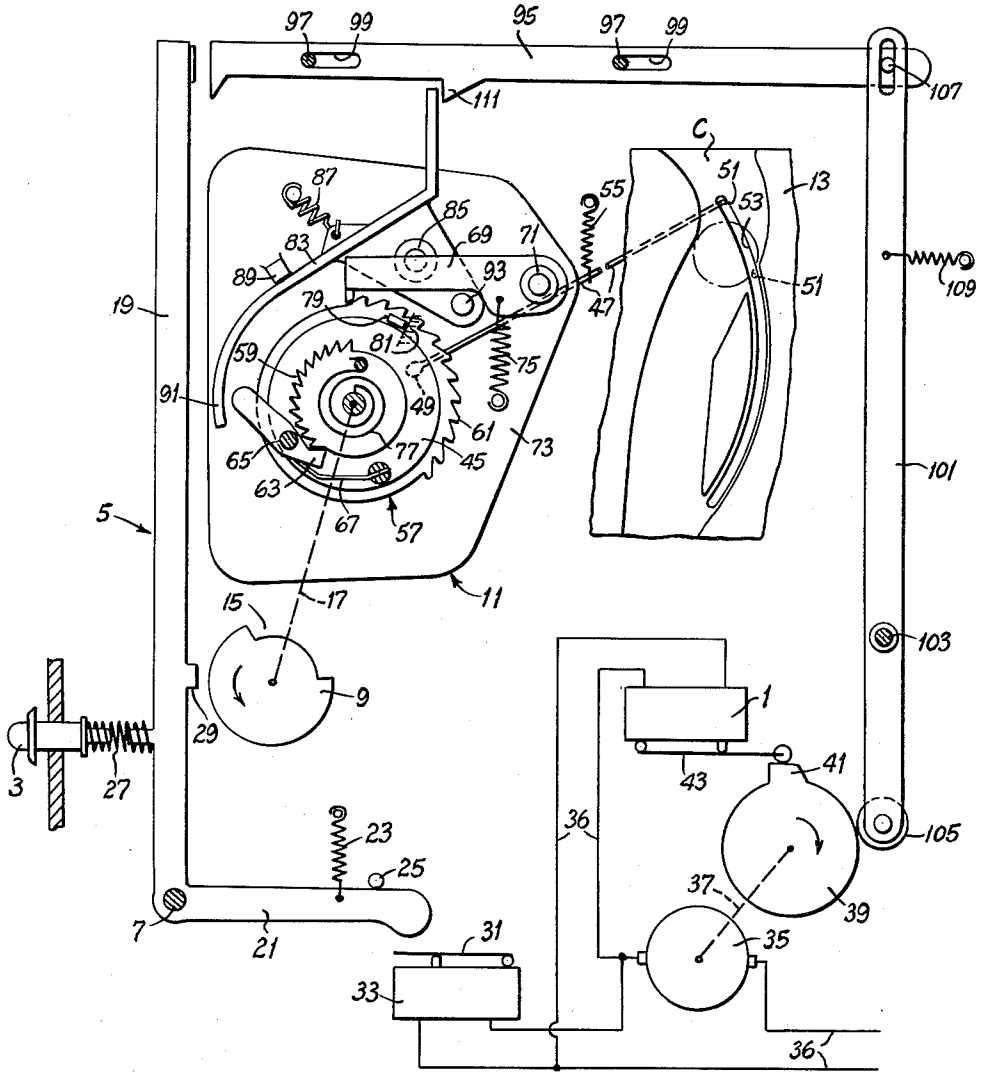
Sept. 11, 1962 J. T. SCHULLER 3,053,370

COIN APPARATUS

Filed Nov. 2, 1959 4 Sheets-Sheet 1

FIG. 1.



