of the present invention using a servomechanism to raise and lower the automatic money handler operating modules into and out of the vault.

Figures 11 and 12 show another embodiment of an automatic money handling device having a novel locking arrangement which can be used in combination with every other embodiment of the present invention.

Figure 1 shows in perspective an automatic money handling device 10 set adjacent to a counter (shown in outline). The money handler is shown mounted above a vault 130 which has steel sides 138, 140, 142, 136 and a door 131. The door has hinges, not shown in this Figure, a lock 132 and a handle 134.

The money handler 10 has a keyboard 120 which is part of an upper cover 118. The upper cover has one or more viewing windows 112 and one or more bill guides 114. The outside dimensions of the devices are about 26 inches wide, 22 inches deep and 32 inches high.

The money handler 10, as shown in Figures 4,5 and 6 rests on an elevator system 11 formed of horizontal rib members 34, 44, vertical rib members 32, 42, linking rib members 30, 40, and front and rear rib members 36, 38 which effectively form two rigid triangles linked together by ribs 36, 38.

The elevator 11 is supported by a pantograph-like structure which is shown in three embodiments in Figures 2, 3, 6, 7 and 8. The general structure which pertains to all three embodiments is shown in Figures 2 and 3 and is described as follows. The pantograph is formed of ribs 52, 54, 56, 58 which are linked for relative motion by pins 51, 55, 59, 61. Members 52, 56 are linked for rotation by pin 59 and members 54, 58 are linked by pin 61. The pins 59, 61 may be formed as part of a spring 60. Members 52 and 54 are linked by pin 51 for rotation and pin 55 similarly links members 56, 58.

Figures 7 and 8 show two further embodiments of the same basic structure in which like parts are similarly numbered but preceded by the number 1 or 2 respectively. Thus parts 52, 152 and 252 are performing the same function in each embodiment. Figure 7 shows an embodiment in which the single spring 60 is replaced by two springs 160 and 160' in parallel. This structure is utilized to prevent excessive demands on one spring and to improve the life expectancy of the system.

The Figure 8 embodiment of the present invention shows a structure virtually identical to that shown in Figure 7 except that added to the lower pin 255 is a tail like structure 15 which is in turn mounted to the vault by member pin 257. This tail 15 enables the device to give a slightly larger range of motion thereby extending the range of operation of the elevator.

The description of the detailed structure and the operation of the elevator 45 which follows is specific to the embodiment shown in Figures 2 to 6 but it applies equally to the embodiments shown in Figures 7

and 8 except for the details previously described with respect to those figures.

Figure 2 shows a spring member 60 in a relatively relaxed state where it produces a force tending to move pins 59 and 61 closer together thereby producing a force to counterbalance the weight of the elevator 11 and money handler 10. A plate 53 is fastened to pin 51 and rear support rib 38 to interconnect the pantograph structure 60 to elevator 11. Guide members 70, 74 have channels 72, 76 respectively formed therein. Elevator 11 has rollers, 47, 49, 35, 37 mounted on axles 147, 149, 135, 137 respectively. The rollers ride in channels 72, 76 to provide both a low friction coupling to the inside wall of the vault and a counter torque to prevent the rotation of the elevator 11 and the money handler 10 about axis 135, 149.

Figure 3 shows the elevator 11 and money handler 10 i the retracted position within vault 130. In this position, spring 60 is stretched compared to its state as shown in Figure 2. Accordingly, spring 60 is a source of stored energy helping to lift elevator 11 and money handler 10 out of the vault. The entire assembly of elevator 11 and the automatic money handler 10 weighs about 150 pounds. A force of about 15 pounds is sufficient to raise or lower the assembly into and out of vault 130. Even a relatively young and lightweight employee in a fast food restaurant or a convenience food store is able to raise and lower the assembly 11, 10 into and out of vault 130 easily.

During raising and lowering of elevator 11 it is desirable that all four rollers 35, 37, 47, 49 be in contact with the proper channels 72, 76. It is also

desirable that the elevator 11 be stable while in motion and neither rock from side to side nor tip forward or backward. This stability is achieved by making the lift point of the elevator where plate 53 is connected by pin 51. Furthermore, elevator 11 and its load are supported by rear rib 38 at the base of the elevator 11. In addition the side triangles of elevator 11 carry virtually no load and the elevator is essentially free of any significant torque in the horizontal plane. Thus the elevator is permitted to flex in a manner analogous to the system used in designing an aircraft frame or wing. This ability to flex enables all four rollers to be in solid, continuous contact with the guides and the vault.

A spring loaded detent system 270 acts to lock the elevator 11 in place when it is in either its raised or lowered position. Upper and lower recesses 271, 272 are formed in guide rail 74. The recesses are adapted to mate with latch member 273 which has first and second ramp surfaces 274 and 275. The centerline of latch member 273 is slightly misaligned with the center lines of recesses 271, 272 when in the upper and lower locked position respectively. The misalignments insure that in the lower locked position the upper edge of lower recesses 272 engages the upper surface 275 of latch pin 273. Spring 60 by providing a force tending to raise elevator 11 holds the device 11 in a locked position. A similar but reversed situation occurs in the upper locking position in which lower edge of recess 271 engages surface 274 of latch member 273 locking elevator 11 in place.

Latch rod 276 is held in place under elevator 11 by brackets 277, 278 and has a handle 279 formed on an

outer extending end. Spring 280 is captured between bracket 278 and latch pin 273 and operates to bias the latch mechanism into a locked position.

The upper portion of vault 130 is formed with a ledge to receive a lightweight but very strong top 20 formed from a reinforced fibreglass structure. Top 20 cannot exceed 15 pounds in weight or it will not be easy to physically move by many of the people employed in fast food restaurants and convenience food stores.

