Dec. 11, 1956 H. SWEDE 2,773,580

VENDING MACHINES

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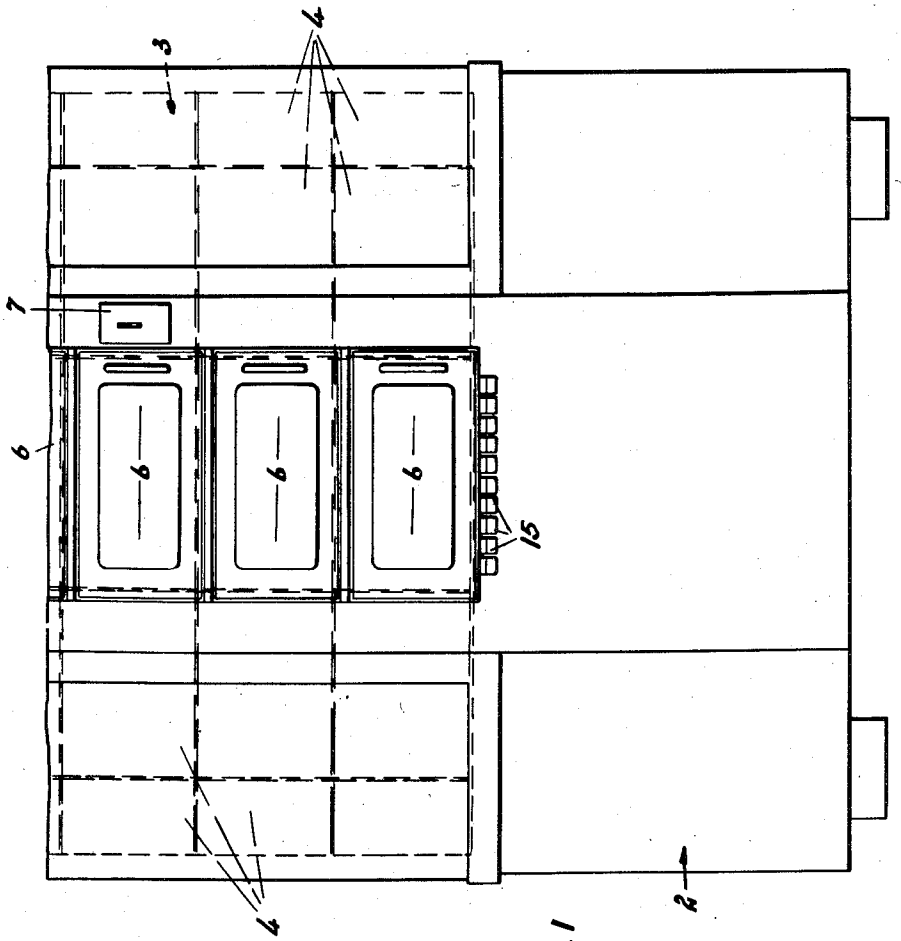


FIG. 1

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VENDING MACHINES

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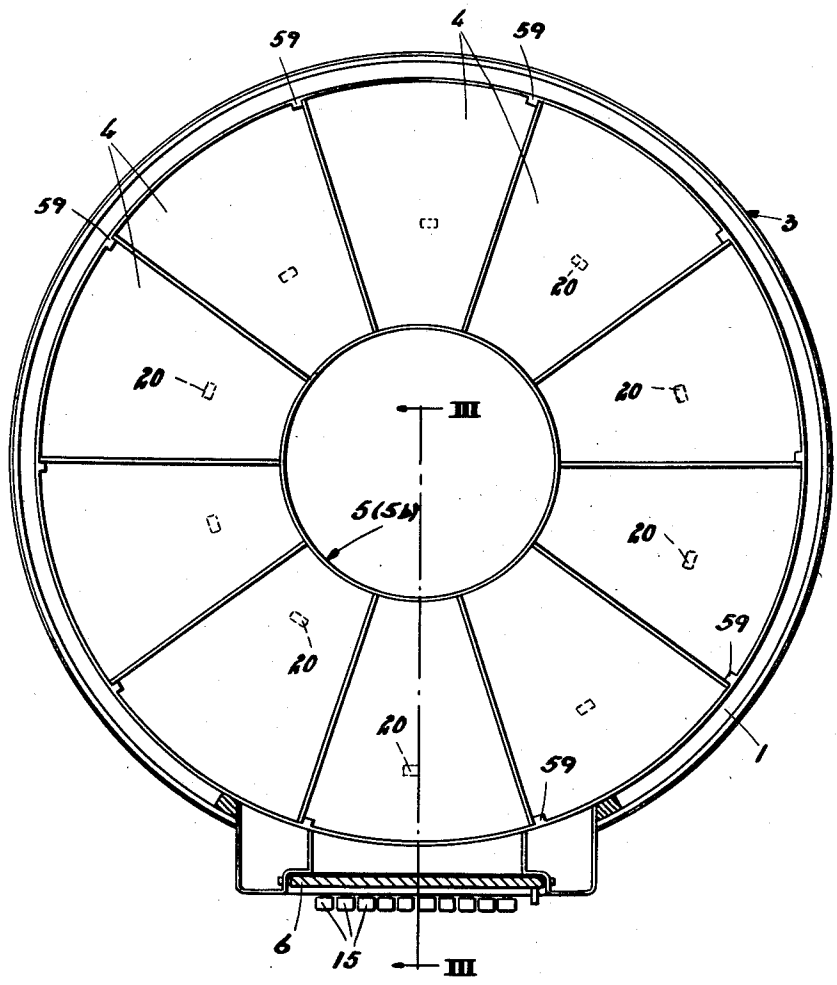