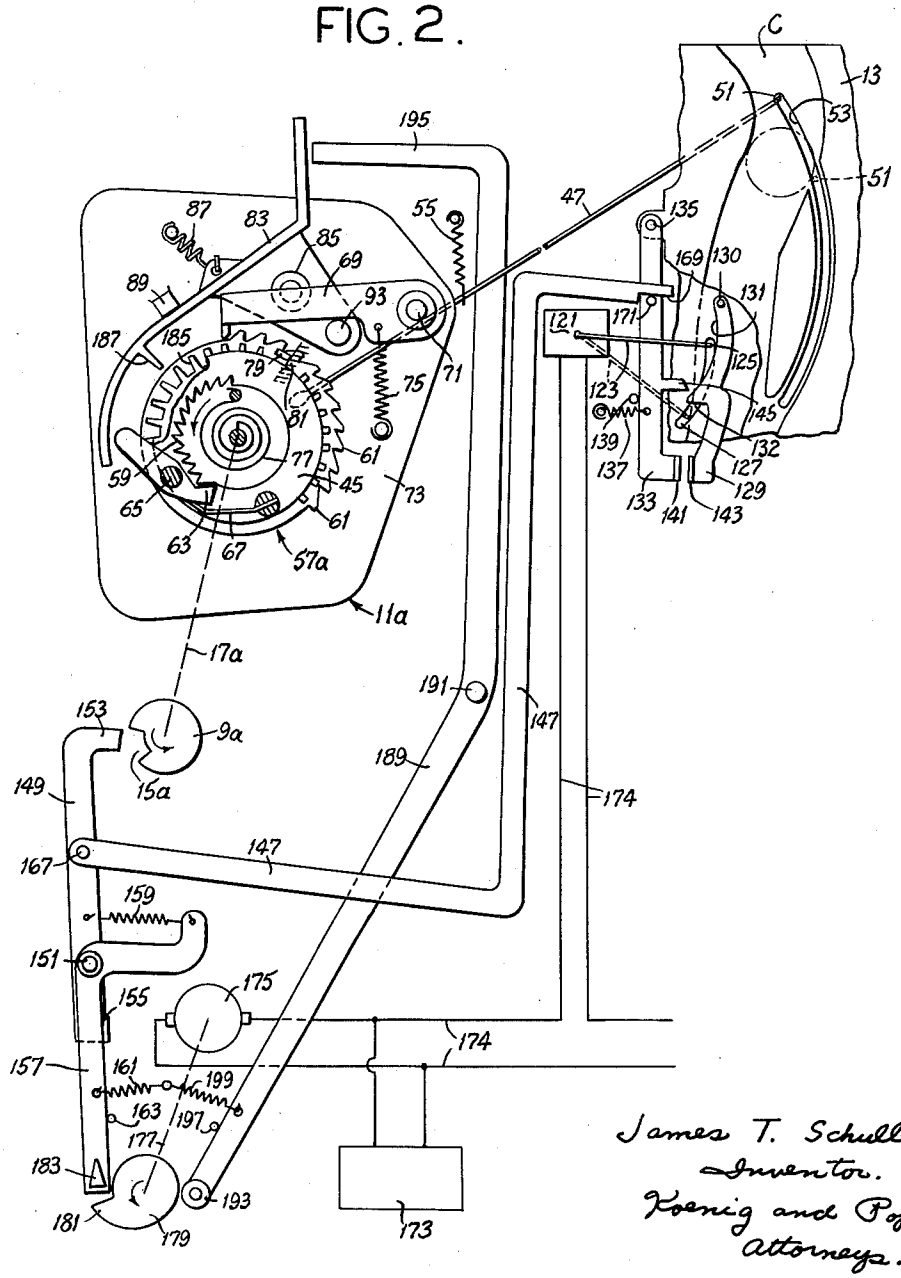
James T. Schuller,
Inventor.
Koenig and Pope,
Attorneys.

Sept. 11, 1962 J. T. SCHULLER 3,053,370

COIN APPARATUS

Filed Nov. 2, 1959 4 Sheets-Sheet 2

FIG. 2.



James T. Schuller,
Inventor.
Koenig and Pope,
Attorneys.

Sept. 11, 1962 J. T. SCHULLER 3,053,370

COIN APPARATUS

Filed Nov. 2, 1959 4 Sheets-Sheet 3

FIG. 3.

