March 3, 1959 JOHN P. T. HSU ET AL 2,875,922

SUPERIMPOSED BOTTLE VENDING MACHINE

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FIG. 1.

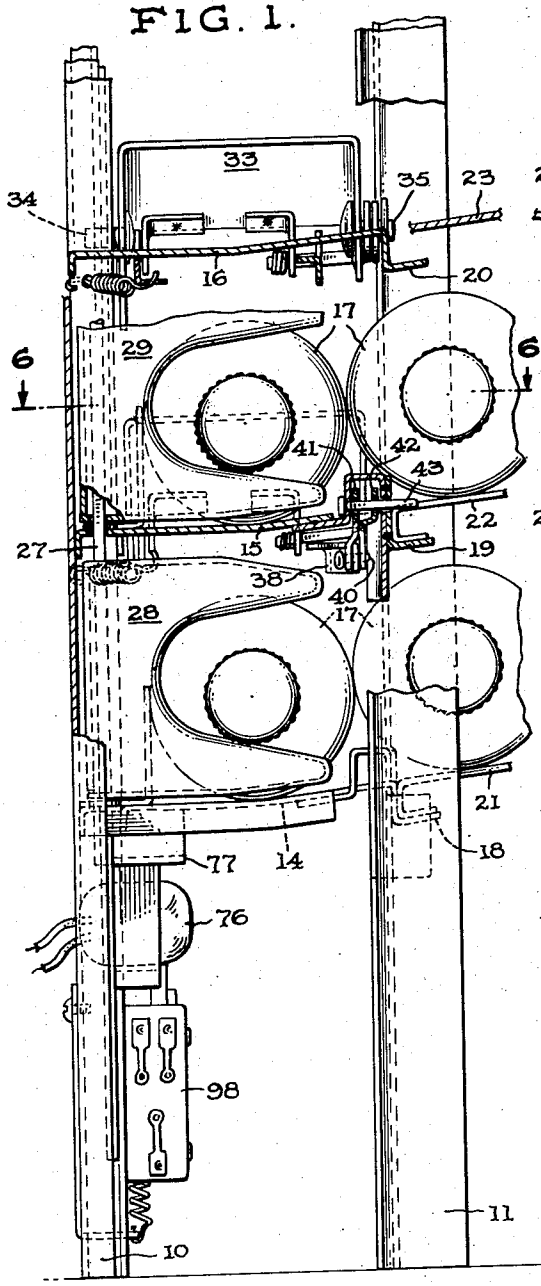

FIG. 2

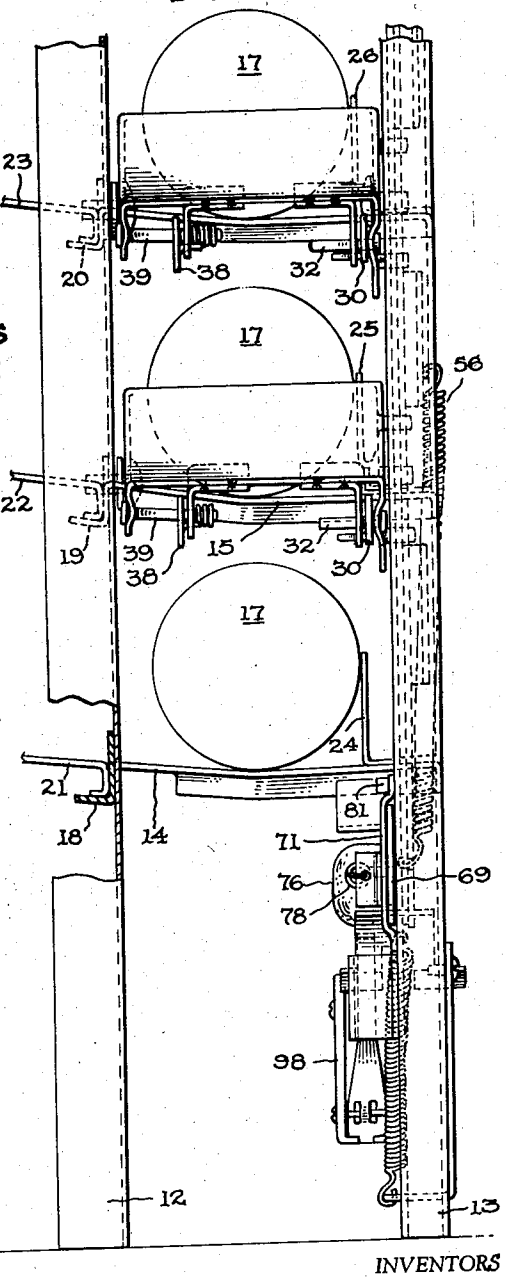

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FIG. 3.