FIG. 2

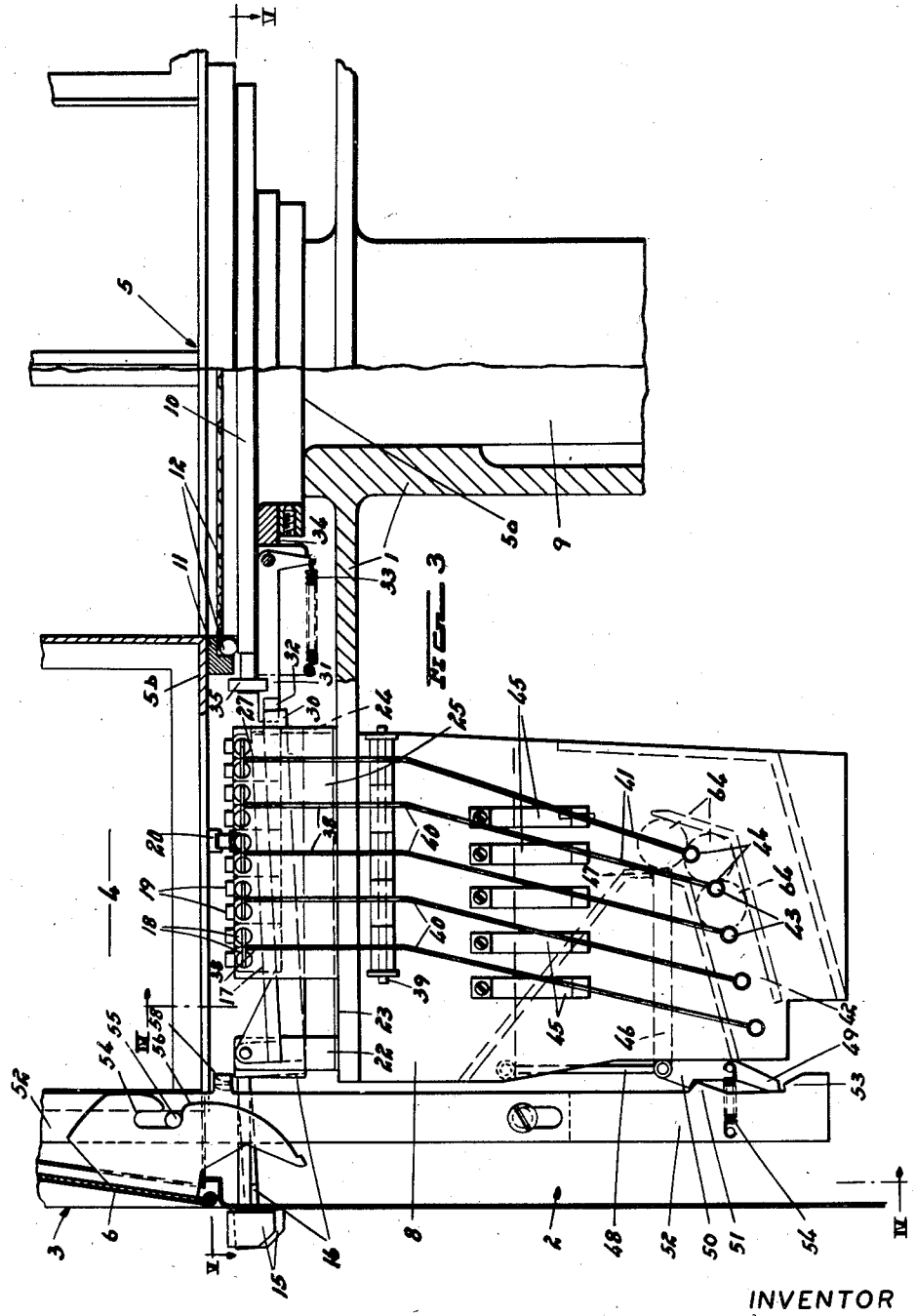
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VENDING MACHINES