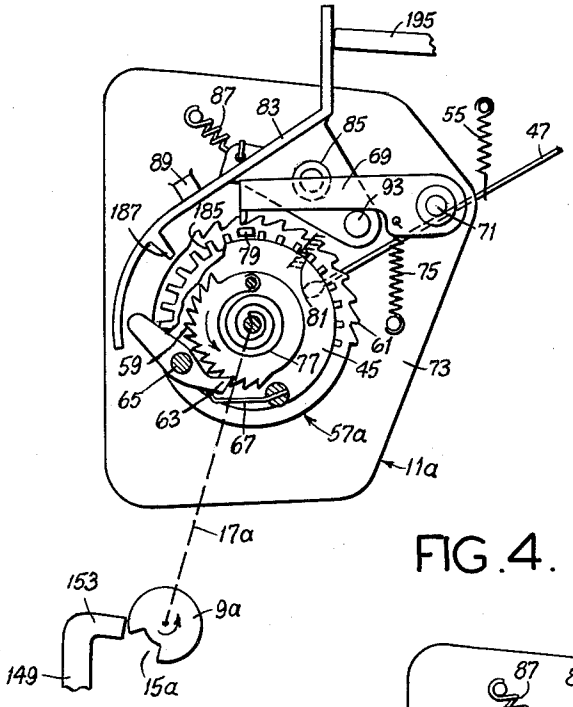
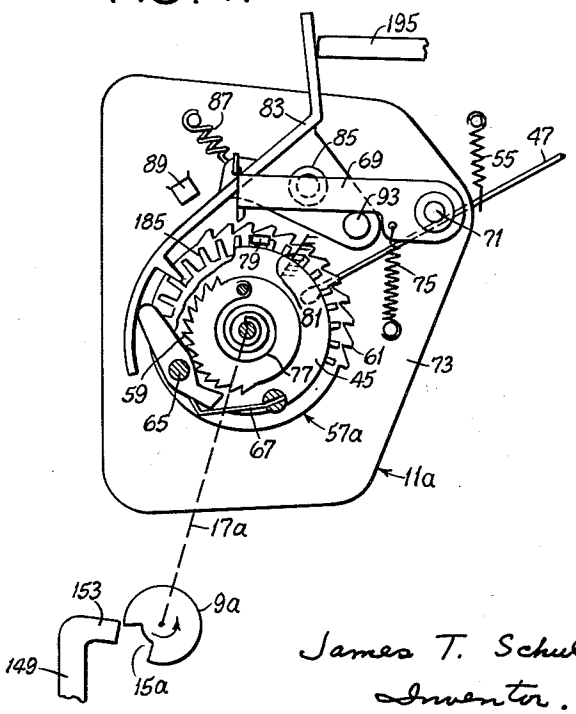


FIG. 4.



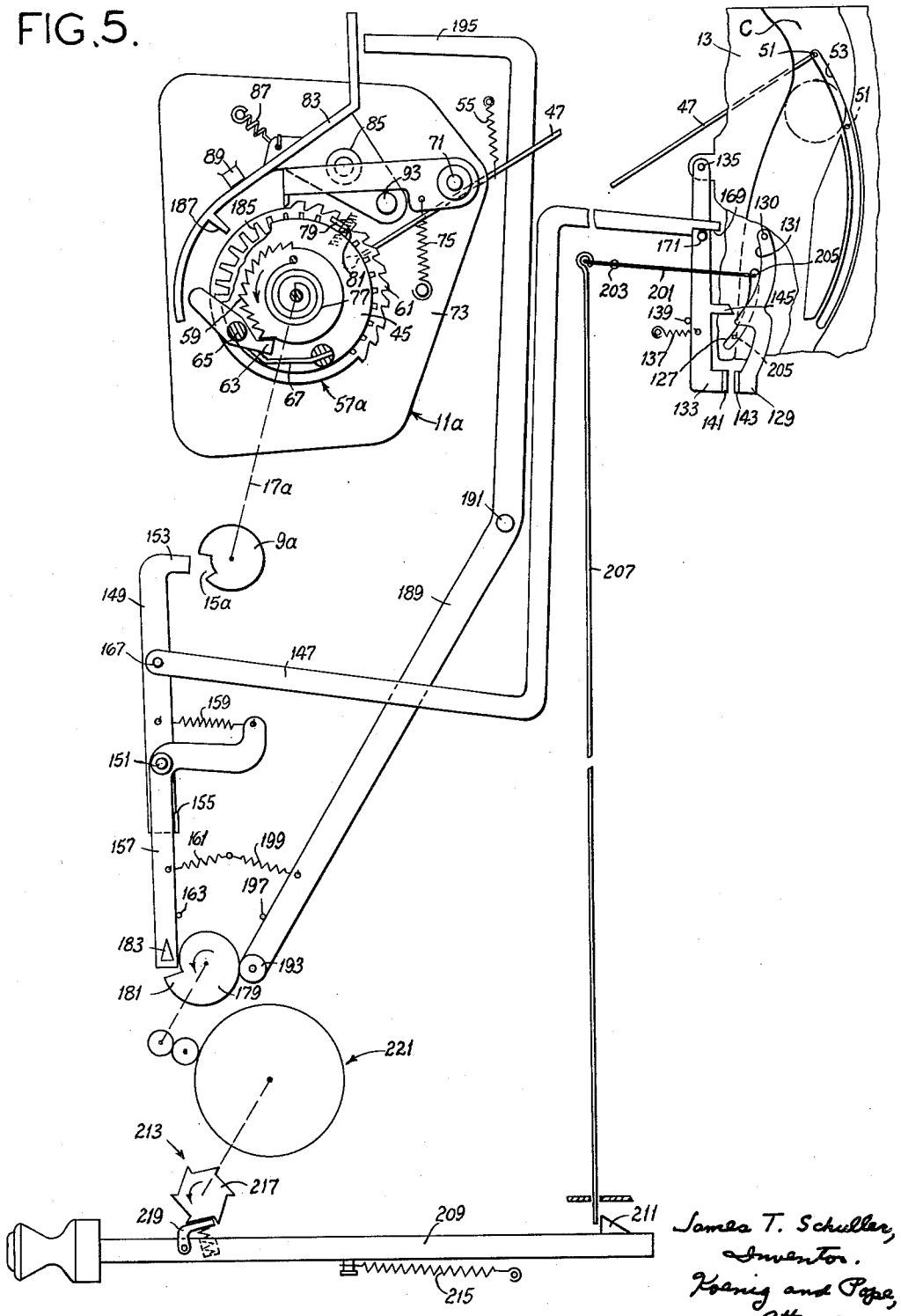
James T. Schuller,
Inventor.
Koenig and Pope,
attorneys.

