

[54] **TICKET VENDING MACHINE**

1,719,497 7/1929 Bell..... 194/DIG. 9

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[57] **ABSTRACT**

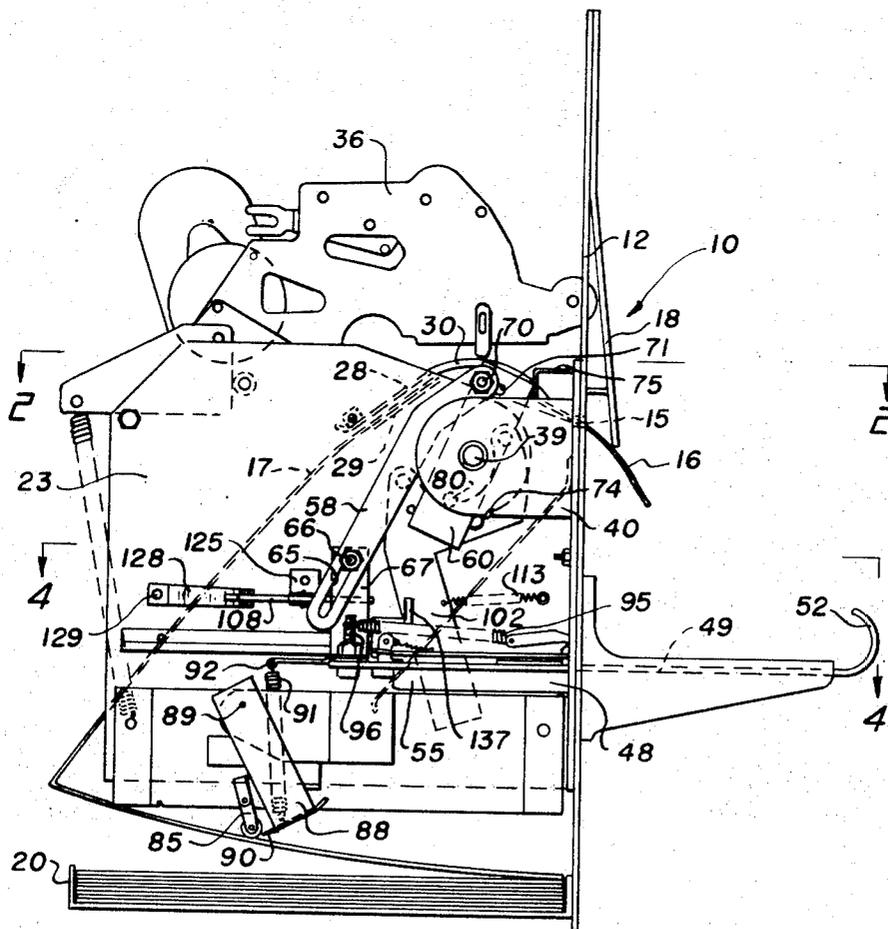
[52] **U.S. Cl.**..... 194/2  
 [51] **Int. Cl.**..... B65h 17/00  
 [58] **Field of Search**..... 194/2, DIG. 9, DIG. 8, 194/10

A coin-released vending machine for tickets having means for dispensing a ticket each time the machine is operated, means for preventing more than one ticket from being dispensed during each operation, and means for preventing a ticket from being drawn out of the machine if it is not released by the desired coin or coins.

[56] **References Cited**  
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**21 Claims, 11 Drawing Figures**