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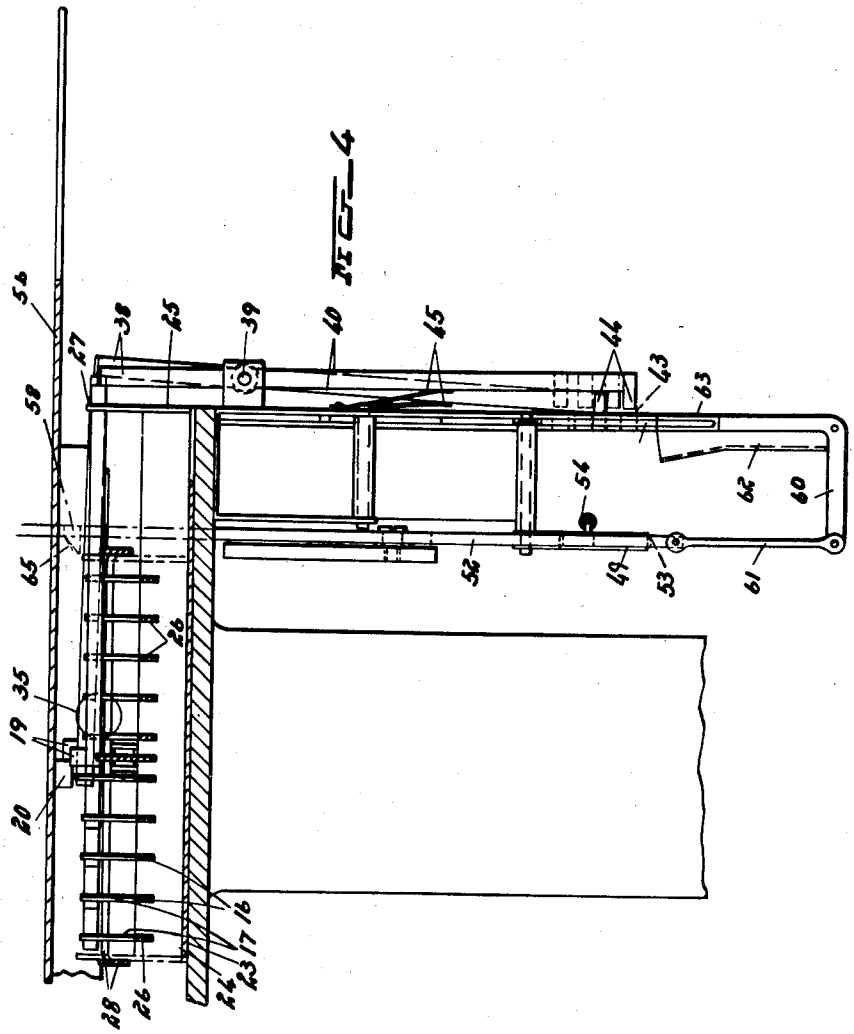
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VENDING MACHINES

Filed Jan. 28, 1954 5 Sheets-Sheet 4

FIG. 4



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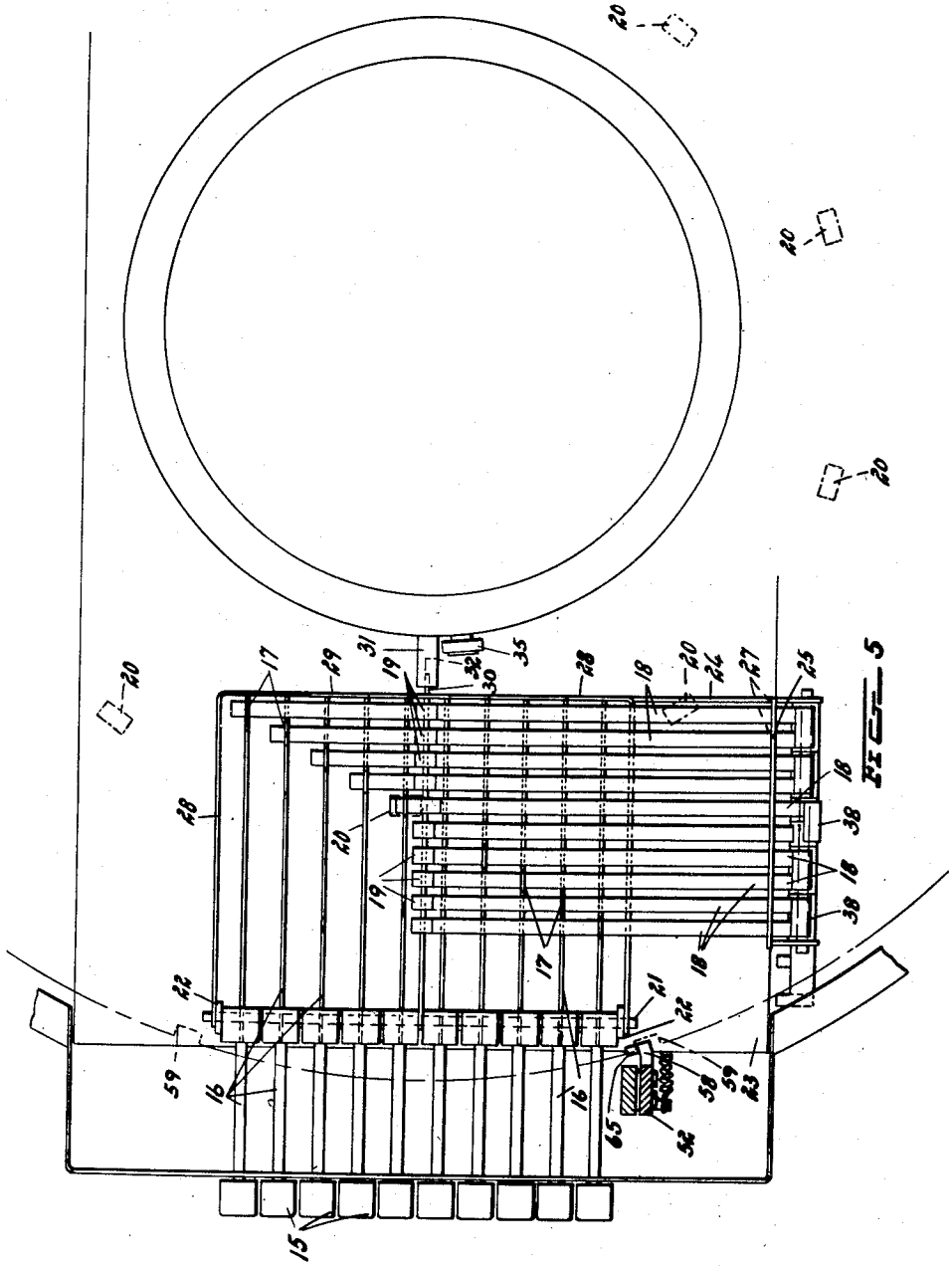