Figures 2, 3, 4, and 5 show the construction of the ledge for supporting the top 20. Side supports 21, 23 run parallel to and above supports 17, 19 to provide a resting place for top 20. Front and rear support is provided by upper bars 22, 26 which are above and parallel to bars 24, 28. In combination, supports 17, 19, 21, 23, 22, 26, 24 and 28 form a channel with upper and lower ledges 25, 27 around three sides of the vault for securely supporting top 20. Top 20 is the same size as the inside dimensions of vault 130 in depth and width and can be slide into the channel from the fourth side so that closing door 131 closes top 20 within the vault 130. Top 20 is made of one of a number of suitable commercially available reinforced materials which can be strong enough to prevent penetration of the material by a high powered bullet at close range. Safeguard Security makes such materials.

The embodiment of the invention shown in Figures 11 and 12 has an electrically powered actuator to raise and lower the device into the vault. The control elements for this operation are two actuator buttons located on each side of the vault. Both buttons must be actuated to make the actuator move the money handler. The

required simultaneous actuation of the buttons and the requirement for continued actuation of the buttons ensures that the operators hands are on the buttons and not somewhere else where injury could occur. If an object blocks or resists the movement of the elevator, the actuator goes to a "down" position. If the operator releases one button, the elevator stops its motion. Reactuation of the released button returns the elevator to its previous direction of motion.

The operation of the control system for the elevator is controlled either by a logic network 675 mounted in the base of the cabinet or by the microprocessor which forms a part of the automatic money handler. The logic network is connected electrically to the power supply, to the buttons and to the motor which drives the actuator shaft. No detailed description of the electronics or of the logic is believed necessary in view of the knowledge readily available for such control systems.

In Figures 11 and 12, parts with like numbers to those in Figures 4 and 5 are shown with like numbers preceded by a "4" or "5". Figures 11 and 12 show a money handler 510 supported on a shelf 700 which is supported in part by the ribs 544, 540, 534, 530, etc. Shelf 700 is connected to a collar 640 which is in turn connected to a threaded member 622. A tube member 620 is in turn engaged by a gear 610 which is housed within cover 600. Cover 600 encloses an electric motor which drives gear 610 which drives member 620 which in turn drives threaded member 622 which telescopes with respect to member 620. A motor driver gear arrangement of this type is commercially available sold by Jasta, Inc. of San Jose, California.

Figures 9 and 10 show another embodiment of the present invention which can be used in combination with any other embodiment of the invention described in this application. This embodiment of the invention can be best understood by examining the embodiment of the invention shown in Figures 2, 3, 4 and 5. Figures 2, 3, 4 and 5 show the construction of the ledge for supporting the top 20. Side supports 21, 23 run parallel to and above supports 17, 19 to provide a resting place for top 20. Front and rear support is provided by upper bars 22, 26 which are above and parallel to bars 24, 28. In combination supports 17, 19, 21, 23, 22, 26, 24 and 28 form upper and lower ledges 25, 27 for securely supporting top 20. Top 20 is the same size as the inside dimensions of vault 130 in depth and width and fits below ledge 25 so that closing door 131 closes top 20 within the vault 130.

The structure described is satisfactory for many purposes, but it does require opening the door to allow the top 20 to be removed and to raise the money handler 10 into position. To eliminate that need in the circumstances where necessary, the embodiment in Figures 9 and 10 is shown.

Figure 10 shows a front view of the vault of this embodiment of the present invention with the top 620 in place. Vault 600 has a door 330 with a handle 334 and first lock 332. The top 620 slides between members 622, 624 and can be held in place there secure from removal by the lock system shown generally by the numeral 200.

Lock system 200 has a bolt element 204, a base member 202 and a rotatable cam member 218 which can be rotated by a key operated central core 240. Base member 202 is

fastened to the inside surface 631 of the vault door 330 by welds or other suitable method. The base member 202 has two primary cavities 215 and 250. Cavity 215 is formed to allow space for the rotatable cam member 218 which has a curved surface 222 and a flat surface 220. Central core 240 which is rotated by a key, not shown, causes the cam to rotate in the direction shown by the arrow for actuating bolt member 204.

Bolt member 204 is formed in a generally "U" shaped cross section with legs 205, 206 and 208. Bolt 204 has a guide slot 210 formed in leg 205. Guide slot 210 is supported for translation on post member 212 which has a relieved portion 216. Bolt 204 is captured on post 212 by a "C" ring 214.

Base member 202 has first and second cam surfaces 230 and 232 which co-operate with surface 234 of bolt 204. Bolt 204 is moved by cam 218 along post 212 and cam surfaces 230 and 232 such that bolt 204 leg 208 can be positioned to block the space between members 622 and 624 when cam surface 218 is against surface 236 of bolt 204. In the blocked position top 620 cannot be removed except by destruction of the lock 200.

The money handler 10 requires electrical power and information for operation. To make those connections, vault 130 has a channel 150 running along its lower front edge behind the door 131 (see Figures 2 and 5). The channel is formed by an inwardly extending lip 153 formed as part of vault 130. Extending downwardly from lip 153 in the base 22 of vault 130 is a vertical member 152 which can be formed as part of lip 153. Inlet 162 is formed in member 152 to permit electrical wire or a connector 158 to be placed either therein or

therethrough. A rear cover plate 154 formed in an "L" shape is bolted to lip 153 at intervals along its length by bolts 156 and nuts 155. A cable 160 is run along channel 150 and connected to connector 158 to supply both electrical power and transfer information to and from the money handler 10. The connection to the money handler is made through electrical lead 164 which is terminated by connector 166 at the main printed circuit board assembly. Power and signals (data) are brought to the bill and coin handlers by a distribution panel which is also connected to the main printed circuit board with a cable. The structure described above allows electrical energy to enter and leave the vault without impairing the physical security of the vault 130. Even if channel 152 were broken open, entry is gained only through a small port 162 formed in the vault which is too small to permit removal of any money or part of the device.