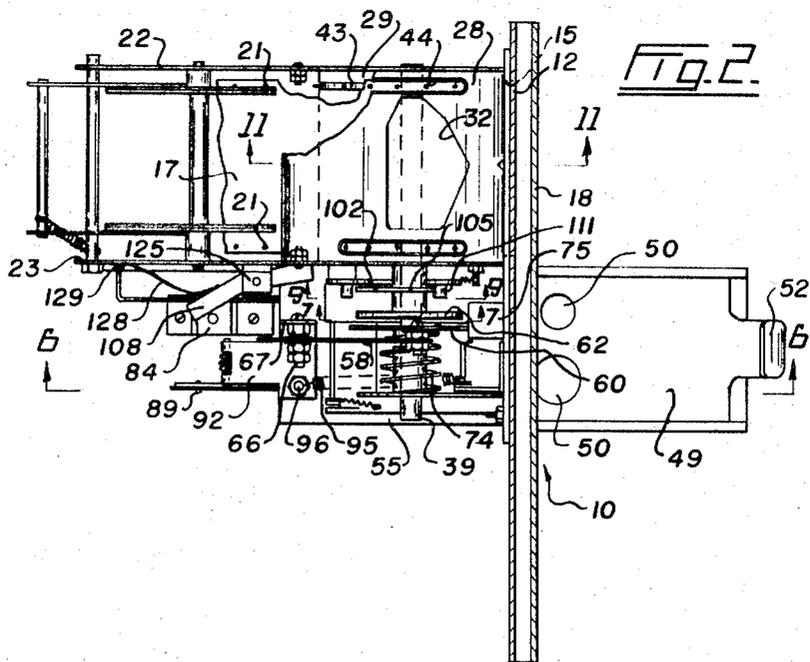
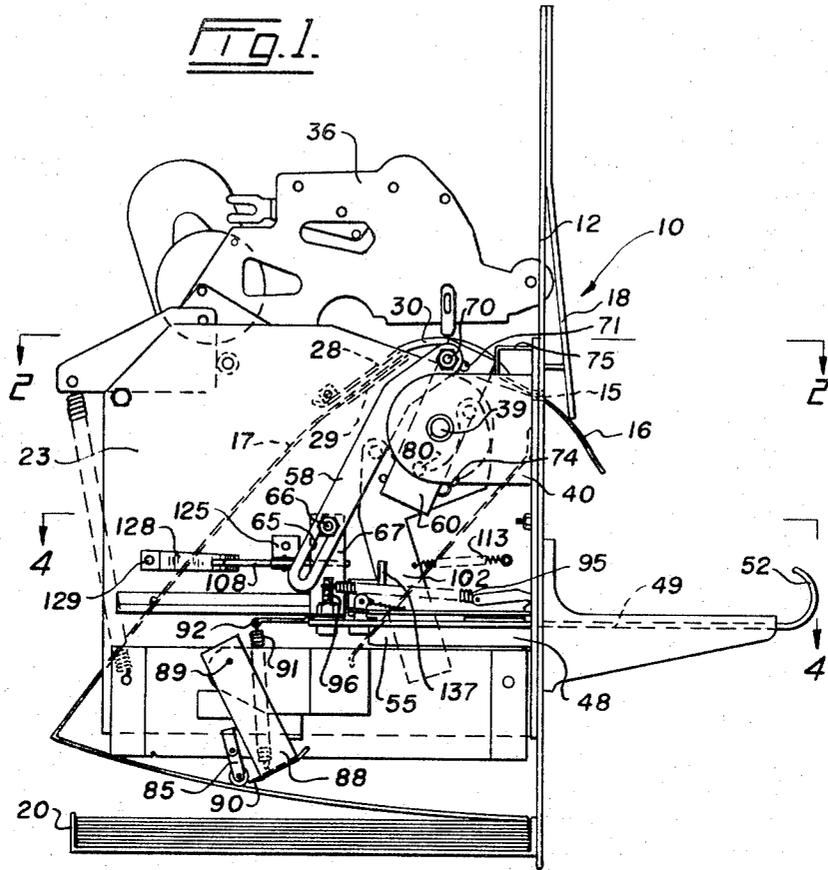


Fig. 3.

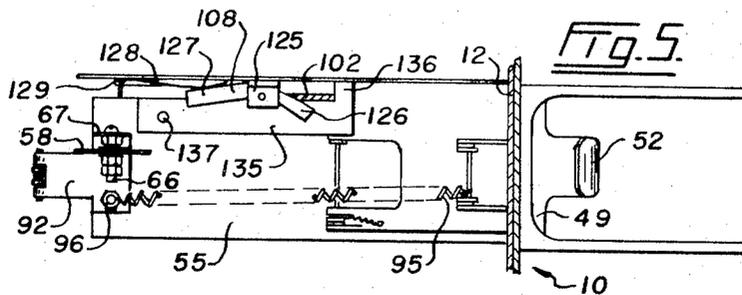
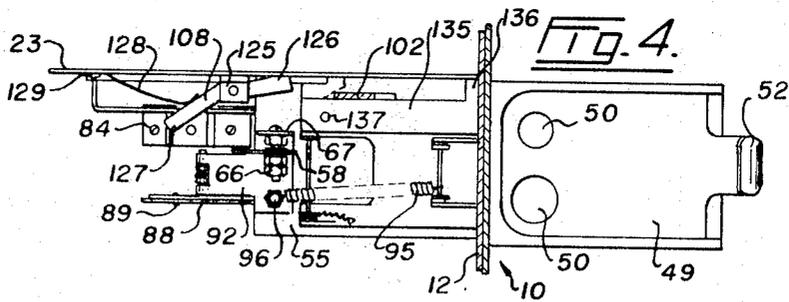
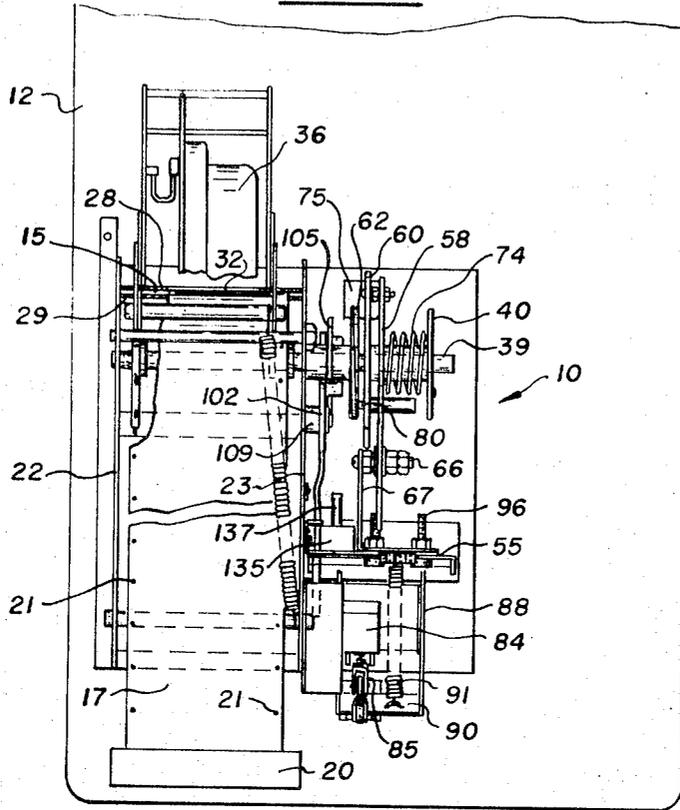