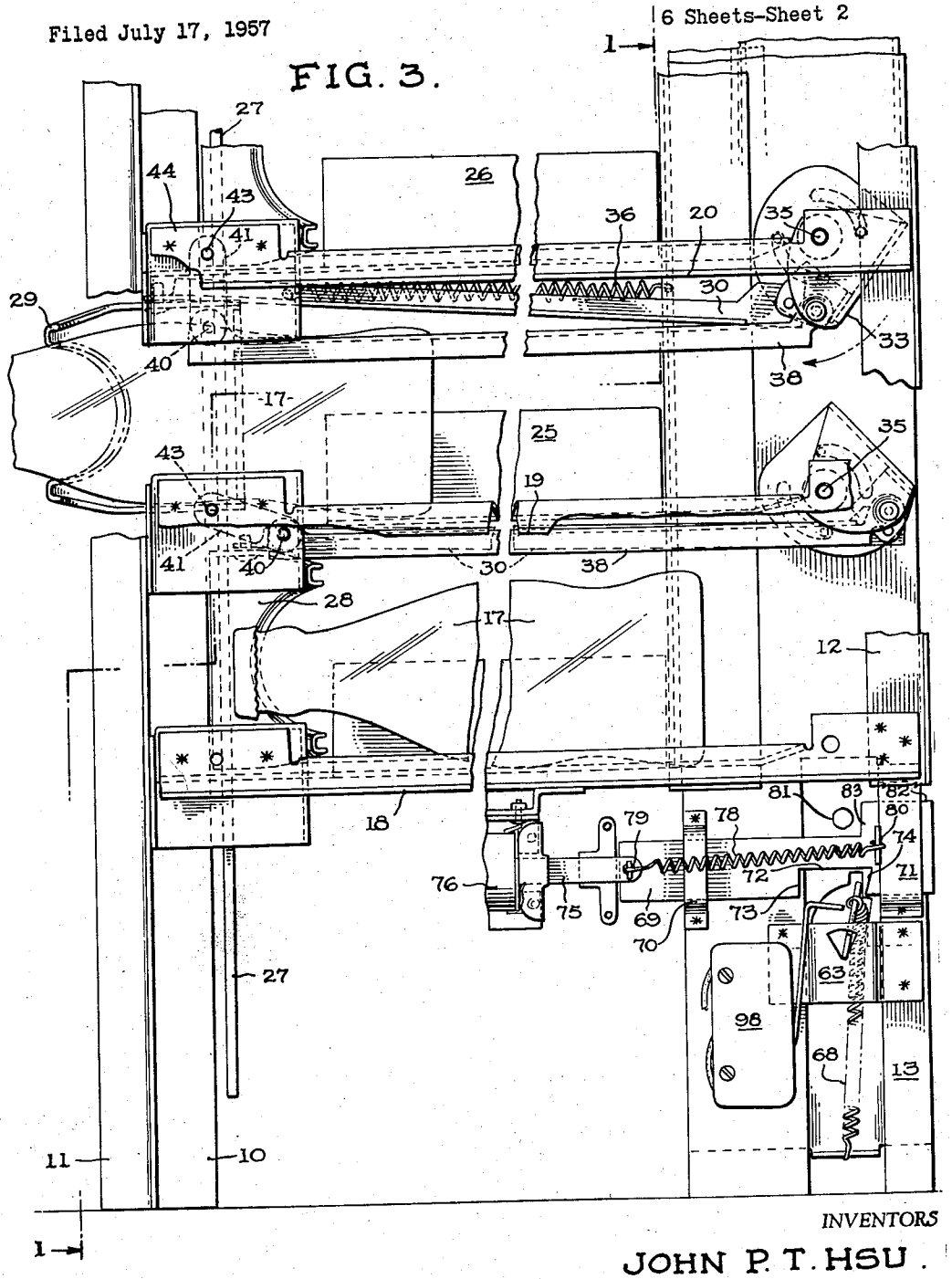

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FIG. 4.