FIG. 5

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VENDING MACHINES

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Claims priority, application Sweden January 30, 1953

6 Claims. (Cl. 194—54)

This invention relates to a vending machine that may be used for all kinds of merchandise suitable for automatic retailing.

An embodiment of the invention chosen by way of example will be described in detail in the following, reference being had to the accompanying drawings, in which:

Figs. 1 and 2 are a diagrammatic side elevation and a horizontal section, respectively, of the vending machine, part of the upper portion thereof being broken away for greater clarity.

Fig. 3 is a section on line III—III of Fig. 2.

Fig. 4 is a section on line IV—IV of Fig. 3.

Fig. 5 is a section on line V—V of Fig. 3.

In the drawings, 1 designates a frame including a closed lower portion 2 for a release mechanism to be described in the following and other mechanisms necessary for the operation of the vending machine, and an upper portion 3 which has a casing of transparent material in order that merchandise disposed in the compartments 4 provided in said portion 3 for such merchandise may be seen from all sides of the vending machine. The compartments 4 are disposed in both vertical and horizontal rows around the periphery of a roundabout 5 which is drivably mounted in the vending machine. In order that the merchandise may be inserted in and removed from the compartments 4, a row of doors 6 is arranged in removal apertures provided in the upper portion 3 of the frame along a generatrix of the vending machine casing. Adjacent the doors 6 the vending machine has a coin slot 7 leading to a coin operated mechanism 8 (only partly shown) common to all merchandise compartments 4.

The roundabout 5 is composed of a continuously drivable lower portion 5*a* and an upper portion 5*b* carrying the merchandise compartments 4 and so connected with said lower portion 5*a* that the upper portion 5*b* can be stopped in a manner to be described in the following while the portion 5*a* continues to rotate. The lower roundabout portion 5*a* which may be driven in any desired manner comprises a vertical shaft 9 (Fig. 3) which is rotatably mounted in the frame 1 and carries or is formed with a supporting and bearing member 10 at its upper end. Bearing balls 12 are disposed between said supporting and bearing member 10 and a bearing annulus 11 at the upper roundabout portion 5*b*. The friction between the supporting and bearing member 10 and the bearing annulus 11 through the balls 12 is as a rule sufficient to have the upper roundabout portion 5*b* partake in the rotation of the lower roundabout portion 5*a*. But to ensure that the portion 5*b* be taken along in the rotation of the portion 5*a* under any circumstances, an adjustable friction clutch of any desired type can be provided between the roundabout portions 5*a* and 5*b*.