Fig. 6.

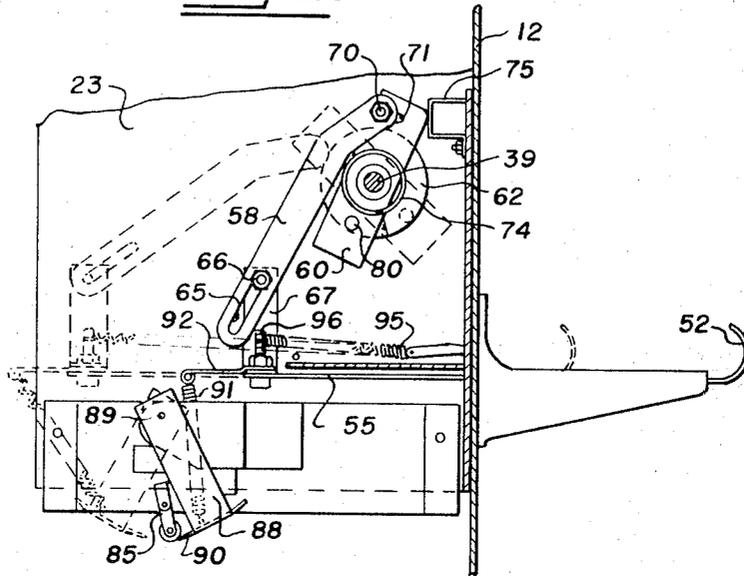


Fig. 7.

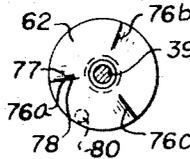


Fig. 8.

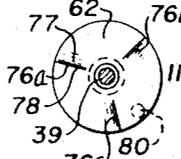


Fig. 9.

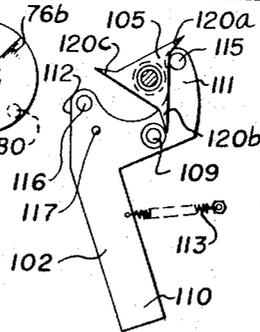


Fig. 10.

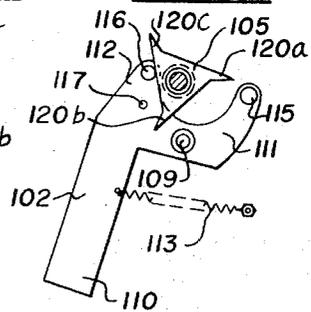
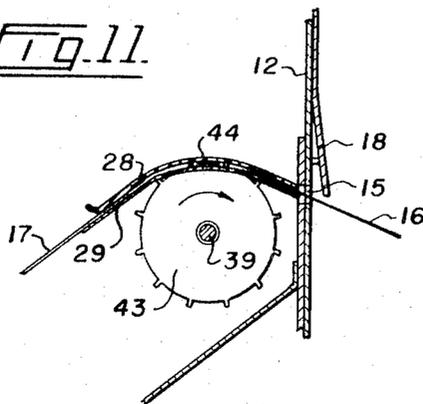


Fig. 11.



## TICKET VENDING MACHINE

This invention relates to a coin-released machine for vending tickets, and particularly parking tickets, one at a time.

Although this machine may be used for dispensing any desired kind of ticket, it is particularly designed for parking tickets, and it is, for the sake of convenience, described herein in connection with this type of ticket.

Parking ticket vending machines are employed on parking lots in order to avoid the necessity of keeping full-time employees on the lot. A person entering the parking lot deposits the required coin or coins in the vending machine and gets a parking ticket, which is left in his vehicle where it can be seen to indicate that he has paid the parking fee. A person making periodic checks on the lot can see whether each vehicle has a parking ticket therein.