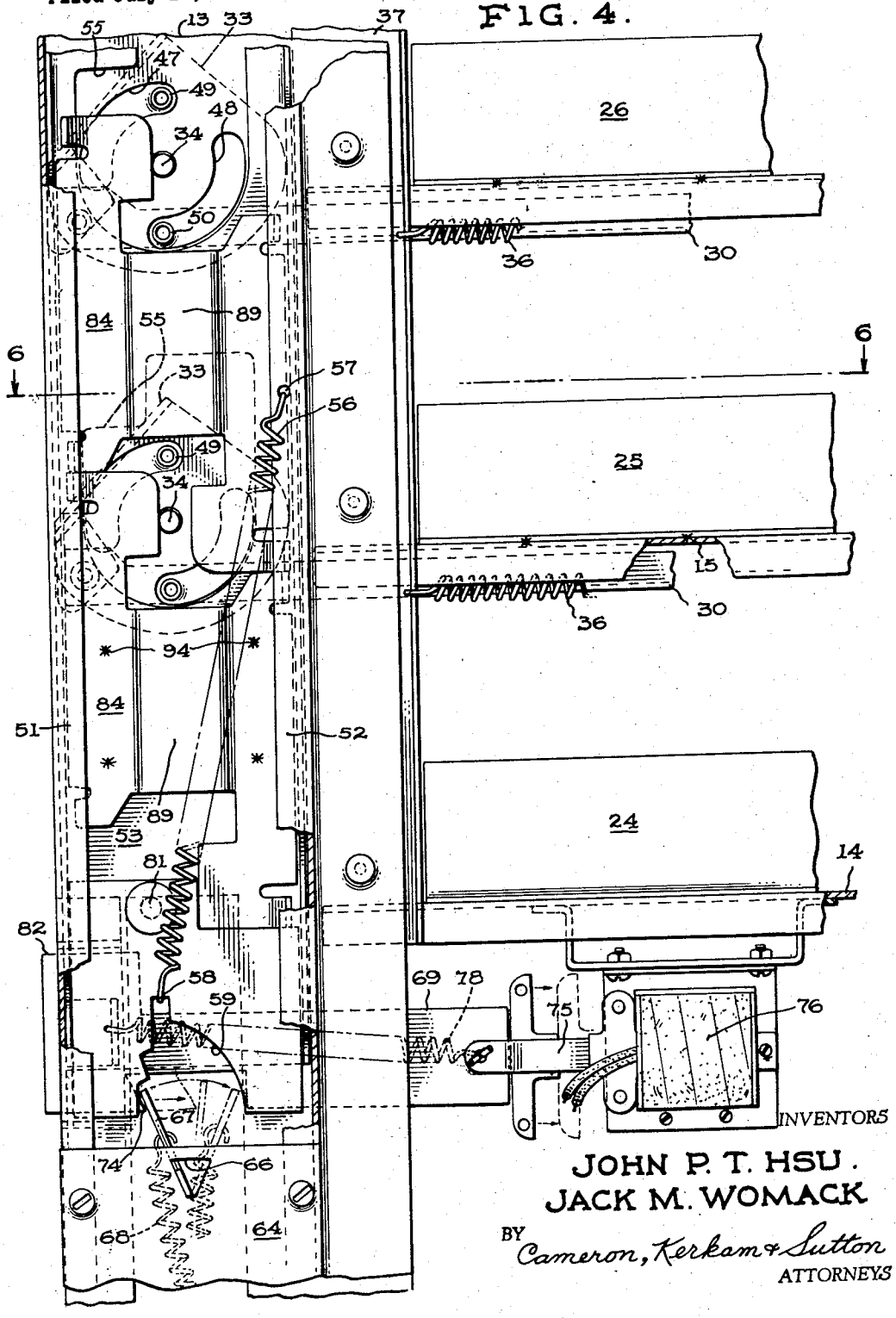

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FIG. 5

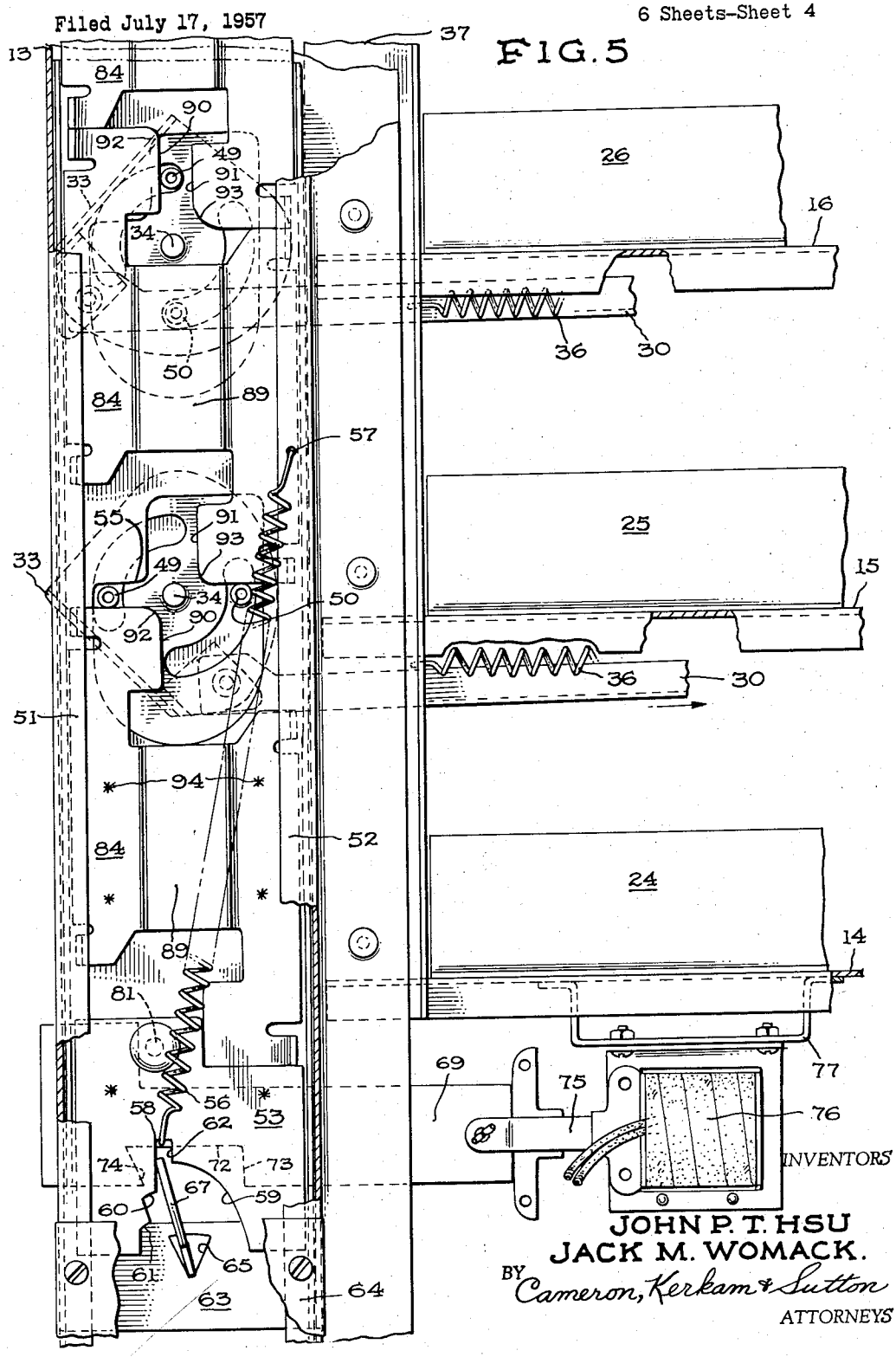

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FIG. 6.