Sept. 11, 1962 J. T. SCHULLER 3,053,370

COIN APPARATUS

Filed Nov. 2, 1959 4 Sheets-Sheet 4

FIG. 5.



James T. Schuller,
Inventor.
Koenig and Pope,
Attorneys.

United States Patent Office 3,053,370 Patented Sept. 11, 1962

3,053,370

COIN APPARATUS

James T. Schuller, St. Ann's, Mo., assignor to National Vendors, Inc., St. Louis, Mo., a corporation of Missouri

Filed Nov. 2, 1959, Ser. No. 850,408
34 Claims. (Cl. 194—94)

This invention relates to coin apparatus and more particularly to coin-actuated apparatus for controlling the operation of a vending machine or other coin-controlled device.

The invention pertains to coin apparatus of a type having a totalizer for totalizing the value of coins received thereby and a feeler operable in conjunction with the totalizer to detect the amount registered thereby, among the several objects of the invention being the provision of coin apparatus of this character for electrically controlling the operation of a vending machine, preventing operation of the machine unless a sufficient amount in coin has been deposited, the provision of coin apparatus of this character for electrically controlling the time of operation of a device in accordance with the amount in coin that has been deposited, and the provision of coin apparatus of this character adapted to allow a number of successive vending operations after deposit of a coin or coins in accordance with the amount deposited. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which several of various possible embodiments of the invention are illustrated,

FIG. 1 is a semischematic view of a first type of coin apparatus of this invention, particularly for controlling the operation of a vending machine;

FIG. 2 is a semischematic view of a second type of coin apparatus of this invention, particularly for coin-controlled timing operations;

FIGS. 3 and 4 are fragments of FIG. 2 illustrating moved positions of parts; and

FIG. 5 is a semischematic view similar to FIG. 2 of a third type of coin apparatus of this invention adapted to allow a number of successive vending operations in accordance with the amount deposited.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings, FIG. 1 illustrates a coin apparatus of this invention including a switch 1 which is adapted, for example, to control the operation of a vending machine. The control exerted by this switch over the vending machine may be any one of various kinds. For example, switch 1 may control a solenoid-operated latch which needs to be released to enable a purchaser to operate a knob, such as a pull-out knob, of a manual vending machine (a manual vending machine being one in which the purchaser manually supplies the power for the vending operation). Or switch 1 may control the operation of an electric motor adapted to drive the dispensing mechanism of an electrically-operated machine. In such a machine, the purchaser, after having deposited the appropriate amount in coin, manually pushes a button which effects switch closure to initiate a vending cycle. The latter type of control is illustrated in FIG. 1, a push button being indicated at 3.

Push button 3 is adapted to operate a feeler lever 5 pivoted at 7. Feeler 5 is adapted to feel out the position of a totalizer member 9 controlled by a totalizer 11 which functions to totalize the value of coins deposited in a coin chute C in a coin chute assembly 13. Totalizer member 9 is illustrated as a disk having a notch 15, and is fixed on a shaft 17 of the totalizer 11. Feeler 5 is shown as having a long arm 19 extending upward from pivot 7 and a short arm 21 generally at right angles to arm 19. Feeler 5 is biased to the retracted position in which it appears in FIG. 1 by a spring 23, this position of the feeler being determined by engagement of arm 21 of the feeler with a stop 25. Spring 23 biases the feeler counterclockwise as viewed in FIG. 1. A coil compression spring 27 is interposed between the push button 3 and arm 19 of feeler 5 and provides a yieldable connection therebetween. When the button is manually pushed in, it acts through spring 27 to swing feeler 5 clockwise against the bias of spring 23.