Claims

1. A security cabinet for a money handling device comprising vault means for safely storing a money handling device with a removable top member, elevator means for moving the device into and out of the vault means, and securing means for locating and securing the top member over the device within said vault means.

2. A security cabinet as claimed in claim 1, wherein the elevator means has means for storing energy for raising and lowering the money handling device within the vault means; the elevator means requiring an amount of force to be applied by an operator to be far less that the total weight of the elevator means and the money storage means.

3. A cabinet as claimed in claim 1 or 2, wherein said vault has reinforced sides and bottom and a slide-in top member.

4. A cabinet as claimed in claim 1,2 or 3, wherein said energy storage means comprises one or more resilient members.

5. A cabinet as claimed in any preceding claim including a blind channel means formed therein to conduct an electrical cable from outside the apparatus to inside it.

6. A cabinet as claimed in any preceding claim, wherein said elevator means includes a pantograph device having a spring means linking opposing pivot points of said pantograph.

7. A cabinet as claimed in any preceding claim including means for reducing the friction between the vault means and the elevator means when the elevator means is raised and lowered.

8. A cabinet as claimed in claim 7 including guide means disposed within said vault to receive said friction reducing means and to prevent the tipping of said money storage means inside said vault.

9. A cabinet as claimed in claim 2, wherein said stored energy means supplies substantially more than half the effort required to raise and lower said housing means.

10. A cabinet as claimed in any preceding claim wherein the top member is formed of lightweight reinforced material having an impact resistance strength approximating that of steel and said vault member has a door member which when closed and locked confines said top member making it non-removable.

11. A cabinet as claimed in any of claims 1 to 9 wherein said top member is locked in position by locking means at a top edge of the cabinet.

12. A cabinet as claimed in any preceding claim including locking means for positively holding said elevator means in a first and a second fixed position.

13. A cabinet as claimed in claim 12 wherein said locking means comprises a locking member spring biassed in the locking direction.

14. A cabinet as claimed in any preceding claim wherein the elevator means has means for raising and lowering said housing means into and out of said vault means, said raising and lowering means being electrically powered.

15. As an independent invention, the additional feature of any of claims 1 to 14.

16. A security cabinet for a money handling device substantially as herein described.

FIG. 1

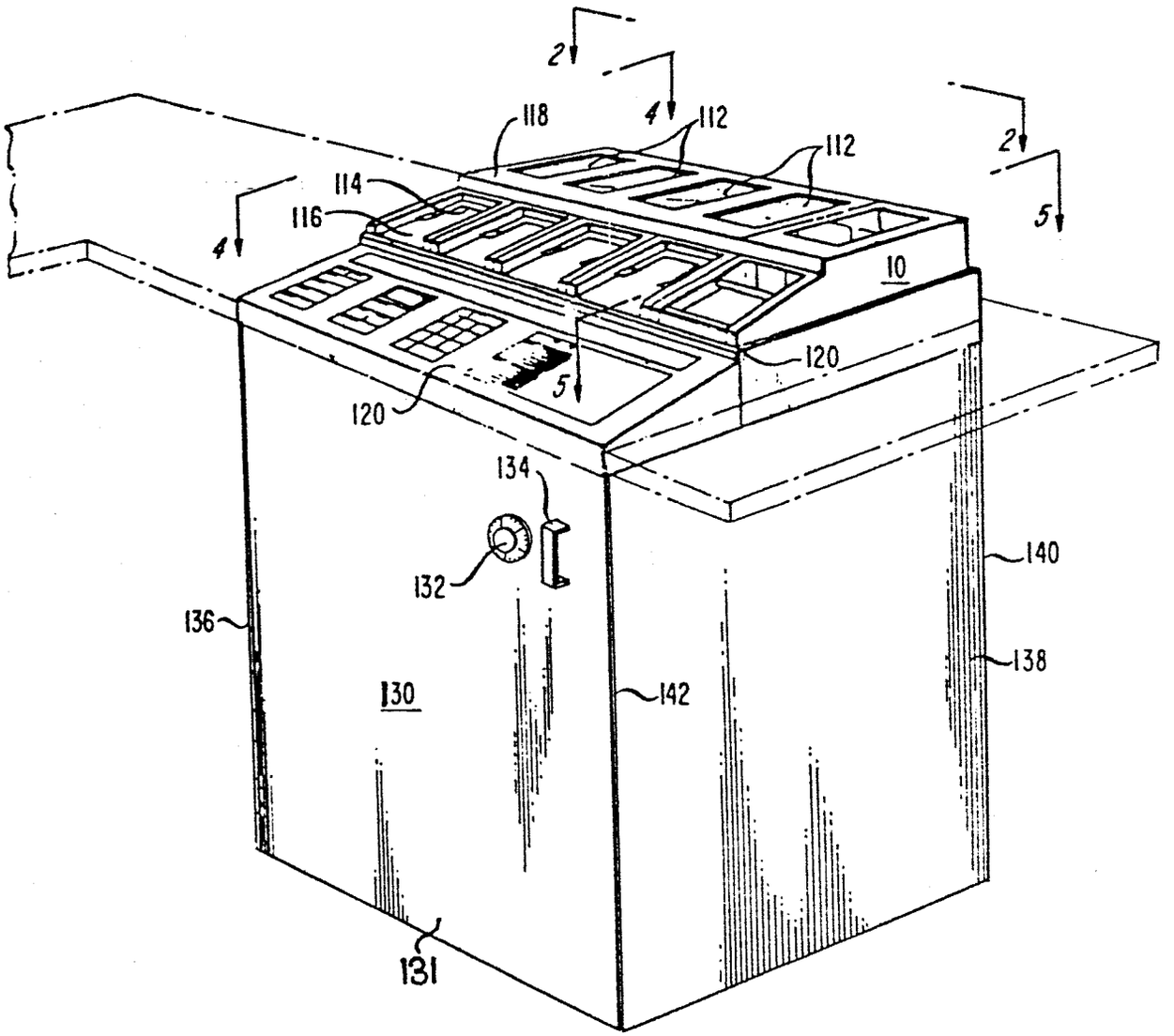
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FIG. 3