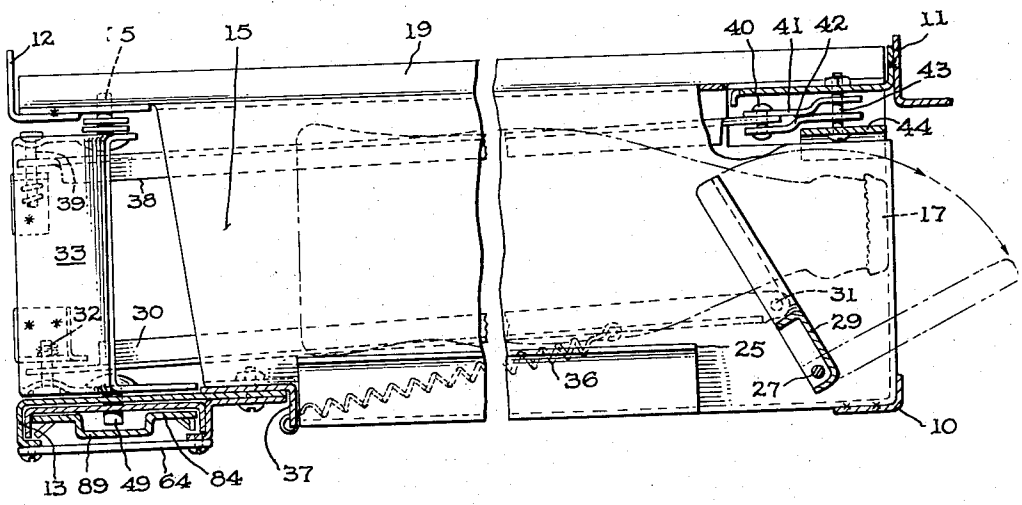
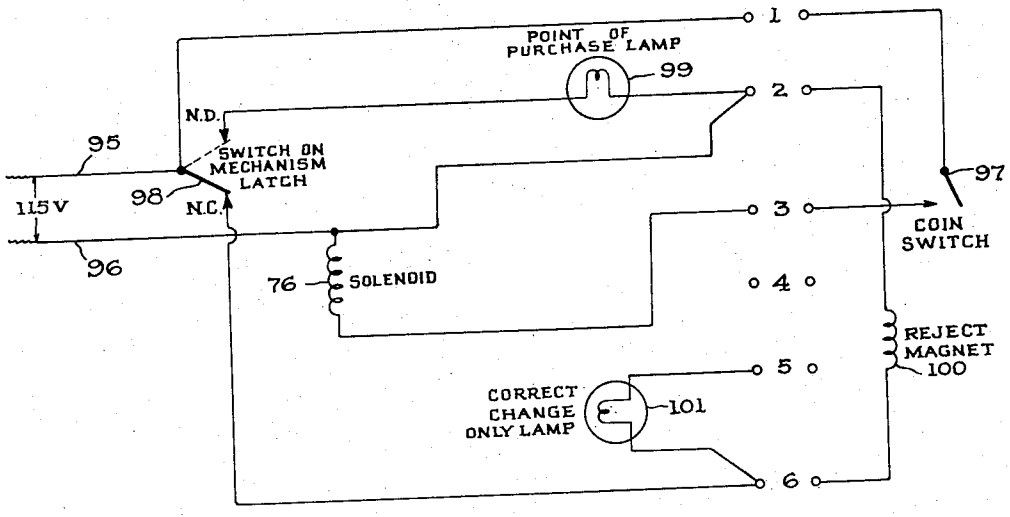


FIG. 8.