To permit removal of merchandise through any one of the removal apertures (closed by means of a door 6) from the respective compartment 4 in the portion 5*b*, as well as operation of the coin mechanism 8, a release

mechanism to be described in the following is adapted to be used. Beneath the lowermost door 6 keys 15 are arranged in a number, in the present instance ten, that corresponds to the vertical rows of compartments 4. Each key 15 carries a figure, letter or other mark which corresponds to a similar mark on the respective vertical compartment row for which it is intended. The keys 15 are disposed on the ends, projecting from the casing of the upper vending machine portion 3, of rocking arms 16 which are mounted for vertical swinging movement in the frame 1 of the vending machine. Each of said rocking arms 16 has on its portion projecting into the vending machine an upwardly directed connection piece 17 with holes for a rod 18 which is pivotally connected with the arm 16 and is somewhat swingable and longitudinally displaceable. Each rod 18 has an upwardly directed projection forming a stop 19. Said stops are located along a line which is radial with respect to the roundabout 5, whereby they will be situated at varying distances from the axis of rotation of the roundabout 5 for cooperation with downwardly directed abutments 20 which are mounted at radially different distances at the underside of the roundabout portion 5*b* and are distributed over the entire area of said portion. Each abutment 20 is disposed below the respective vertical compartment row whereby depression of a certain determined key results in the stopping of the roundabout portion 5*b* with a certain determined vertical compartment row facing the doors 6. On depression of the keys 15 which are swingable through equally great angular movements the stops 19 are lifted equally high in spite of the large differences in length of the arms 16 and rods 18, this because of the fact that the engagement means formed by the connection pieces 17 for the arms 16 and rods 18 are arranged along a line that intersects the angle formed by the axes of rotation of the arms 16 and rods 18, whereby the longest arm 16 will engage with the longest rod 18 and the longest but one arm 16 will engage with the longest but one rod 18 etc., and that the stops 19 and the rods 18 are disposed at the same distance from the common swinging axis of said rods, whereby an adjustment is obtained with equal lifting height of the stops 19 on actuation. For practical reasons the stops 19 are arranged along a line parallel to the arms 16, which line divides the arms 16 into two groups. Nothing prevents, however, the stops from being arranged along a line parallel to and outside some of the outermost arms 16 or anywhere between said arms. The key arms 16 are mounted on a bar 21 which is in turn mounted in upstanding lugs 22 provided on a plate 23 which is secured to the vending machine frame 1 and has on one hand an upwardly directed flange 24 parallel to the bar 21 and on the other another upwardly directed flange 25 making an angle with the bar 21. The flange 24 is provided with a number of recesses 26 for the free ends of the arms 16 which project into the vending machine. The arms 16 have been given a certain lateral pretension, whereby they frictionally bear against either side of portions of the flange 24 which define the respective recess 26, so that after actuation the arms 16 will remain in such a position that the respective stop 19 is held lifted until it is restored into initial position, as will be described more in detail in the following. The flange 25 is provided with a number of holes 27 for the rods 18. The holes 27 are somewhat larger than the diameter of the respective rod 18 whereby a certain clearance is obtained which will permit swinging and displacement of the rod. A U-shaped member 28 is mounted on the bar 21. Its web 29 bears against the upper side of the arms 16 and is provided with a pin 30 which is directed towards the axis of rotation of the roundabout 5 and is preferably formed by the end, extending beyond the web 29, of an

arm mounted on the bar **21** and connected with the web **29** and thus with the U-shaped member **28**. The pin **30** is adapted to be actuated by an arm **31** which is provided with a recess **32** for the pin **30** at its end directed towards the pin. The arm **31** is mounted for swinging against the action of a spring **33** on a ring **34** which is so mounted on the shaft **9** that, like the roundabout portion *5b*, it will be frictionally carried along in the movement of the continuously rotatable roundabout portion *5a*, but can be stopped when the arm **31** engages with the pin **30**, without the rotation of the shaft and thus of the roundabout portion *5a* being thereby prevented. The roundabout portion *5b* and the ring **34** are mounted on the shaft independently of each other so that a stopping of the ring **34** does not result in a stopping of the roundabout portion *5b* or vice versa. Projecting from the supporting and bearing disc **10** of the shaft **9** is an abutment **35** preferably in the form of a pin secured to the disc **10** and a ring mounted on said pin. Said abutment **35** is normally situated immediately ahead of the arm **31** (as seen in the direction of rotation of the roundabout **5**) and as it is mounted on the continuously rotating roundabout portion *5a*, it rotates continuously about the axis of rotation thereof, all for a purpose that will be apparent from the following.