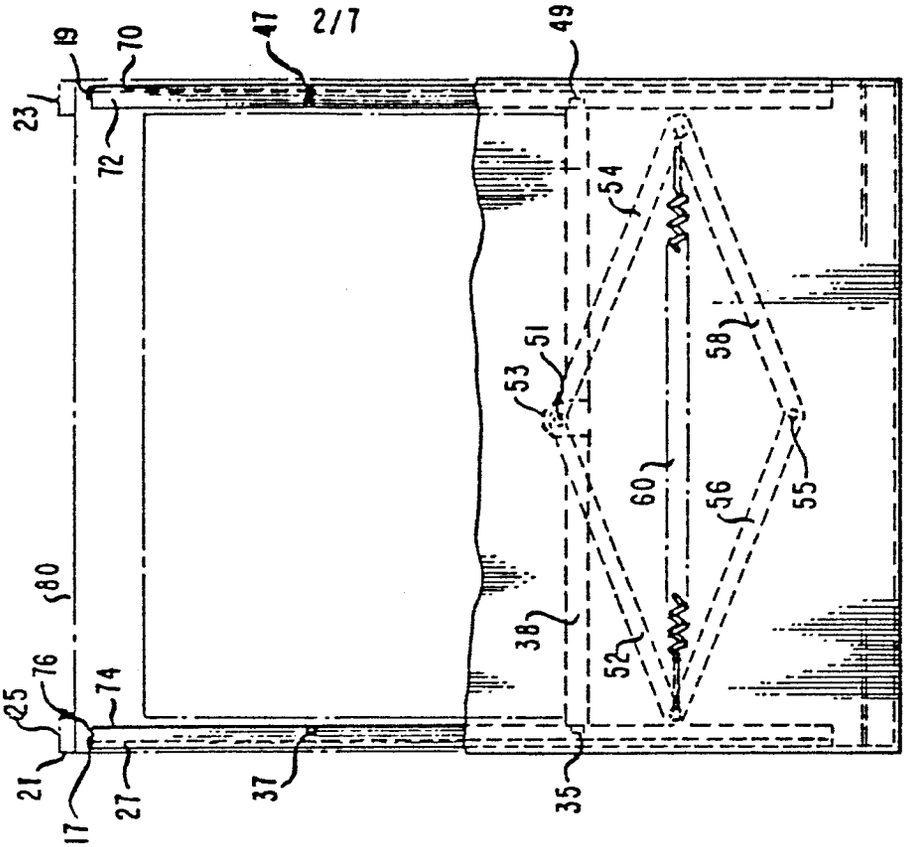
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FIG. 2

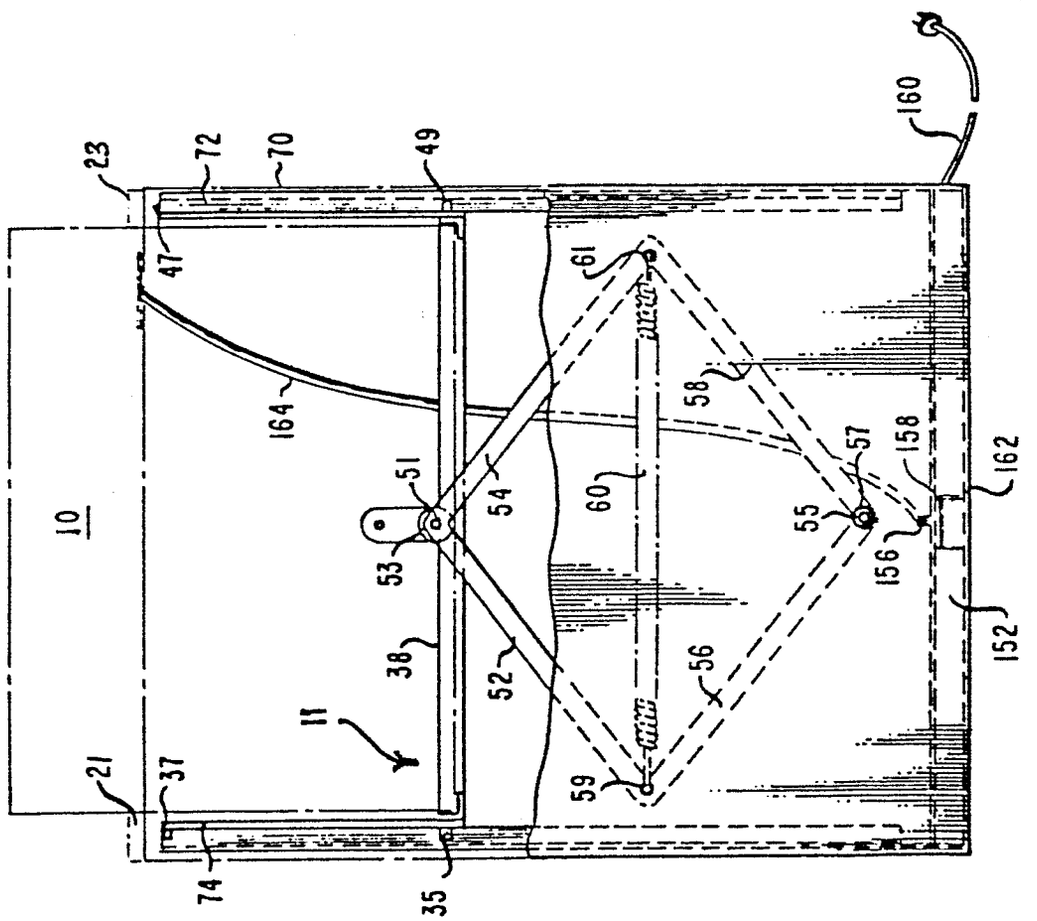
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FIG. 5