The prior art includes a number of machines for dispensing parking tickets. However, most of these are comparatively complicated and therefore quite expensive. Some of the simpler machines have the problem that a person if he can insert a flat instrument through a dispensing slot can grip a ticket and pull it out without paying the fee.

A vending machine according to the present invention is of comparatively simple construction, and it includes means for preventing a person from pulling out the next ticket in line for dispensing by means of an instrument inserted into the vending slot. It also includes means for preventing a person from inserting the required coins and then getting out more than one ticket.

The present machine is such that when the required coins are inserted into the coin slide, the latter is shoved inwardly as far as possible to cock the machine. When the slide is moved outwardly towards its normal position, a ticket is moved out of the dispensing slot. If the slide is moved outwardly far enough to enable the next ticket to be drawn out of the machine, the latter cannot be cocked again until the proper coins are inserted into the slide.

A ticket vending machine according to the present invention comprises a freely-mounted dispensing shaft having sprocket means thereon for engaging tickets and sequentially moving these upon rotation of the shaft in a dispensing direction, operating means for intermittently engaging and rotating the shaft, each rotation of the shaft being sufficient to dispense one ticket, latching means for releasably engaging the shaft if the latter is rotated in the dispensing direction by a pull on the ticket to prevent sufficient movement to dispense the ticket, and releasing means operated by said operating means to release the shaft to permit the rotation by said operating means.

A preferred form of vending machine in accordance with this invention is illustrated in the accompanying drawings, in which

FIG. 1 is a side elevation of the ticket vending machine,

FIG. 2 is a horizontal section taken on the line 2—2 of FIG. 1,

FIG. 3 is a view of the inner end of the machine,

FIG. 4 is a horizontal section taken on the line 4—4 of FIG. 1, showing the operating slide in its outer or inoperative position,

FIG. 5 is a view similar to FIG. 4, but with the operating slide in its inner or operating position,

FIG. 6 is a vertical fragmentary section taken on the line 6—6 of FIG. 2,

FIGS. 7 and 8 are sections taken on the line 7—7 of FIG. 2 showing in side elevation an index or ratchet disc in two different positions, the background elements being omitted,

FIG. 9 is a section taken on the line 9—9 of FIG. 2 showing in side elevation only, a control arm and associated cam in the normal positions thereof,

FIG. 10 is a view similar to FIG. 9 showing the arm and cam in different positions, and

FIG. 11 is a sectional view taken substantially on the line 11—11 of FIG. 2.

Referring to the drawings, 10 is a ticket vending machine in accordance with the present invention which is mounted in a cabinet or casing, not shown. The cabinet or casing has been omitted for the sake of clarity, but machine 10 includes a face plate 12 which usually is secured to the housing or casing in such a way that it forms part of the front wall thereof. Plate 12 has a dispensing slot 15 therein which is just large enough to permit a ticket 16 of a ticket web 17 to pass through. A fixed flap 18 is secured at an upper end to the outer surface of plate 12 and extending downwardly over but spaced outwardly from slot 15 to prevent direct access to said slot. Ticket web 17 rests on a tray 20 located below the vending mechanism but within the cabinet or casing thereof. The tickets are connected end to end and are alternately folded in a stack on the tray. The tickets of web 17 have perforations 21 adjacent and extending along opposite edge thereof. A pair of spaced-apart walls 22 and 23 are secured to and extend inwardly from front plate 12. Web 17 extends upwardly from tray 20 between a pair of closely spaced guide plates 28 and 29 which are curved at 30 and extend towards slots 15. Upper plate 28 has a relatively large opening 32 therein at the curved portions 30 thereof.

A standard ticket stamping device 36 is mounted above guide plates 28, 29 and is positioned to stamp a ticket through opening 32 when said stamping device is operated. As this type of stamping device is well known in the trade and does not actually form part of this invention, it will not be further described herein. When it is operated, the device stamps the ticket ready to be dispensed.

A dispensing shaft 39 is freely mounted in suitable bearings in support plates 22 and 23, and extends beyond plate 23 to another vertical wall or support plate 40 mounted on and extending inwardly from face plate 12. A pair of sprockets 43 are fixedly mounted on shaft 39 and project upwardly through a pair of elongated openings 44 in upper guide plate 28, and are positioned to engage the perforations 21 of the ticket web 17 as the latter passes between guide plates 28 and 29. Rotation of shaft 39 and sprockets 44 moves the ticket web to shift a ticket 16 out of the machine through slot 15.

Operating means for the machine includes a standard coin release mechanism 48 mounted on face plate 12 spaced below shaft 39. The coin release mechanism has a slide 49 with one or more coin-receiving holes 50 therein. Slide 49 has a handle 52 at its outer end. Mechanism 48 does not require description herein since it is standard and does not form part of the present invention, but it is such that when the required coins are inserted in holes 50, slide 49 can be moved inwardly, otherwise said slide cannot be shifted inwardly.