The ends, projecting from the flange **25**, of the somewhat swingable and longitudinally displaceable rods **18** are adapted to act upon the one ends **38** of rocking arms **40** which are mounted on the exterior of the casing of the coin mechanism **8** by means of a rod **39** secured to the casing. Each of said arms **40** supports on its other end **41** a pin **44** insertable through holes **43**, provided in the coin mechanism casing, in a coin channel **42** which is arranged in the coin mechanism **8**. In the embodiment shown in the drawings the ends **38** of the rocking arms **40** are of T-shape, whereby the respective rocking arm **40** can be actuated by two adjacent rods **18**. As will appear without further from the following, the ends **38** of the rocking arms **40** can however be so formed that each rocking arm can be actuated by an optional number of rods **18**, whereby it will be possible to dispose and divide the compartments **4** with due consideration of the space necessary in each single case for a certain article or for articles in a certain price class. The pins **44** which are insertable in the coin channel **42** limit the insertion in the coin channel of a definite number of coins for each pin **44** and of one and the same predetermined value, thus making possible insertion in the merchandise compartments **4** and selling in the vending machine of merchandise of varying prices. The outermost right-hand rocking arm **40** (Fig. 3), whose pin **44** is insertable in the coin channel on rocking of the arm and only permits introduction of one coin into the coin channel, permits selling of an article of a value corresponding to the coin in the two vertical compartment rows in the roundabout portion *5b*, the abutments **20** of which compartment rows cooperate with the stops **19** which are disposed on the rods **18** actuating said rocking arm. On insertion of the pin **44** mounted on the outermost left-hand rocking arm **40** in the coin channel, five coins of a certain value can be introduced into the coin channel, thus permitting selling of articles of a value corresponding to said five coins in the vertical compartment rows of the roundabout portion *5b*, which rows actuate said rocking arm through the rods **18** cooperating therewith, the stops **19** and the abutments **20**. The pins **44** may have any form whatever. For instance they may have the form of plates or the like insertable in the coin channel **42**. The point of insertion of the pins and thus their position in the coin channel **42** can of course also be varied, thus making possible introduction of coins of different values, e. g. a half dollar and a quarter dollar piece. In the last-mentioned case a coin slot and sorting means for each value must of course be arranged. The rocking

arms **40** are adapted to be restored into initial position by springs **45**.

A longitudinally movable rod **46** is mounted in the coin mechanism **8** above the coin channel **42** and reaches with its one end the obliquely upwardly directed end of the coin channel **42**. Said rod rests in a hole **47** provided in the wall of said coin channel. Normally, the free end surface of the rod **46** is coplanar with the wall of the coin channel **42**. The other end of the rod **46** (Fig. 3) is pivotally connected on one hand with one end of an arm **48** or the like pivotally mounted in the coin mechanism **8**, and on the other hand with a pawl **49** which has a cam **50** for cooperation with another cam **51** on a vertical, longitudinally movable bar **52** which at its lower end has a tooth **53** for engaging with the pawl **49** which is held in bearing engagement with the bar **52** by means of a spring **54** interposed between said bar **52** and the pawl **49**. The bar **52** extends along and rearwardly of the doors **6** and presents at each door a pin **55** which on opening of the door **6** is adapted to be actuated by a cam means **56** secured to the door and having in addition a slot **57** for the pin for a purpose to be described more in detail in the following. The bar **52** has a projection **58** which is adapted, upon displacement of the rod, to be engaged with and disengaged from the roundabout portion *5b* which for this purpose has a recess **59** (Fig. 5) at each vertical compartment row in order to lock the roundabout portion *5b* against rotation when an article is removed from a compartment **4**. In Fig. 4 the bar **52** is shown connected by means of a link **61** with a bell crank lever **60** pivotally mounted in the frame **1** of the vending machine. On its vertical limb the bell crank lever **60** has a piece forming the coin channels **62** and **63** for a purpose to be described in the following.

The function of the vending machine will now be described. When a customer has decided to buy a certain article in one of the compartments **4** of the roundabout **5** which is continuously rotating with both portions *5a* and *5b*, he depresses that of the keys **15** whose mark corresponds to that vertical compartment row, in one of the compartments in which the article is located. The stop **19** disposed on the key arm **16** is thereby lifted and retained in its lifted position by the arm **16** frictionally bearing—as earlier mentioned—against the flange **24** in the recess **26**. On depression of the key **15**, which results in the end of the arm **16** projecting into the vending machine being moved upwardly, said end actuates and swings the U-shaped member **28**, lifting the pin **30** projecting from said member upwardly into operative position. The roundabout **5** is still rotating and continues to rotate until the abutment **20** disposed at the respective compartment **4** and projecting from the roundabout portion *5b* comes into bearing contact with the stop **19**. The roundabout portion *5b* is now prevented from rotating, whereas the continuous rotation of the roundabout portion *5a* and the ring **34** with the arm **31** still continues. The vertical compartment row, in one of the compartments **4** of which the article desired by the customer is located, has stopped opposite the row of doors provided in the casing of the vending machine. The ring **34** is taken along in the continued rotation of the roundabout portion *5a* until the arm **31**, pivotally mounted on the ring **34**, comes into contact with the pin **30** projecting from the U-shaped member **28** and locks the ring **34** against rotation. The parts now occupy the positions shown in Fig. 3, and it should be observed that the abutment **35** of the roundabout portion *5a* is situated immediately ahead of the arm **31** as seen in the direction of rotation of the roundabout **5** and continues to move as does the roundabout. The abutment **35** has thus to make one revolution before it actuates the arm **31** in the manner described hereinafter and as a result thereof restores the parts of the mechanism to their initial positions.