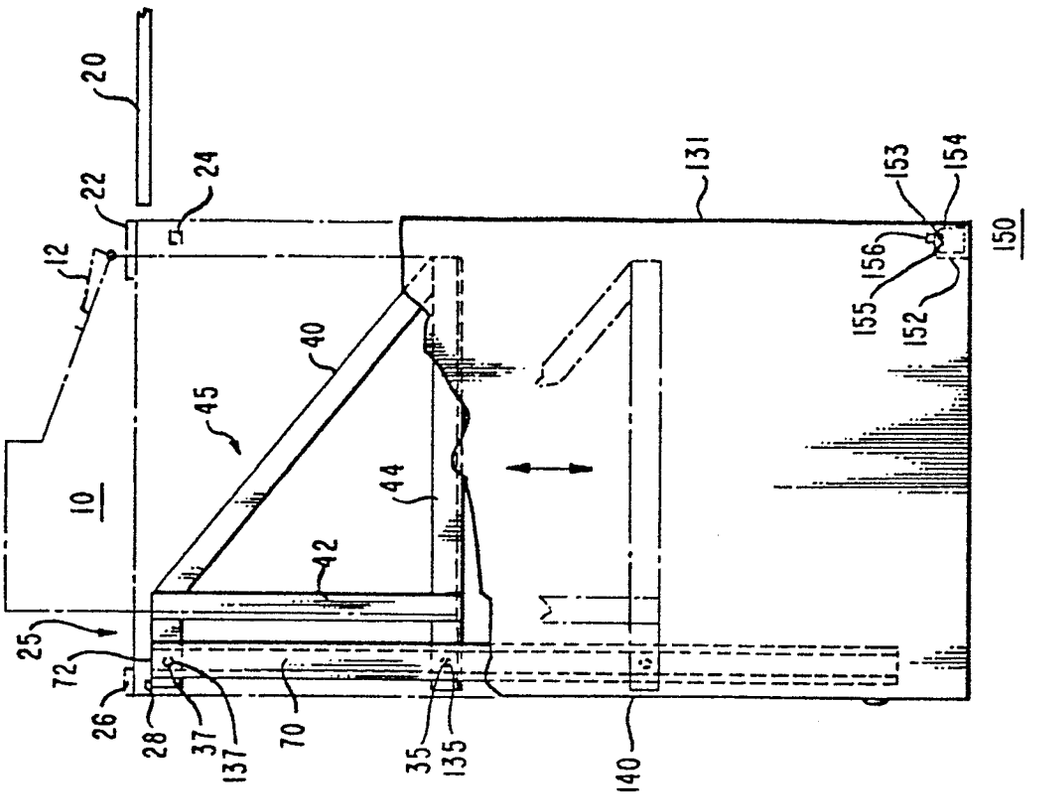
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FIG. 4