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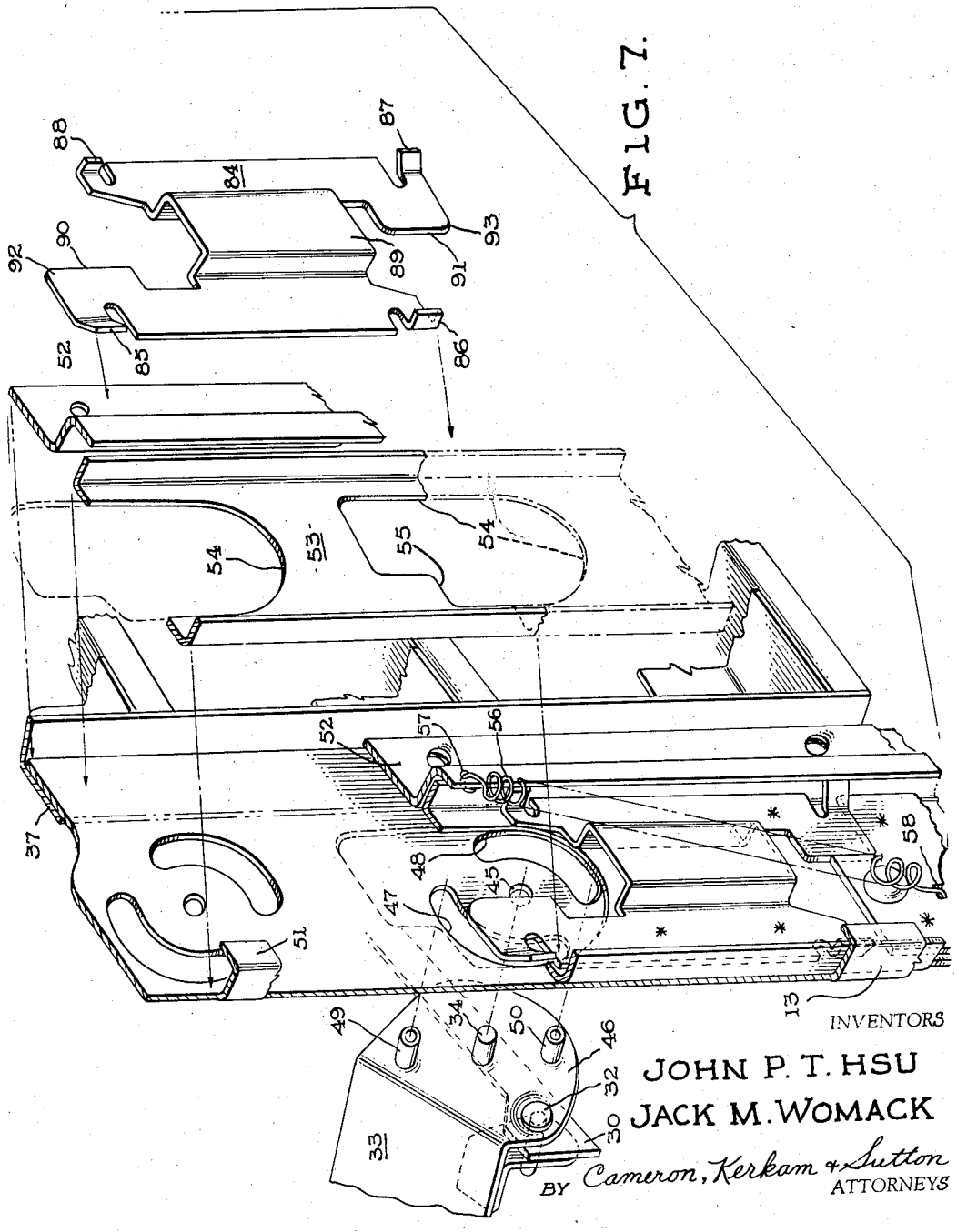

FIG. 7.

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SUPERIMPOSED BOTTLE VENDING MACHINE

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Application July 17, 1957, Serial No. 672,434

5 Claims. (Cl. 221—125)

This invention relates to superimposed bottle vending machines of the type wherein a number of articles to be vended are arranged in superimposed groups of objects one of each group of objects being normally disposed in a vending position and locked against removal which veding machine includes lock-out structure which permits the removal of but one article from one group of superimposed groups of articles for each cycle of operation of the machine.

The bottle vending machine of the present concept provides a selective vending machine permitting the user to choose from a number of groups of articles one of the type of articles which the customer desires to purchase by depositing a coin and the machine includes lock-out mechanism which prevents the customer from removing more than one article for each coin deposited.

The vending machine of the present invention is particularly adapted to handle bottled beverages arranged in groups according to beverage; each group is supported on an inclined shelf; and the lock-out mechanism permits the removal of a single bottle from a selected shelf and prevents the removal of additional bottles during a cycle of the machine commenced by the deposit of a coin.

In the present dispensing mechanism each group of bottles is mounted on an inclined shelf so that the bottles are fed by gravity one at a time to the vending position and a divider is provided which prevents gravitational movement of all of the bottles on a shelf each time a single bottle is withdrawn from the selected group of bottles to prevent removal of more than one bottle from the selected group of bottles.

The dispensing mechanism of the present invention includes a lock-out mechanism, and a swingable gate at each shelf operates the lock-out mechanism when the gate is rotated preventing rotation of the gates on the other shelves thus preventing removal of bottles from shelves other than the selected shelf.

It is therefore an object of this invention to provide novel lock-out mechanism for vending machines in which a novel arrangement of lock-out plates is employed together with a novel latch for these plates.

Another object is to provide novel vending machines having superimposed vending stations including novel lock-out mechanism having a novel arrangement of lock-out plates together with a novel latch for these plates.

Another object is to provide novel lock-out mechanism for such vending machines in which a novel arrangement of lock-out plates is employed together with a novel latch for these plates which latch is electrically released by the deposit of a coin and is returned to latching position by downward movement of the lock-out plates.

Other and further objects of the present invention will appear from the following description of an illustrative embodiment thereof.

The present invention is capable of various mechanical embodiments one of which is shown in the accompanying drawings and is described hereinafter to illustrate the present inventive concept. This illustrative embodiment

should in no way be construed as defining or limiting the invention.