When the abutment 20 is moved into engagement with the lifted stop 19 the rod 18 carrying said stop 19 is acted upon and displaced in its longitudinal direction and thereby rocks the rocking arm 40 against the action of the spring 45, the pin 44 disposed on said rocking arm being introduced into the coin channel 42 and limiting the number of coins which can be inserted in the coin channel 42, in the present instance three coins 64. When the contemplated number of coins has been inserted in the coin channel 42 the door 6 is actuated. The uppermost one of the coins 64 inserted in the coin channel 42 being situated opposite the end surface of the rod 46, said rod is prevented from moving longitudinally whereby the pawl 49 pivotally mounted on the rod will be swung, by the cam 50 on the pawl 49 cooperating with the cam 51 on the rod 52 upon displacement of the latter when the door 6 is swung, outwardly so far away from the bar 52 that the pawl 49 does not reach, and cannot engage with, the tooth 53 on the bar 52 to block the latter against displacement. In the contrary case, i. e. if no, or too small a number of, coins 64 have been inserted in the coin channel 42 the cooperating cam surfaces 50 and 51 will actuate the pawl, thus displacing the rod 46 whereby the pawl 49 is moved into engagement with the tooth 53 and prevents moving of the bar 52 and thus swinging of the door 6.

When the door 6 is swung outwards for the removal of the article from the compartment 4, the cam means 56 of said door 6 acts upon the pin 55 of the bar 52 so that said bar is longitudinally displaced and the other pins 55 on the bar 52 enter the slots 57 in the other doors 6 whereby the latter are locked, and the projection 58 provided on the bar 52 enters the recess 59 and thereby locks the roundabout portion 5*b* against rotation. The projection 58 is formed with an oblique surface 65 whereby the roundabout portion, when said projection 58 enters the recess 59, is rotated somewhat rearwardly, i. e. in the direction opposite to the one in which the roundabout is normally rotating, whereby the abutment 20 is moved out of engagement with the stop 19, so that the rocking arm 40, actuated by the spring 45 is rocked and the rod 18 is displaced and the pin 44 is moved out of the coin channel 42 releasing the coins inserted in the coin channel so that they fall into a collecting receptacle (not shown in detail). On opening of the respective door 6 the member forming the coin channels 62 and 63 and connected to the bar 52 and thus to the door 6 and pivotally mounted opposite the lower end of the coin channel 42, opens up communication between the coin channel 42 and the collecting receptacle, but beforehand it passes the coins—if they are released—to the return opening on the exterior of the vending machine. After the door 6 has been shut the roundabout portion 5*b* is still locked against rotation because of the abutment 20 engaging the stop 19. Since the coins 64 have fallen into the collecting receptacle, the coin channel 42 is free from coins whereby the pawl 49 described above can come into operation and prevent the shut door 6 from being opened again. The continuously rotating roundabout portion 5*a* continues to move and the abutment 35 takes part in this movement. When said abutment 35 passes the arm 31 locked by the pin 30, it presses said arm downwardly against the action of the spring 33 whereby the arm 31 actuates the pin 30 and swings the U-shaped member 28 carrying said pin downwardly in initial position simultaneously as said U-shaped member in turn restores the arm 16 and thus the key 15, the rod 18 and the stop 19 carried thereby in their initial positions. The roundabout portion 5*b* is now free again and is taken along in the rotation of the roundabout portion 5*a* until the vending machine as described in the foregoing is again operated for vending by depression of any of the keys 15. The keys 15 may of course be depressed out of mischief whereby the roundabout portion 5*b* is caused to stop. However, after a certain time interval the continuously rotating abutment 35 restores, in the above-mentioned manner, the release mechanism of the vending machine in initial position and permits the roundabout portion 5*b* to continue its interrupted rotation by being again taken along by the roundabout portion 5*a*.

The coin mechanism 8 is provided with coin sorting means which are known in and per se and which are therefore not described in detail. In addition, it has means (not described in detail) for returning coins inserted in the coin mechanism to the customer if they have not been inserted in the intended manner or in the number necessary for permitting an article located in a determined compartment to be removed from the vending machine.

It will be evident without further that the described vending machine can be structurally modified to a great extent both as a whole and as far as details are concerned. The pins 44 insertable in the coin channel can thus be operated by electric pulses on depression of the keys 15, without departing from the spirit of the invention. The arms 16 and thus the stops 19 can be adapted to be retained in their lifted position by other means than those shown in the drawings and described above.

Further modifications are conceivable within the scope of the inventive idea such as it is defined in the appendant claims.