An operating slide 55 is secured to or forms part of coin slide 49 and moves with the latter. Slide 55 forms part of operating means for machine 10 and is connected, as described below, to a shaft drive linkage including a pull bar or arm 58, rocker arm 60, and an index or ratchet disc 62 secured on the shaft 39.

Pull bar 58 has an elongated slot 65 near its lower end into which a pin or bolt 66 slidably extends from an upright standard 67 which is fixed to and projects upwardly from operating slide 55. The upper end of bar 58 has a pin or bolt 70 which extends laterally therefrom into a slot 71 in the upper end of rocker arm 60, said arm being freely mounted on shaft 39 substantially midway between the ends of the arm. A spring 74 freely surrounds shaft 39 and is connected at one end to support plate 40 and at its opposite end to rocker arm 60, this spring biasing the arm in a clockwise direction against a stop 75 mounted on plate 12.

Disc 62 has ratchet teeth 76a, 76b and 76c on a face thereof, each of these teeth having an incline 77 leading up to a shoulder 78 which extends substantially normally to the adjacent face of the disc, see FIGS. 7 and 8. A spring-loaded plunger 80 is carried by rocker arm 60 near its lower end, and extends towards disc 62 to engage the face thereof from which teeth 76 project. FIG. 7 shows position of plunger 80 relative to the ratchet teeth of disc 62 when the machine is in the at-rest position, while FIG. 8 shows the disc after it has been rotated a little during cocking of the mechanism and the new position of the plunger.

A micro-switch 84 is mounted on support plate 23 and has a depending operating lever 85 which is normally in the switch-open position. Switch 84 is electrically connected so that when it is closed, stamping device 36 is operated to stamp the date and time on the ticket between guide plates 28 and 29 and which is the next one to be dispensed.

A rocker 88 is mounted on a shaft 89 and hangs downwardly therefrom, said rocker having a foot 90 which is positioned to engage switch lever 85 when the lower end of said rocker is swung inwardly of machine 10. A spring 91 is connected to foot 90 and extends upwardly therefrom and has its opposite end connected to an extension 92 which projects inwardly from the inner end of operating slide 55. When the slide is in its normal inoperative position, spring 91 is substantially vertical and retains rocker 88 in an inclined position, extending towards face plate 12, as shown in FIG. 1. When slide 55 is moved inwardly to shift the upper end of spring 91 inwardly across a toggle line between the lower end of the spring and shaft 89, rocker 88 is suddenly swung inwardly to move lever 85 and operate switch 84. When this takes place, stamping device 36 stamps a ticket waiting to be dispensed. When slide 55 is moved outwardly again, rocker 88 is swung in the same direction to permit switch lever 85 to move to open the switch.

When the required coins are inserted in holes 50 of coin slide 49, the latter and operating slide 55 can be moved inwardly of machine 10. This swings the lower end of pull bar 58 inwardly and draws this bar in the same direction to swing rocker arm 60 about shaft 39 into the position shown in broken line in FIG. 6. This shifts plunger 80 across the face of disc 62 and up over tooth 76c into the position shown in FIG. 8. This cocks the machine. At the same time, the movement of the slide 55 causes stamping device 36 to stamp the ticket

ready to be dispensed, as described above. When the coin slide is drawn outwardly, and this action is assisted by a spring 95 which has one end connected to face plate 12 and its opposite end connected to a bolt 96 projecting upwardly from the inner end of operating slide 55, bar 58 is shifted outwardly and causes rocker arm 60 to swing back to its normal position, spring 74 assisting this action. When this takes place, plunger 80 engages disc tooth 76c to rotate disc 62, and as this disc is fixed to shaft 39, the shaft rotates with it. This rotation turns sprockets 44 to move the ticket 16 engaged thereby out through dispensing slot 15, at which time it can be torn off web 17.

With the arrangement described so far, a person could insert an instrument through slot 15 to grasp the next ticket in line for dispensing and pulling said ticket out of the machine, but suitable latching means is provided for preventing this. This latching means includes a Y-shaped arm 102, cam 105, and stop member 108.

Arm 102 is swingably mounted on a pin 109 projecting laterally from support plate 23, and consists of a downwardly-projecting lever 110 and two upwardly-projecting members 111 and 112. A spring 113 normally biases lever 110 of arm 102 in an anti-clockwise direction towards face plate 12 into a normal at-rest position, as shown in FIGS. 1 and 9. The upper members 111 and 112 of Y-arm 102 have pins 115 and 116, respectively, projecting laterally therefrom into the path of cam 105. Another pin 117 projects laterally from arm 102 just below pin 116.

Cam 105 is fixedly mounted on shaft 39 to rotate therewith. This cam has three projections 120a, 120b and 120c radiating therefrom and spaced 120° apart around the cam circumference. These projections extend into the general plane or path of pins 115, 116 and 117.