In the accompanying drawings, in which like reference characters indicate like parts:

Fig. 1 is a front elevation, partly in section, of an illustrative embodiment of a bottle vending machine in accordance with the present invention;

Fig. 2 is a rear elevational view of the embodiment of Fig. 1;

Fig. 3 is an elevational view partly in section as seen from the right in Fig. 1;

Fig. 4 is an elevational view partly in section as seen from the left in Fig. 1 showing the latch in position to prevent withdrawal of a bottle;

Fig. 5 is a side elevation corresponding to that of Fig. 4 with the lowest tier gate open for withdrawal of a bottle from the lowest tier and showing the latch in position for return to latched position;

Fig. 6 is a horizontal cross section on line 6—6 of Figs. 1 and 4;

Fig. 7 is an exploded view of a part of the lock-out mechanism shown in Figs. 3–6; and

Fig. 8 is diagrammatic showing of a suitable electric circuit for use with the bottle vending machine of the embodiment of Figs. 1–7.

Referring now to the several figures, the bottle dispensing mechanism of the present invention includes four vertically disposed corner members **10**, **11**, **12** and **13** which support between them any desired number of spaced platform members **14**, **15** and **16** which provide dispensing or vending stations for the articles to be dispensed or sold such as the bottles generally indicated at **17**. Platforms **14**, **15** and **16** may be provided with downwardly and upwardly extending portions **18**, **19** and **20**, respectively, to receive shelf members **21**, **22** and **23**, respectively, which extend laterally therefrom and in an upward direction to receive and store as many of the bottles **17** as may be desired so that the bottles **17** roll downwardly under the force of gravity onto the platforms **14**, **15** and **16** and into position to be dispensed. Back plates **24**, **25** and **26** are provided on each of the platforms **14**, **15** and **16**, respectively, to prevent the weight of bottles on the respective shelf members from forcing the bottle in dispensing position out of dispensing position.

A common vertical shaft **27** is provided adjacent vertical frame member **10** and passes through each of the platform members **14**, **15** and **16** and dispensing gates **28** and **29** are mounted for rotation on shaft **27** there being a suitable dispensing gate for each of the vertically disposed dispensing stations. All of the gates **28** and **29** are of similar construction and are bifurcated so that the necks of the bottles to be dispensed may be manually grasped therethrough.

The dispensing mechanism is the same for each of the dispensing stations and will be described with respect to one such station, the station provided by platform member **15** and gate **29**. Referring now more particularly to Fig. 6, longitudinally extending rods **30** are pivotally connected at **31** to the tops of the gates **28**, **29**, etc., as shown in dotted lines in Fig. 6 and at **32** to rotating plates **33** which are mounted for rotation on pivots **34** and **35**, each pivot **35** extending through an upstanding portion of a member such as member **20** in Figure 3 and each pivot **34** extending through a portion of vertical frame member **13**. Each rotating plate **33** is connected with the gate at the next lower level, the connecting rods **30** each extending under and close to the next upper partition **15**, **16**, etc. A spring **36** connects between each rod **30** and an extension **37** of frame member **13** to urge the rods **30** to the left as seen in Fig. 6 and to urge their gates towards closed position. Springs **36** also urge members **33** into rotation

about pivots 34 and 35 to the raised position seen in Fig. 1.

A second longitudinally extending rod 38 is pivotally connected to each member 33 at 39 and is pivotally connected at its other end at 40 to a pair of arms 41 and 42 which in turn are pivoted at 43 in an upstanding extension 44 of the platform which is shown as platform 15 in Fig. 6. Thus when gate 29 is moved to open position as seen in Fig. 3 by the manual removal of bottle 17 during the dispensing operation, its rod 30 is moved to the right as seen in Fig. 6 rotating its associated member 33 in a clockwise direction as seen in Fig. 3 and rotating rod 38 downwardly and to the left as seen in Fig. 3 to a position interposed between the bottle 17 being withdrawn and the next bottle 17 on the shelf 22 preventing the next bottle 17 from entering the dispensing position to prevent more than one bottle from being dispensed during a single cycle of the machine.

A novel lock-out mechanism is provided to prevent the opening of more than one dispensing gate 28 or 29 for a given cycle of the mechanism and this lock-out mechanism is best seen in Figs. 4, 5, 6 and 7. Referring particularly to Fig. 7, where it will be seen that the construction is the same for each dispensing station and so will be described only with respect to rotating member 33, it will be seen that vertical frame member 13 is provided with a suitable opening 45 to receive pivot 34 of member 33 and pivot 34 is mounted on base 46 of member 33. Member 13 is provided with pairs of arcuate shaped slots 47 and 48 symmetrically disposed around opening 45. Slots 47 and 48 receive pins 49 and 50, respectively, which are carried by base 46 on a diameter passing through pivot 34. Pins 49 and 50 are arranged to lie in the upper and lower extremities of slots 47 and 48, respectively, and in a vertical line when member 33 is in its raised position corresponding to the closed position of gate 29.

Member 13 is provided with an outwardly and inwardly extending portion 51 which forms a channel and a correspondingly shaped plate 52 is suitably secured to member 13. A U-shaped member 53 is mounted for vertical movement in the channel formed by members 51 and 52 and is suitably cut away at 54 at each dispensing station to permit free rotation of pins 49 and 50 when plate 53 is in its raised position. Each opening 54 is provided with a shoulder 55 which when plate 53 moves downwardly, as will appear more fully hereinafter, is moved to position above the adjacent pin 49 to prevent rotation of member 33 for the dispensing station from which the bottle is being withdrawn. A spring 56 connects to member 52 at 57 and to plate 53 at 58 to urge plate 53 toward its upper or raised position.