What I claim and desire to secure by Letters Patent is:

1. In a vending machine a roundabout adapted to hold merchandise in vertical rows and horizontal tiers, a vertical drive shaft for driving said roundabout and adapted to move continuously, means for stopping said roundabout, bearing balls supporting said roundabout on said vertical drive shaft, a coin mechanism, rod means in said stop means corresponding in number to the vertical rows of merchandise mounted for swinging movement in vertical direction and lengthwise movement tangentially to said roundabout, ear means arranged in pairs at different distances from the axis of said roundabout, one of said ear means in each of said pair of ear means being mounted on one of said rod means, the other one of said ear means in each of said pair of ear means being mounted on said roundabout and in register with one of the vertical rows of merchandise, manually operable levers acting on said rod means in vertical direction, a key on an outer end of each of said manually operable levers, and biased levers between said rod means and said coin mechanism transferring the lengthwise movement exerted on said rod means by said roundabout before a standstill for changing said coin mechanism.

2. In a vending machine a roundabout adapted to hold merchandise in vertical rows and horizontal tiers, a vertical drive shaft for driving said roundabout and adapted to move continuously, means for stopping said roundabout, bearing balls supporting said roundabout on said vertical drive shaft, a coin mechanism, a rod means in said stop means corresponding in number to the vertical rows of merchandise mounted for swinging movement in vertical direction and lengthwise movement tangentially to said roundabout, coin channel in said coin mechanism, biased levers between said rod means and said coin mechanism, one end of each of said transferring levers being actuated by one of said rod means, a pin on the other end of each of said transferring levers, said pins being movable into said coin channel on different points thereof for limiting the number of coins insertable in said coin mechanism.

3. In a vending machine a roundabout adapted to hold merchandise in vertical rows and horizontal tiers, a vertical drive shaft for driving said roundabout and adapted to move continuously, means for stopping said roundabout, bearing balls supporting said roundabout on said vertical drive shaft, a casing surrounding said roundabout and supporting said vertical drive shaft and said stopping means, said stopping means including rod means corresponding in number to the vertical rows of merchandise and mounted for swinging movement in vertical direction and lengthwise movement tangentially to said

roundabout, manually operable levers acting on said rod means in vertical direction, slots in said casing, said levers biased in lateral direction being arranged in said slots for staying in rod actuating condition.

4. In a vending machine a roundabout adapted to hold merchandise in vertical rows and horizontal tiers, a vertical drive shaft for driving said roundabout and adapted to move continuously, means for stopping said roundabout, bearing balls supporting said roundabout on said vertical drive shaft, a casing surrounding said roundabout and supporting said driving means and said stop means, said stop means including rod means corresponding in number to the vertical rows of merchandise and mounted for swinging movement in vertical direction and lengthwise movement tangentially to said roundabout, ear means arranged in pairs at different distances from the axis of said roundabout, one of said ear means in each of said pair of ear means being mounted on said rod means, the other one of said ear means in each of said pair of ear means being mounted on said roundabout and in register with one of the vertical rows of merchandise, manually operated levers acting on said rod means in vertical direction, slots in said casing, said levers biased in lateral direction being arranged in said slots for staying in rod actuating condition, means for restoring said levers, said restoring means including a bow swingably mounted in the casing for action on said levers, and an abutment acting on said bow and adapted to be rotated by the continuously driveable shaft.

5. In a vending machine a roundabout adapted to hold merchandise in vertical rows and horizontal tiers, a vertical drive shaft for driving said roundabout and adapted to move continuously, means for stopping said roundabout, bearing balls supporting said roundabout on said vertical drive shaft, a casing surrounding said roundabout and supporting said driving means and said stopping means, said stop means including rod means corresponding in number to the vertical rows of merchandise mounted for swinging movement in vertical direction and lengthwise movement tangentially to said roundabout, ear means arranged in pairs at different distances from the axis of said roundabout, one of said ear means in each of said pair of ear means being mounted on said rod means, the other one of said ear means in each of said pair of ear means being mounted on said roundabout and in register with one of the vertical rows of merchandise, manually operated levers acting on said rod means in vertical direction, slots in said casing, said levers biased in lateral direction being arranged in said slots for staying in rod actuating condition, means for restoring said levers, said restoring means including a bow swingably mounted in the casing for action on said levers, an abutment acting on said bow, a pin on said bow, a biased lever acting on said pin, a ring on said continuously drivable shaft, a bearing means for supporting said ring on said continuously drivable shaft, and an abutment on said shaft acting on said lever.

6. In a vending machine a roundabout adapted to hold merchandise in vertical rows and horizontal tiers, a vertical drive shaft for driving said roundabout and adapted to move continuously, means for stopping said roundabout, bearing balls supporting said roundabout on said vertical drive shaft, a coin mechanism, said stop means including rod means corresponding in number to the vertical rows of merchandise mounted for swinging movement in vertical direction and lengthwise movement tangentially to said roundabout, biased levers between said rod means and said coin means and said coin mechanism transferring the lengthwise movement exerted on said rod means by said roundabout for changing said coin mechanism, said rod means being arranged in pairs acting on one of said biased levers between said rod means and said coin mechanism.

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