Stop member 108 consists of a bent arm pivotally mounted in a bracket 125 projecting from side plate 23, see FIGS. 2, 4 and 5. The stop member arm has a stop end 126 and an opposite inclined end 127 against which an end of a leaf spring 128 bears. This leaf spring is mounted on wall 23 at 129, and it presses inclined end 127 of the stop arm outwardly from the wall so as to normally maintain stop end 126 against said wall, at which time it is in the path of the lower end or lever 110 of arm 102.

The latching means of apparatus 10 normally prevents rotation of shaft 39, and suitable releasing means is provided to disengage the latching means and thereby permit rotation of the shaft. This releasing means includes a release plate 135 mounted on the upper surface of operating slide 55 and extending longitudinally of said slide, see FIGS. 4 and 5. This plate has a finger 136 projecting laterally therefrom so that it can engage arm 102 when the slide is moved inwardly sufficiently to cock the dispensing means. A pin 137 projects upwardly from release plate 135 near the end thereof remote from finger 136, this pin being in line with the inclined end 127 of stop member 108.

FIG. 9 shows arm 102 retained in its normal position by spring 113, at which time pin 115 is against projection 120a of cam 105 so that the latter cannot be rotated. This prevents rotation of shaft 39, thereby preventing the drawing of a ticket 16 through dispensing slot 15. When coin slide 49 is moved inwardly with the coins in holes 50, operating slide 55 and release plate 135 move in the same direction. When pin 137 engages

the inclined end 127 of stop member 108, this inclined end is swung inwardly against the bias of spring 128 to shift stop end 126 out of the path of lever 110 of arm 102 so that the latter is free to move to the position shown in FIG. 10. This shifts pin 115 out of the path of cam projection 120a so that the cam and shaft 39 can now be rotated. At the same time, pin 116 engages projection 120c to rotate cam 105 and therefore shaft 39 about 40° to cause the end of the ticket to project from slot 15. This action rotates disc 62 to the position shown in FIG. 8. However, pin 117 of arm 102 being in line with projection 120b of the cam prevents the latter projection from reaching and moving pin 116. When the coin slide is drawn outwardly or moves outwardly under the action of spring 95, spring 113 returns arm 102 to its normal position, at which time pin 115 has passed cam projection 120a and is in line with projection 120c to prevent further rotation of the shaft so that only one ticket is dispensed at a time. As arm 102 returned to its normal position, pins 116 and 117 were shifted out of the path of cam projection 120b to permit the rotation of the cam and the shaft, thereby causing the rest of the ticket to be moved through slot 15. However, pins 116 and 117 are not clear of projection 120b until arm 102 has swung outwardly sufficiently to clear stop 126 to allow spring 128 to shift this stop back into the path of arm 102. This outward movement of the slide is so far that release mechanism 48 prevents it from being moved inwardly again until additional coins are inserted into the coin slide. When pin 115 returns to its normal position it engages the next cam projection 120c. If projection 120b had been allowed to swing around to engage the back of projection 120c, pin 115, in engaging the front of said projection 120c, would rotate cam 105 and shaft 39 backwards a little, and this could cause trouble with the ticket web 17.

If a person were able to grip the ticket lying between guide plates 28 and 29 and attempted to draw it out through slot 15, cam projection 120a bearing against pin 115 would cause arm 102 to start to swing inwardly, but it would only move until it engages stop end 126 of stop member 108. This permits only a small movement of the ticket which is not sufficient to enable the whole ticket to be drawn out of the machine.

I claim:

1. A ticket vending machine, comprising a rotatably mounted dispensing shaft sprocket means mounted on the shaft for engaging cooperably perforated tickets and dispensing said tickets upon rotation of the shaft operating means adapted to be freed by insertion of a coin for movement from a first position to a second position, latching means connected between said shaft and operating means for latching said shaft against rotation in response to movement of the operating means to the first position and for releasing said shaft for rotation in response to movement of the operating means to the second position, and shaft drive means connected between said shaft and operating means for causing sufficient unidirectional rotation of the shaft to dispense a ticket clear of the sprocket means during sequential movement of the operating means from the first position to the second position and then from the second position to the first position.

2. A ticket vending machine as claimed in claim 1 in which said operating means comprises,

- a. a coin-freed operating slide movable between an inoperative first position and a cocking second position, and said shaft drive means comprises
- b. a ratchet connected for rotation of said shaft to dispense a ticket when operated in one direction and for movement free of the shaft when operated in an opposite direction, and
- c. connecting means between the slide and the ratchet to operate the ratchet when the slide moves from the cocking position to the inoperative position.

3. A ticket vending machine as claimed in claim 2 in which said ratchet comprises,

- a. a disc fixedly mounted on the shaft and having ratchet teeth projecting therefrom, having shoulders thereon engageable to rotate the disc and the shaft in the
- b. a rocker arm freely mounted on the shaft beside the disc, and
- c. a plunger on the rocker arm at one end thereof and biased towards the disc for engaging said teeth and rotating the disc and the shaft in the ticket dispensing direction, said connecting means being connected to the arm near an opposite end thereof, whereby swinging movement of the arm during movement of the slide towards the cocking position causes said plunger to ride over the teeth, and movement of the slide towards the inoperative position causes the plunger to engage one of said shoulders and rotate the disc.