As best seen in Fig. 5, plate 53 is provided adjacent its lower end with a cam surface 59 which has formed therein latch steps 60 and 61 and a vertically extending portion 62. A pair of opposed plates 63 and 64 are secured on opposite sides of the lower extremity of frame member 13 and are provided with opposed triangularly shaped openings 65 and 66, respectively, to receive a latch 67 which is urged by spring 68 to either its extreme left-hand position or its extreme right-hand position as seen in Fig. 4. When plate 53 is in its raised position latch 67 normally engages shoulder 61 to prevent downward movement of member 53.

A latch actuating member 69 is mounted for reciprocating movement in brackets 70 and 71 mounted on member 13 and member 69 is cut away at 72 to provide shoulders 73 and 74, the shoulder 74 engaging latch 67 to move the same against the action of spring 68, the shoulder 73 being masked by the plate 53 as seen in Fig. 5. Member 69 is connected to rod 75 of a suitable solenoid 76 which is mounted beneath the lower dispensing station and is secured to platform 14 by a bracket 77.

As will appear more fully hereinafter, when the user of the dispensing mechanism deposits a coin therein solenoid 76 is energized moving member 69 to the right as seen in Fig. 5 to bring shoulder 74 into engagement with latch 67 to move latch 67 to the extreme right-hand position shown in dotted lines in Fig. 4 to release plate 53 for downward movement. Solenoid 76 is then deenergized and a suitable spring 78 connected to member 69 at 79 and to frame 13 at 80 returns member 69 to its starting position without moving latch member 67 from the position it has assumed against cam surface 59. Thereafter, when plate 53 moves downwardly during a dispensing operation, as will appear more fully hereinafter, cam surface 59 bearing against latch 67 moves latch 67 in counterclockwise rotation as seen in Fig. 4 to the position seen in Fig. 5 and upon raising of plate 53 at the end of the dispensing operation latch 67 first engages notch 60 and then engages notch 61 to prevent more than one downward movement of plate 53 for a dispensing cycle to prevent the dispensing of more than one bottle during each cycle of operation of the mechanism.

A stud 81 extends rearwardly from plate 53 and, when plate 53 is in raised position, is in the position shown in Fig. 4 so that surface 82 of member 69 can pass beneath it. When solenoid 76 is energized and draws member 69 to the left as seen in Fig. 3 surface 82 passes beneath stud 81 and prevents downward movement of plate 53 until member 69 has returned to its normal position. When plate 53 moves downwardly stud 81 moves downwardly where it can be engaged by surface 83 of member 69 so that member 69 cannot shift latch 67 when member 53 is in its downward position during a dispensing operation.

Referring again to Fig. 7, an H-shaped plate 84 for each dispensing station is mounted for vertical movement in the channel provided by members 51 and 52 and has upstanding portions 85, 86, 87 and 88 at each corner thereof, respectively, to form a tight but sliding fit in channel members 51 and 52, respectively. Member 84 is provided with a raised central channel portion 89 to ride over the tops of pins 49 and 50 when pins 49 and 50 are in their normal vertically disposed positions. Member 84 is provided with opposed surfaces 90 and 91 having rounded extremities 92 and 93, respectively.

The lowest plate 84 of the stack of plates 84 of the lock-out mechanism as seen in Fig. 4 is suitably secured to plate 53 as by spot welding at points 94.

Referring now to Figs. 4 and 5, the lock-out mechanism operates to prevent the withdrawal of more than one bottle for each cycle of operation of the dispensing mechanism. When a coin is deposited in the machine solenoid 76 is energized moving the latch member 67 to the right as seen in Fig. 4 into position against cam surface 59 releasing plate 53 for downward movement. The bottle chosen by the customer is then grasped by the neck and assume that this bottle is selected from the lowest tier of bottles. Withdrawal of the bottle 17 will then rotate gate 28 and move its arm 30 to the right rotating its member 33 in a counterclockwise direction thus lowering its spacer rod 38 to prevent another bottle from feeding into the dispensing station from its shelf 21.

Rotation of member 33 rotates its pins 49 and 50 in a counterclockwise direction and pin 49 rides over surface 92 to force all of the plates 84 therebelow including the lowermost plate 84 and plate 53 downwardly while pin 50 moves under surface 93 to raise all of the plates 84 thereabove to bring surfaces 90 of the plates thereabove into position to be engaged by the adjacent pins 49 and to bring the surfaces 91 of the plates therebelow into position to be engaged by pins 50. Movement of plate 53 downwardly moves surfaces 55 downwardly with the result described below, and the raised central portions 89 of the upper plates 84 pass over the top of pins 50. Thus, at all but the dispensing station rotation of members 33 is prevented which, in turn, acts through rods 30 to prevent opening of the gates at other than the selected station.

The function of member 53 which contains the cut out sections 54 is best understood by considering what could happen if member 53 were removed. A customer could insert a coin and withdraw a bottle from a shelf, holding the gate in the open position. Then, by pulling firmly on a bottle situated on a lower shelf, enough force could be exerted against plate 84 in the mechanism to prevent spring 56 from raising the lower portion of member 53 which contains the locking shoulders. Consequently the lock-out mechanism would be held in the lowered position and the open gate could be closed allowing another bottle to enter the vend position from which it could be withdrawn and this process could be repeated.