Arm 19 of feeler 5 has a projection 29 movable toward and away from the disk 9. Disk 9 initially occupies a retracted or "zero" position in which it appears in FIG. 1. In this zero position of the disk, notch 15 is angularly displaced from feeler projection 29. If button 3 is pushed in when notch 15 is angularly displaced from projection 29, feeler 5 will swing clockwise away from its retracted position through only a minimum angle, its swing being limited by engagement of projection 29 with the outer periphery of the disk. However, when disk 9 is rotated to the position wherein notch 15 is aligned with projection 29, then pushing in of the button 3 results in swinging of feeler 5 through a maximum angle, this swing of the feeler being referred to as working movement of the feeler. When feeler 5 is in its retracted position, projection 29 is out of engagement with disk 9 so as not to impede the rotation of the disk.

Arm 21 of feeler 5 is engageable upon working movement of the feeler (swinging of the feeler through the stated maximum angle) with the actuating arm 31 of a normally open starter switch 33 to close the switch 33. An electric motor 35 is connected in a circuit 36 in series with switch 33. Accordingly, when switch 33 is closed, motor 35 is energized. Motor 35 drives via suitable speed reducing means a camshaft 37 on which is secured a cam 39 having a single lobe 41. Cam 39 is engageable with actuating arm 43 of the switch 1. Switch 1 is connected in parallel with switch 33 in circuit 36. Switch 1 is a normally closed switch, being held open when lobe 41 of cam 39 engages switch arm 43. Motor 35 is adapted to drive cam 39 clockwise as viewed in FIG. 1, and when the cam rotates away from its FIG. 1 position wherein lobe 41 holds switch 1 open, arm 43 drops off the lobe and switch 1 closes. Thus, when starter switch 33 is closed, motor 35 is energized to drive the cam 39. Arm 43 immediately drops off the lobe 41 and switch 1 closes to hold the motor energized, even though switch 33, opens until the cam completes a single-revolution cycle and lobe 41 reopens switch 1.

Totalizer 11 may be of the same type as shown in my copending application Serial No. 799,294, filed March 13, 1959, entitled Coin Apparatus, now Patent 2,991,867, issued July 11, 1961. Essentially, it comprises a pawl carrier constituted by a disk 45 which is rotatable relative to shaft 17 on the axis of the shaft 17. A trip wire 47 has one end fixed to the disk 45 at 49 and extends radially from the disk over to the coin chute assembly 13, where it has a finger 51 at its free end which extends across the coin chute C in assembly 13. For simplifying the disclosure, only one coin chute is shown, this being a chute for coins of one denomination such as nickels. Assembly 13 has an arcuate slot 53 for reception of the finger 51. Trip wire 47 is biased by a spring to swing upward to the raised retracted position in which appears in FIG. 1. For convenience, this spring is shown in FIG. 1 as a tension spring 55, but by referring to U.S. Patent 2,991,867 it will be seen that this spring may be a clock spring coiled around the axis of the disk 45.

Totalizer 11 also includes a ratchet cluster 57 fixed on the shaft 17. This ratchet cluster is formed to provide a set of driving ratchet teeth 59 and a set of holding ratchet teeth 61. It is rotatable together with totalizer disk 9. Disk 45 may rotate relative to the ratchet cluster and disk 9. A driving pawl 63 is pivoted at 65 on disk 45 and biased toward engagement with driving ratchet teeth 59 by a spring 67. A holding pawl 69 is pivoted at 71 on plate 73 of the totalizer and is biased by a spring 75 toward engagement with holding ratchet teeth 61. The ratchet cluster 57, shaft 17 and disk 9 are all biased to rotate together counterclockwise to the zero position in which they appear in FIG. 1 by a clock spring 77. This zero position is determined by engagement of a finger 79 on the ratchet cluster with a fixed stop 81. A totalizer reset lever 83 is pivoted at 85 on plate 73. This reset lever is biased by a spring 87 to swing clockwise to a retracted position determined by its engagement with a stop 89 on plate 73. It has a tail 91 engageable with the driving pawl 63 and a pin 93 engageable with the holding pawl 69 when it swings counterclockwise away from its FIG. 1 retracted position to release both these pawls.

A reset bar 95 is mounted for sliding movement above the totalizer 11 as by means of studs 97 extending through elongate slots 99 in the bar. Bar 95 is actuated by cam 39 via a cam follower lever 101 pivoted at 103 having a follower roller 105 at its lower end engageable by the cam and a pin-and-slot connection 107 at its upper end to one end of the bar 95. The other end of bar 95 is engageable with the upper end of feeler 5. Lever 101 is biased to swing clockwise by a spring 109 to keep roller 105 against the cam and to bias bar 95 to its FIG. 1 retracted position. Bar 95 has a projection 111 engageable with the upper end of reset lever 83 upon movement of the bar to the left away from its retracted position.