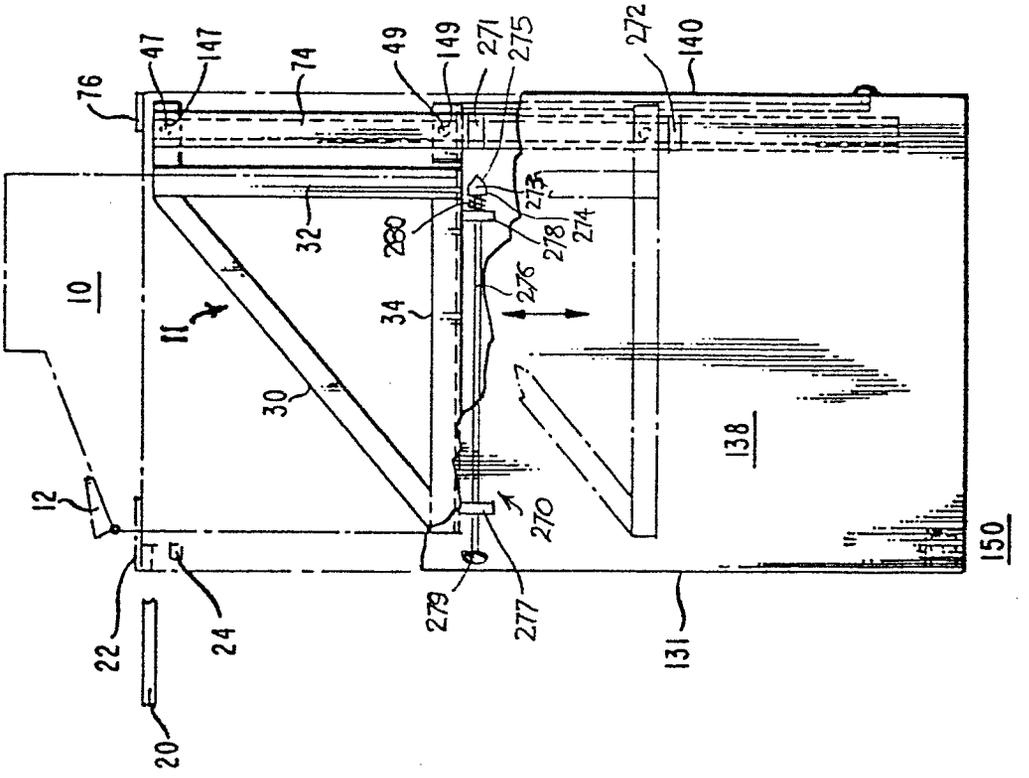
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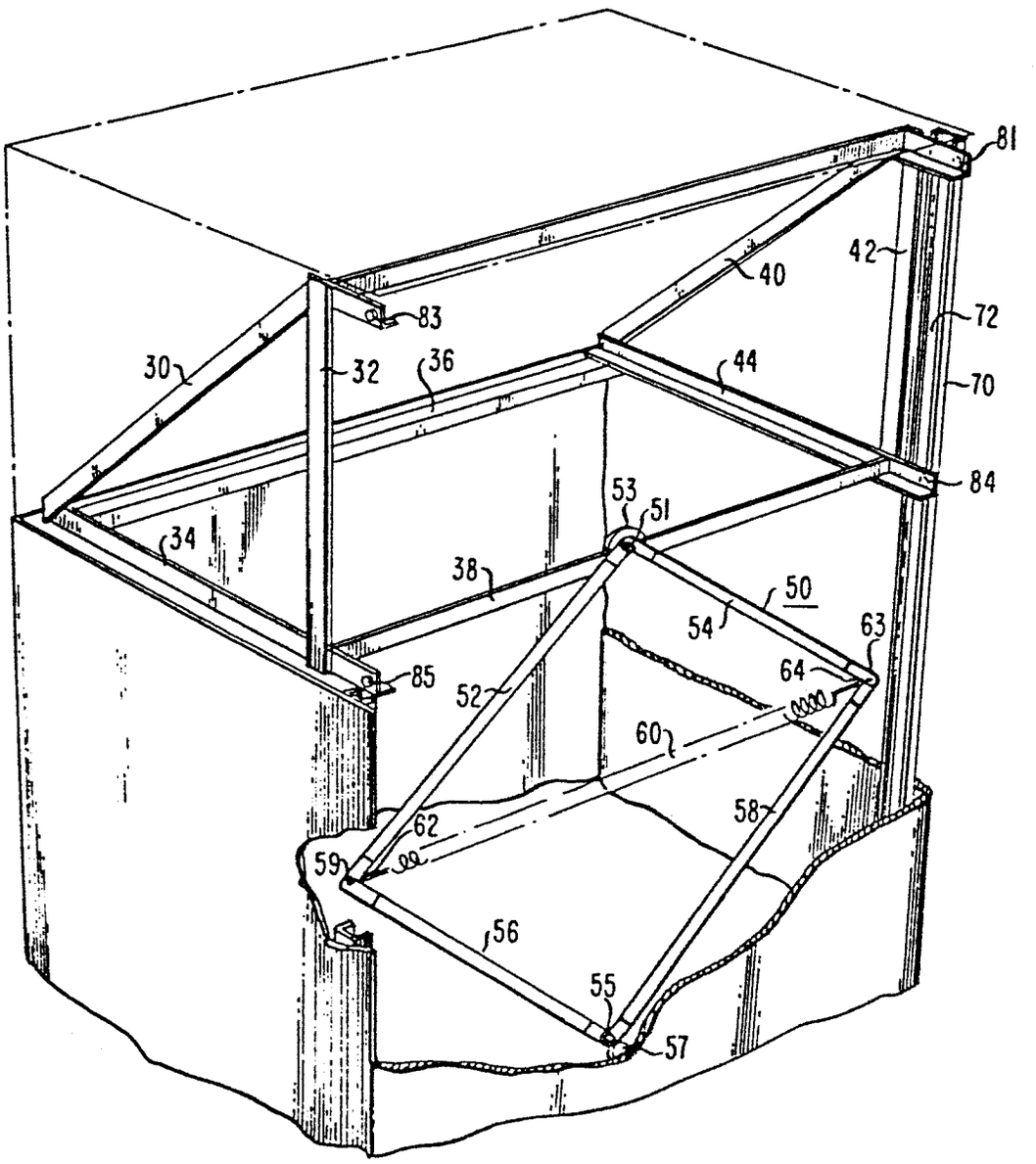
FIG. 6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57

FIG. 7

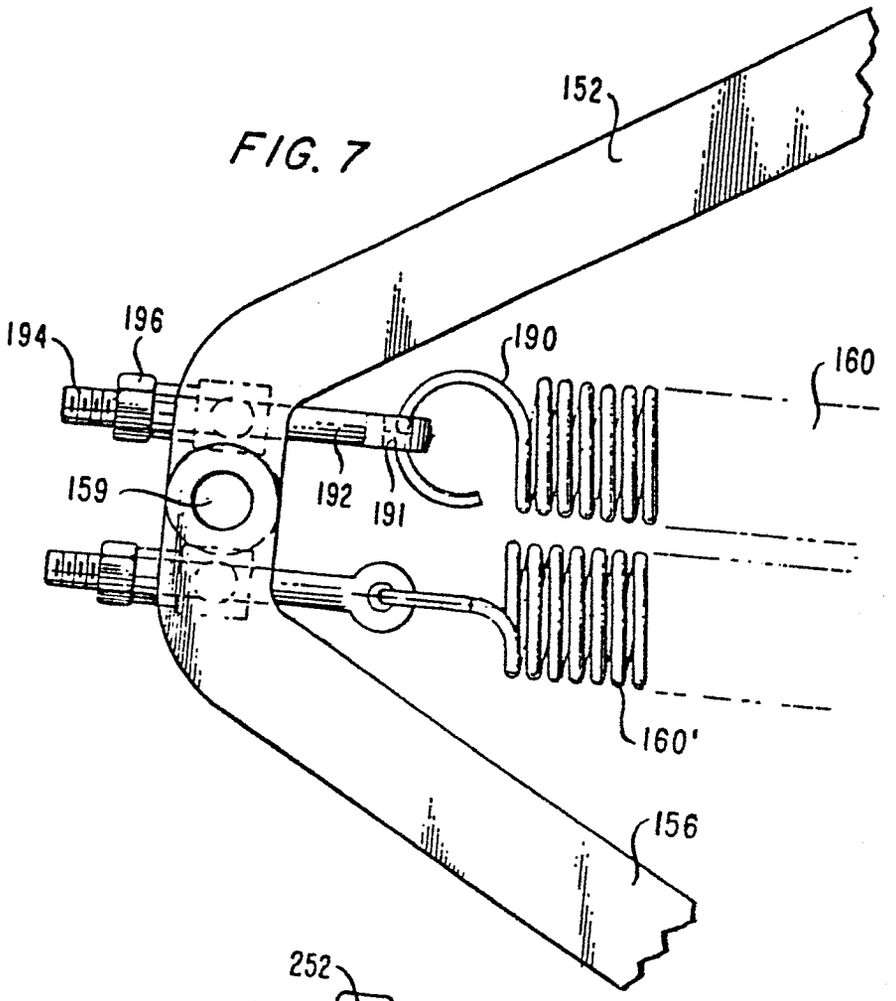
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FIG. 8