4. A ticket vending machine as claimed in claim 3 including

- a. spring means connected to the operating slide and biasing said slide towards the inoperative position, and
- b. spring means connected to the rocker arm and biasing said arm to cause the plunger to engage a ratchet tooth shoulder.

5. A ticket vending machine as claimed in claim 1 in which said latching means comprises,

- a. a cam fixedly mounted on the shaft and having projections radiating therefrom,
- b. a control arm swingably mounted adjacent the cam and having a normal at-rest position, and
- c. pin means on the control arm and in the path of the cam projections and normally preventing rotation of the cam,

said pin means when the control arm is swung out of its at-rest position permitting the cam to rotate a limited distance only and when said arm is swung back to the at-rest position permitting the cam to rotate sufficiently to allow said shaft to rotate completely to dispense a ticket.

6. A ticket vending machine as claimed in claim 5 including spring means biasing said control arm towards its at-rest position.

7. A ticket vending machine as claimed in claim 5 in which said pin means comprises,

- a. a first pin normally near and in front of a cam projection, with reference to the direction of rotation of the cam, when the control arm is in the at-rest position, and

- b. a second pin behind and normally spaced from the cam projection following said projection of the first pin,  
said first pin moving out of the path of the adjacent cam projection and said second pin moving towards its adjacent cam when the control arm is swung away from the at-rest position.
8. A ticket vending machine as claimed in claim 7 in which said pin means includes a third pin normally between said second pin and the cam projection behind said cam projection ahead of the second pin.
9. A ticket vending machine as claimed in claim 1 in which said latching means comprises,
- a cam fixedly mounted on the shaft and having projections radiating therefrom,
  - a Y-shaped control arm swingably mounted adjacent the cam and having a normal at-rest position, said arm being formed with a lever at one end and spaced-apart members projecting from its opposite end, the swingable mounting of the arm being between said lever end and said members,
  - a first pin on one of said members normally near and in front of a cam projection, with reference to the direction of rotation of the cam, when the control arm is in the at-rest position, and
  - a second pin on the other of said members and behind and normally spaced from the cam projection following said projection of the first pin, said pins being in the path of the cam projections and normally preventing rotation of the cam, and said first pin moving out of the path of the adjacent cam projection and said second pin moving towards its adjacent cam when the control arm is swung away from the at-rest position.
10. A ticket vending machine as claimed in claim 9 including a third pin on said other of the members in the path of the cam projections and normally between said second pin and the cam projection behind said cam projection ahead of the second pin.
11. A ticket vending machine as claimed in claim 5 including a stop member positioned normally to prevent said control arm from moving more than a limited distance from its at-rest position.
12. A ticket vending machine as claimed in claim 9 including a stop member in line with said lever end and positioned normally to prevent said control arm from moving more than a limited distance from its at-rest position.
13. A ticket vending machine as claimed in claim 1 in which said operating means comprises,
- a coin-freed operating slide movable between an inoperative first position and a cocking second position, said shaft drive means comprises,
  - a ratchet connected for rotation of said shaft to dispense a ticket when operated in one direction and for movement free of the shaft when operated in an opposite direction,
  - connecting means between the slide and the ratchet to operate the ratchet when the slide moves from the cocking position to the inoperative position;
- and said latching means comprises,
- a cam fixedly mounted on the shaft and having projections radiating therefrom,
  - a control arm swingably mounted adjacent the cam and having a normal at-rest position, said control arm being swung away from the at-rest position and

- back thereto respectively when the operating slide is moved towards the cocking position and back to its inoperative position, and
- pin means on the control arm and in the path of the cam projections and normally preventing rotation of the cam,  
said pin means when the control arm is swung out of its at-rest position permitting the cam to rotate a limited distance only and when said arm is swung back to the at-rest position permitting the cam to rotate sufficiently to allow said shaft to rotate completely to dispense a ticket.
14. A ticket vending machine as claimed in claim 13 including spring means biasing said control arm towards its at-rest position.
15. A ticket vending machine as claimed in claim 13 in which said pin means comprises,
- a first pin normally near and in front of a cam projection, with reference to the direction of rotation of the cam, when the control arm is in the at-rest position, and
  - a second pin behind and normally spaced from the cam projection following said projection of the first pin,  
said first pin moving out of the path of the adjacent cam projection and said second pin moving towards its adjacent cam when the control arm is swung away from the at-rest position.
16. A ticket vending machine as claimed in claim 15 in which said pin means includes a third pin normally between said second pin and the cam projection behind said cam projection ahead of the second pin.
17. A ticket vending machine as claimed in claim 1 in which said operating means comprises,
- a coin-freed operating slide movable between an inoperative first position and a cocking second position,
  - a ratchet connected for rotation of said shaft to dispense a ticket when operated in one direction and for movement free of the shaft when operated in an opposite direction,
  - connecting means between the slide and the ratchet to operate the ratchet when the slide moves from the cocking position to the inoperative position;
- and said latching means comprises,
- a Y-shaped control arm swingably mounted adjacent the cam and having a normal at-rest position, said arm being formed with a lever at one end and spaced-apart members projecting from its opposite end, the swingable mounting of the arm being between said lever end and said members, said control arm being swung away from the at-rest position and back thereto respectively when the operating slide is moved towards the cocking position and back to its inoperative position,
  - a first pin on one of said members normally near and in front of a cam projection, with reference to the direction of rotation of the cam, when the control arm is in the at-rest position, and
  - a second pin on the other of said members and behind and normally spaced from the cam projection following said projection of the first pin,  
said pins being in the path of the cam projections and normally preventing rotation of the cam, and said first pin moving out of the path of the adjacent cam projection and said second pin moving