Assuming that chute C is a nickel chute, for example, and that a one-step (one tooth spacing) advance of the ratchet cluster 57 and disk 9 is desired for each nickel deposited in the chute, slot 53 registers with chute C from the upper end of the slot through a distance such that a nickel falling in the chute swings the wire 47 downward and rotates disk 45 clockwise through such an angle as to carry driving pawl 63 back over one driving tooth 59. Then the nickel passes on by the finger 51 and the wire 47 is swung up by spring 55 so that driving pawl 63 steps the ratchet cluster and disk forward through a step corresponding to the tooth spacing. The ratchet cluster and disk 9 are then held in the attained position against the return bias of spring 77 by the holding pawl 69 and the driving pawl. The first nickel steps the ratchet cluster and disk 9 forward one step from the zero position, the second nickel steps them forward another step, and so on. Assuming that the purchase price is twenty-five cents, for example, the notch 15 in the zero position of disk 9 will be five steps back from registration with projection 29 on feeler 5, and five nickels need to be deposited in chute C to bring notch 15 around through five steps into registration with projection 29.

If an insufficient number of nickels is deposited, meaning that notch 15 is not brought around into registration with projection 29 on feeler lever 5, operation of push button 3 is ineffecitve to close the starter switch 33. This is because feeler 5 is blocked from working movement by disk 9. It can swing clockwise through only a small angle before projection 29 engages the outer periphery of the disk 9, this angle of swing being insufficient for feeler 5 to close switch 33. However, if a sufficient number of nickels is deposited to bring notch 15 around into registration with projection 29, then operation of push button 3 is effective to accomplish working movement of the feeler to close starter switch 33. This is because projection 29 can then enter notch 15, permitting feeler 5 to swing clockwise through a sufficient angle to close switch 33.

When switch 33 closes, motor 35 is energized, and cam 39 is driven clockwise as viewed in FIG. 1. Push button 3 is held depressed until cam 39 has rotated to the point where cam lobe 41 clears switch arm 43. The latter then drops to close switch 1. Now the latter acts to hold motor 35 in operation so that the cam 39 continues to rotate. As the cam continues to rotate, cam lobe 41 engages the follower roller 105 at the lower end of lever 101 and rocks lever 101 counterclockwise. Lever 101 thereupon drives reset bar 95 to the left as viewed in FIG. 1. Ordinarily, the push button 3 will have been released by this time, and the feeler 5 will have been returned to its retracted position by spring 23 so that projection 29 will be out of the notch 15 in disk 9. If not, bar 95 will push on the upper end of the feeler 5 to swing feeler 5 counterclockwise to retract projection 29 from notch 15 in disk 9. This retraction of feeler 5 even though the push button should be held in is permitted by the spring 27, which yields as the feeler 5 rocks counterclockwise back to retracted position. It occurs before projection 111 actuates reset lever 83. Then projection 111 on the reset bar 95 engages the upper end of reset lever 83, rocking the latter clockwise to release both the driving pawl 63 and the holding pawl 69. Spring 77 then returns the ratchet cluster 57 and the disk 9 to zero position. Finally, as the cam 39 completes a one-revolution cycle, cam lobe 41 pushes switch arm 43 upward to open switch 1 and shut off the motor 35. Thus, all parts are returned to their initial position in readiness for the next cycle.

Motor 35 may act to drive the dispensing mechanism of an electrically operated vending machine, as well as acting to drive the cam 39. Such a dispensing mechanism is shown, for example, in Fry U.S. Patent 2,594,147, issued April 22, 1952. In such case, operation of the camshaft 37 through one revolution accomplishes one vending cycle. Or switch 1, in addition to serving as a holding switch for motor 35, may act when closed to complete a circuit through a separate motor for powering the dispensing mechanism. Or switch 1 may act when closed to energize a solenoid to release a latch in a manual vending machine such as is shown, for example, in Ridings et al. U.S. Patent 2,872,009, issued February 3, 1959.