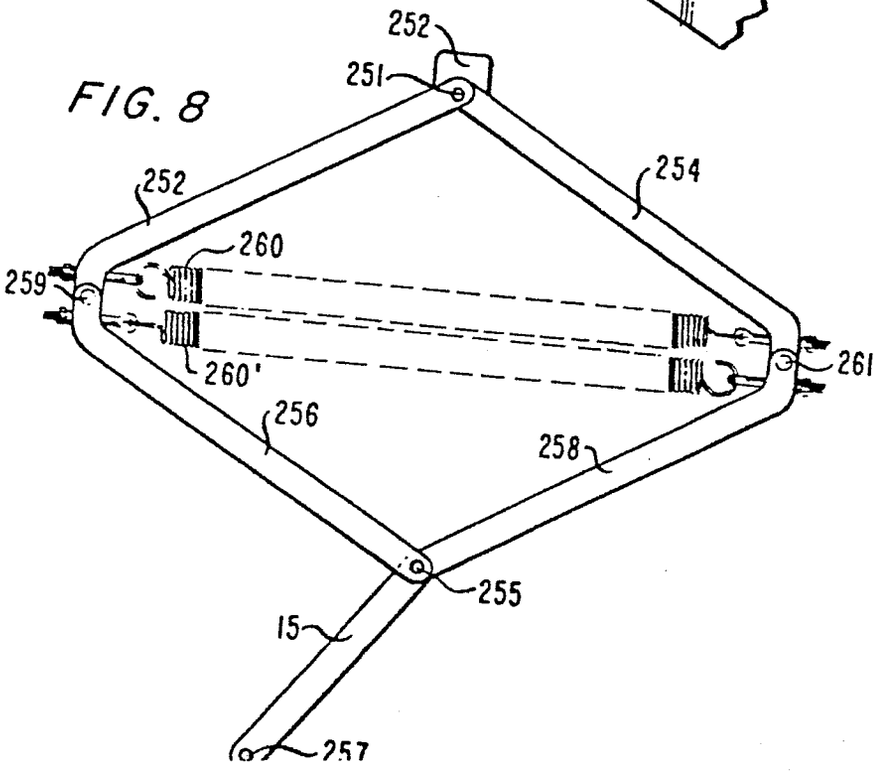
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FIG. 9

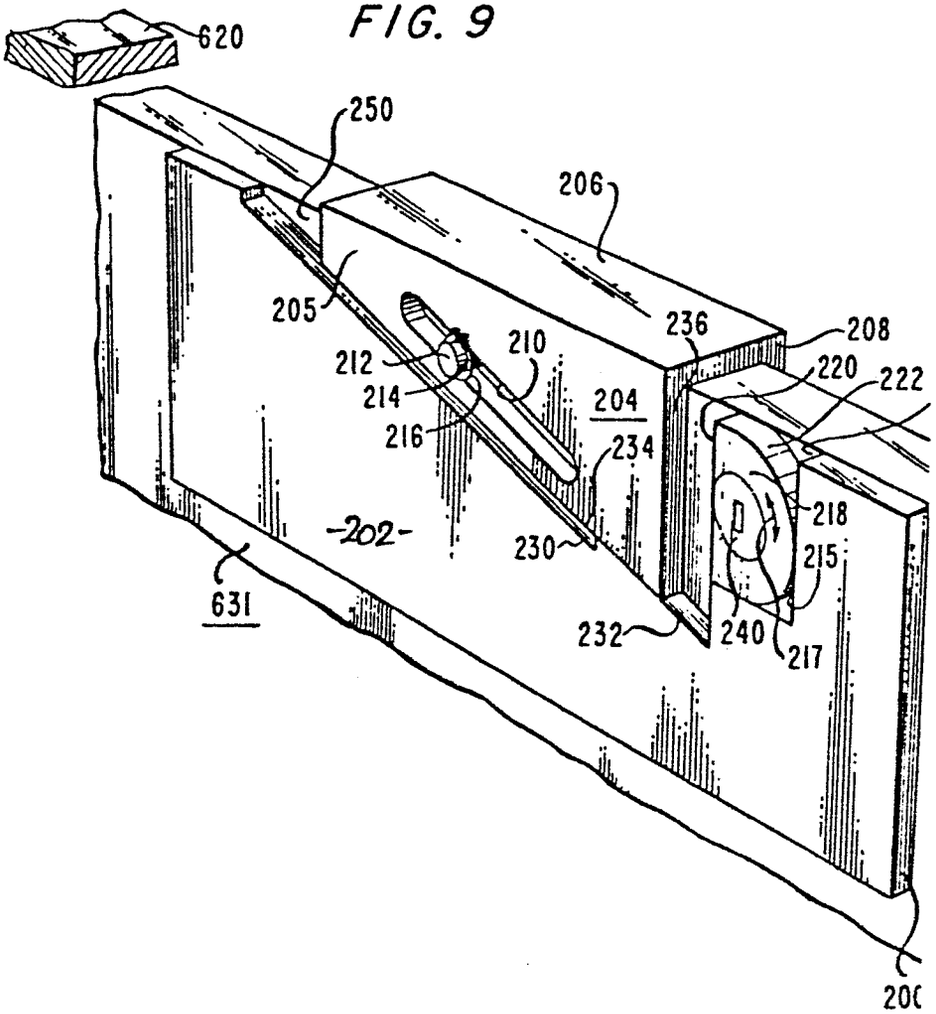
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FIG. 10