towards its adjacent cam when the control arm is swung away from the at-rest position.

18. A ticket vending machine as claimed in claim 13 including,
- a. a movable stop member aligned with the control arm and positioned normally to prevent said control arm from moving more than a limited distance from its at-rest position, and
  - b. means on the operating slide to move said stop member out of alignment with the control arm when the slide is moved towards the cocking position.
19. A ticket vending machine as claimed in claim 17 including,
- a. a movable stop member normally in line with said lever end and positioned to prevent said control arm from moving more than a limited distance from its at-rest position, and
  - b. means on the operating slide to move said stop member out of alignment with the lever end when the slide is moved towards the cocking position.
20. A ticket vending machine comprising,
- a. a rotatably mounted dispensing shaft having sprocket means thereon for engaging and dispensing cooperably perforated tickets upon rotation of the shaft,
  - b. a coin-freed operating slide movable between an inoperative first position and a cocking second position,
  - c. a ratchet connected for rotation of said shaft to dispense a ticket when operated in one direction and for movement free of the shaft when operated in an opposite direction,
  - d. connecting means between the slide and the ratchet to operate the ratchet when the slide moves from the cocking position to the inoperative position,
  - e. a cam fixedly mounted on the shaft and having projections radiating therefrom,
  - f. a control arm swingably mounted adjacent the cam and having a normal at-rest position, said control arm being swung away from the at-rest position and back thereto respectively when the operating slide is moved towards the cocking position and back to its inoperative position, and
  - g. pin means on the control arm and in the path of the cam projections and normally preventing rotation of the cam,  
said pin means when the control arm is swung out of its at-rest position permitting the cam to rotate a limited distance only and when said arm is swung back to the at-rest position permitting the cam to rotate sufficiently to allow said shaft to rotate completely to dispense a ticket.
21. A ticket vending machine comprising,
- a. a rotatably mounted dispensing shaft having sprocket means thereon for engaging and dispensing cooperably perforated tickets upon rotation of

- the shaft,
- b. a coin-freed operating slide movable between an inoperative first position and a cocking second position,
  - c. a ratchet disc fixedly mounted on the shaft and having ratchet teeth projecting therefrom,
  - d. a rocker arm freely mounted on the shaft beside the disc,
  - e. a plunger on the rocker arm at one end thereof and biased towards the disc for engaging said teeth and rotating the disc and the shaft in the ticket dispensing direction,
  - f. connecting means between the slide and the ratchet to operate the ratchet when the slide moves from the cocking position to the inoperative position,  
said connecting means being connected to the arm near an opposite end thereof, whereby swinging movement of the arm during movement of the slide towards the cocking position causes said plunger to ride over the teeth, and movement of the slide towards the inoperative position causes the plunger to engage one of said shoulders and rotate the disc,
  - g. a cam fixedly mounted on the shaft and having projections radiating therefrom,
  - h. a Y-shaped control arm swingably mounted adjacent the cam and having a normal at-rest position, said arm being formed with a lever at one end and spaced-apart members projecting from its opposite end, the swingable mounting of the arm being between said lever end and said members,
  - i. a first pin on one of said members normally near and in front of a cam projection, with reference to the direction of rotation of the cam, when the control arm is in the at-rest position,
  - j. a second pin on the other of said members and behind and normally spaced from the cam projection following said projections of the first pin,
  - k. a third pin on said other of the members normally between said second pin and the cam projection behind said cam projection ahead of the second pin,  
said pins being in the path of the cam projections and normally preventing rotation of the cam, and said first pin moving out of the path of the adjacent cam projection and said second pin moving towards its adjacent cam when the control arm is swung away from the at-rest position,
  - l. a movable stop member normally in line with said lever end and positioned to prevent said control arm from moving more than a limited distance from its at-rest position, and
  - m. means on the operating slide to move said stop member out of alignment with the lever end when the slide is moved towards the cocking position.
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