For simplicity, the apparatus has been described above as a single-coin, single-price apparatus. It will be readily understood that it may be made a multiple-coin apparatus by adding coin chutes for coins of additional denominations. For example, a dime chute and a quarter chute may be used as in U.S. Patent 2,991,867. Reference may be made to that patent for full details. It will also be readily understood that the apparatus may be made a multiple-price apparatus by adding additional push buttons 3, feelers 5 and disks 9, the latter then being referred to as price disks. For example, to make the apparatus a three-price apparatus, there would be three feelers 5, one for each of the three prices, and three disks 9 on shaft 17, one for each of the three feelers. Assume that the three prices were twenty-five cents, thirty cents, and thirty-five cents. Push buttons for twenty-five cent items would actuate a twenty-five cent feeler. Push buttons for thirty cent items would actuate a thirty cent feeler. Push buttons for thirty-five cent items would actuate a thirty-five cent feeler. The twenty-five cent feeler would feel into a twenty-five cent disk 9, mounted on shaft 17 to require a five-step advance from zero position for operation of the respective feeler. The thirty-cent feeler would feel into a thirty cent disk 9, mounted on shaft 17 to require a six-step advance from zero position for operation of the respective feeler. The thirty-five cent feeler would feel into a thirty-five cent disk 9, mounted on shaft 17 to require a seven-step

advance from zero position for operation of the respective feeler.

FIG. 2 illustrates another coin apparatus of this invention adapted for controlling the time of operation of a device (such as a coin-controlled dryer for laundry or appliance) or for controlling the operation of a vending machine. The FIG. 2 apparatus includes a switch **121** adapted to be closed by a first coin deposited in coin chute C and to remain closed for an interval determined by the total value of coins deposited in the chute as registered by a totalizer **11***a*. Switch **121** has an actuating member constituted by a trip wire **123** extending from the case of the switch to the coin chute assembly **13**, where it has a finger **125** at its free end extending across chute C. Chute assembly **13** has an arcuate slot **127** receiving finger **125** and carries a latch **129** pivoted at **130** for latching the switch-actuating trip wire **123** in the lowered switch-closing position of the wire illustrated in dotted lines in FIG. 2. Switch **121** includes spring means biasing wire **123** to swing upward to the normal raised switch-open position illustrated in solid lines in FIG. 2. A coin falling in chute C, after having actuated trip wire **47** of the totalizer **11***a*, engages finger **125** on wire **123**, and swings the wire **123** downward. The latch is formed with a curved edge portion **131** extending down to a shoulder **132**. When finger **125** moves downward, it engages curved edge portion **131** and pushes aside the latch **129** until it passes off the curved edge portion, and then the latch swings back under a return gravity bias to bring latch shoulder **132** over the finger to hold the wire **123** down in switch-closing position against the upward return bias on the wire.

Switch trip wire **123** remains latched down in switch-closing position until latch **129** is released by a trip **133** pivoted at **135** on the coin chute assembly **13**. Trip **133** hangs down from its pivot **135** and is biased clockwise as viewed in FIG. 2 by a spring **137** to a retracted position against a stop **139**. Trip **133** has a tab **141** at its lower end engageable with a tab **143** at the lower end of latch **129** when trip **133** swings counterclockwise away from its retracted position for releasing the latch **129**, i.e., for moving latch shoulder **132** off finger **125** on switch trip wire **123**. Trip **133** also has a finger **145** above latch shoulder **131** and below the upper end of slot **127** which comes into position to intercept finger **125** on wire **123** when trip **133** swings counterclockwise away from retracted position, thereby to arrest wire **123** when released from latch **129** and keep it from swinging all the way back upward to its raised switch-open position until trip **133** is returned to retracted posiiton.

Trip **133** is adapted to be actuated by a link **147** from a feeler **149**, constituted by a lever pivoted at **151**. Feeler **149** has a projection **153** at one end (its upper end as appears in FIG. 2) movable toward and away from a disk **9***a* having a notch **15***a* and fixed on shaft **17***a* of totalizer **11***a*. At its lower end below pivot **151**, feeler **149** has a laterally extending ear **155** engageable by a cam follower arm **157** also pivoted at **151**. A spring **159** is connected between the upper end of arm **157** and feeler **149** providing a yieldable connection between the arm and the feeler and biasing ear **155** against the arm. A spring **161** biases arm **157** and feeler **149** counterclockwise to a retracted position against a stop **163**. In this retracted position of the feeler **149**, projection **153** is out of engagement with the disk **9***a* so as not to impede its rotation.

Link **147** is pin-connected at one end as indicated at **167** to the feeler **149**, and has a bottom notch **169** at its other end where it bears on a pin **171** on latch trip **133**. The arrangement is such that upon a full clockwise stroke of feeler **149** away from its retracted position, as permitted by entry of projection **153** in notch **15***a* of disk **9***a* when notch **15***a* registers with projection **153**, link **147** is moved toward the right to actuate latch trip **133**. This full stroke of the feeler is referred to as working movement of the feeler. However, if notch **15***a* is out of register with projection **153**, feeler **149** is blocked from working movement. It can then swing only through a small angle less than full stroke, its swing being limited by engagement of projection **153** with the periphery of disk **9***a*, and this limited swing is insufficient to actuate the trip **133**.