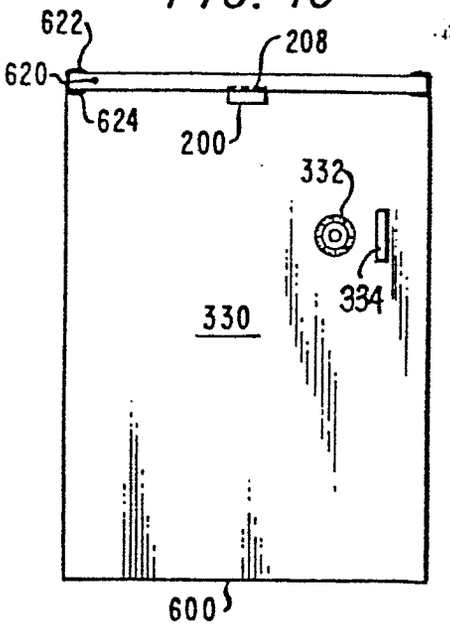
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FIG. 12

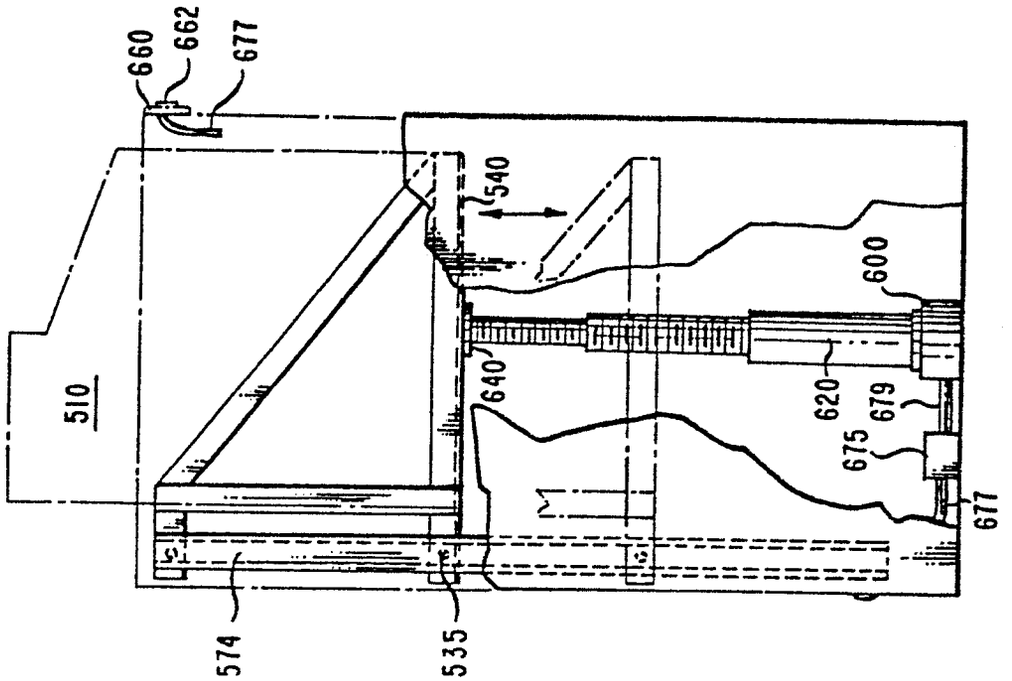
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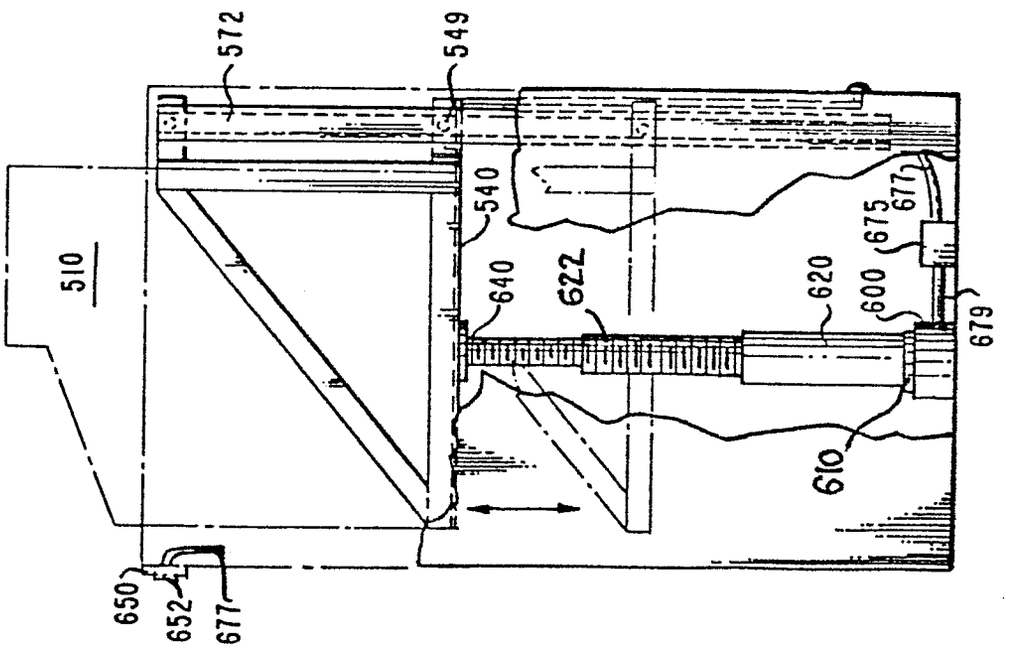
FIG. 11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