Cut away sections 54 of member 53 prevent this by insuring that member 53 will be raised and therefore locked against downward movement whenever a gate 28, 29, etc. is reclosed after opening. As can be seen from the drawings, in removing a bottle, member 33 rotates causing pin 49 to push down on plate 84 which in turn pulls member 53 down which includes the shoulder 55 formed as part of cut out 54. Shoulder 55 is pulled down immediately above pin 49 and therefore member 33 cannot be rotated back to normal position without at the same time lifting member 53 causing latch 67 to engage the locking shoulders.

After the selected bottle has been withdrawn gate 28 is returned by its spring 36 toward closed position and pins 49 and 50 of the corresponding member 33 rotate in a clockwise direction permitting all of plates 84 therebeneath to be raised by action of spring 56 together with plate 53 and all plates 84 thereabove to be lowered by the force of gravity. Latch 67, which was moved by cam surface 59 and spring 68 to the position shown in Fig. 5 during the downward movement of plate 53, drops progressively into notch 60 and then into notch 61 as plate 53 is raised to prevent any of the gates 28 and 29 from being opened. By the time pins 49 other than pin 49 at the dispensing station have been cleared by surfaces 90 latch 67 is engaged in notch 60 so that plate 53 cannot be moved downwardly and all of the gates at the dispensing stations are locked against rotation.

As noted above solenoid 76 is energized by the customer placing a coin in the dispensing mechanism through any suitable and well known circuit such as that shown in Fig. 8. In the circuit of Fig. 8 wires 95 and 96 lead from any suitable source of current, conventionally 115 volt 60 cycle current, to one side of coin switch 97 and to the other side of coin switch 97 through the solenoid 76 respectively. A suitable switch 98 actuated by the movement of latch 67, as best seen in Fig. 3, closes the circuit to purchase lamp 99 to cause lamp 99 to glow when the coin switch 97 has been closed and solenoid 76 has shifted latch 67 to place the machine in condition for dispensing. The circuit in Fig. 8 includes a reject magnet 100 and a correct change lamp 101 all wired in the circuit in well known and conventional manner.

When the customer deposits a coin in the mechanism and the coin is accepted, coin switch 97 is closed momentarily in known manner and solenoid 76 is energized momentarily to shift latch 67 to position to permit the dispensing cycle to begin and to close switch 98 to illuminate lamp 99 to advise the customer that the mechanism is in dispensing condition. Thereafter the customer withdraws the selected bottle and the mechanism operates in the manner above-described to prevent withdrawal of more than one bottle for a cycle of operation of the machine.

It should now be apparent that the present invention in every way satisfies the several objectives described above.

Changes in or modifications to the above-described illustrative embodiment of this invention may now be suggested to those skilled in the art without departing from the present inventive concept. Reference should therefore be had to the appended claims to cover the scope of this invention.

What is claimed is:

1. In a vending machine having a reciprocal lockout mechanism, a plate mounted for reciprocating movement forming a portion of said mechanism, at least one latching shoulder formed within said plate, a cam surface formed within said plate opposite said shoulder, a spring-loaded over-the-center latch mounted between said shoulder and said cam surface and in one extreme position engaging said shoulder and locking said plate against movement and in the other extreme position engaging said surface for return to said first named extreme position on downward movement of said plate, resilient means urging said plate upwardly and means for moving said latch from shoulder engaging position to cam surface engaging position.

2. A vending machine as described in claim 1 in which said means for moving said latch includes a member movable at right angles to the direction of motion of said plate from an at rest position to engage one side only of said latch and means carried by said plate and engaging said member preventing movement of said plate when said member is out of its at rest position.

3. A vending machine as described in claim 2 including resilient means urging said member toward its at rest position and solenoid means having a sliding armature connected to said member which upon energization moves said member from its at rest position.

4. In a superimposed vending machine including a vertical series of article supports, a gate for each support normally blocking removal of articles from the support and a lock-out mechanism common to the gates, a U-shaped channel, opposed arcuate slots in the base of said channel adjacent each support, an element for each support rotated by opening of the adjacent gate, a pair of studs carried by each element each extending through an adjacent arcuate slot and normally lying in the long axis of said channel, a plate mounted for movement in said channel, resilient means urging said plate in one direction, latch means cooperating with at least one latch shoulder within said plate normally preventing movement of said plate in the other direction, a recess in said plate adjacent each support normally permitting rotation of said studs in said arcuate slots, a shoulder in each recess engaged by one of said studs on movement of said plate against said resilient means preventing rotation of said studs and of said gates, a stack of vertically reciprocal plates one for each support mounted in said channel over said first plate, each plate of said stack of plates being channeled for free movement over said studs when said studs are in the long axis of said channel, a surface on each plate of said stack of plates engageable by an adjacent stud when said plates are moved preventing rotation of said studs and of the adjacent gate and a surface on each plate of said stack of plates engageable by rotation of an adjacent stud when an adjacent gate is opened to remove an article moving all the plates of said stack of plates therebelow and said first plate downwardly and moving the plates of said stack of plates thereabove upwardly.

5. A machine as described in claim 4 including solenoid means for shifting said latch means from said shoulder and a cam surface within said first plate returning said latch toward shoulder engaging position upon downward movement of said plate.

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