Switch **121** is connected in series with an electrically powered device **173** to be controlled thereby in a circuit **174**. Device **173** may, for example, be an electrical appliance such as a dryer. An electric motor **175** is connected in parallel with device **173** in circuit **174**. Motor **175** drives via suitable speed reducing means a camshaft **177** on which is secured a cam **179**. This cam rotates counterclockwise as viewed in FIG. 2. It has a lobe **181** adapted once each revolution thereof for engagement with a follower **183** at the lower end of follower arm **157** to rock arm **157** and feeler **149** clockwise.

Totalizer **11***a* comprises a pawl carrier or disk **45** (the same as in totalizer **11**) rotatable relative to shaft **17***a* on the axis of shaft **17***a*. Disk **45** carries trip wire **47** having finger **51** at its free end extending across coin chute C through slot **53**, and wire **47** is biased to swing upward by spring **55**, the same as in totalizer **11**. Totalizer **11***a* includes a ratchet cluster **57***a* fixed on shaft **17***a* which is similar to cluster **57** of totalizer **11** in having driving ratchet teeth **59** and holding ratchet teeth **61**, but which additionally has a set of escapement teeth **185**. Disk **9***a* is fixed on shaft **17***a* in such position relative to cluster **57***a* that in the zero position, notch **15***a* registers with projection **153**. The only other difference between totalizer **11***a* and totalizer **11** is that, in totalizer **11***a*, reset lever **83** has a finger **187** adapted on movement of lever **83** away from retracted position to enter between two adjacent escapement teeth **185** before lever **83** releases the pawls **63** and **69** to limit the escape of the ratchet cluster **57***a* and disk **9***a* to less than one step. Then, when lever **83** swings back to retracted position, finger **187** is withdrawn from between the escapement teeth after the pawls have returned into engagement with the driving teeth **59** and holding teeth **61**, and the ratchet cluster **57***a* and disk **9***a* complete an escape through one step (i.e., one tooth spacing). A lever **189** pivoted at **191** has a cam follower roller **193** at its lower end engageable by cam **179** and an arm **195** at its upper end engageable with the upper end of reset lever **83**. Lever **189** is biased clockwise to a retracted position against a stop **197** by a spring **199**.

Assuming that chute C of the FIG. 2 apparatus is a nickel chute, for example, each nickel deposited in the chute will step the ratchet cluster **57***a* and disk **9***a* one step (one tooth spacing) forward (counterclockwise). This occurs by reason of the nickel engaging finger **51** on trip wire **47** and swinging wire **47** downward, the action being exactly the same as in totalizer **11**. The first nickel steps the ratchet cluster **57***a* and disk **9***a* forward (counterclockwise) one step from the FIG. 2 zero position and also hits the switch-actuating trip wire **123** to swing it down to its switch-closing position wherein it is held by latch **129**. Each additional nickel steps the ratchet cluster **57***a* and disk **9***a* forward (conuterclockwise) one additional step, and the ratchet cluster and disk are held in any attained advanced position against the return bias of spring **77** by the pawls **63** and **69**.

Assuming that three nickels are deposited, for example, one after another, the ratchet cluster **57***a* and the disk **9***a* will be advanced three steps from the zero position, as illustrated in FIG. 3. Switch **121** will be closed when the first nickel hits finger **125** on switch trip wire **123**. With switch **121** closed, and held closed by latch **129**, the controlled device **173** and the motor **175** are both energized. Motor **175** drives cam **179** counterclockwise, the cam starting from the position in which it is shown in FIG. 2. During the initial phase of the first revolution of

the cam, it acts to swing the lever **189** counterclockwise away from its retracted position. The arm **195** at the upper end of lever **189** engages the upper end of reset lever **83** and swings the latter counterclockwise. Finger **187** on the reset lever **83** enters between the escapement teeth **185** and then pawls **63** and **69** are released to allow cluster **57***a* and disk **9***a* to escape (rotate backwards) under the bias of return spring **77** to the extent permitted by finger **187** (which is somewhat less than one full step), as shown in FIG. 4. Then when the lobe **181** of cam **179** passes by the follower **193**, lever **189** returns to its retracted position under the return bias of spring **199**. This permits reset lever **83** to return to its retracted position under the return bias of spring **87**. As the reset lever **83** returns to retracted position, pawls **63** and **69** are returned into engagement with teeth **59** and **61** before finger **187** disengages from the escapement teeth **185**. Accordingly, ratchet cluster **57***a* and disk **9***a* complete their escape through one step, and hence are now two steps forward from zero position.

The lobe **181** on cam **179** then engages follower **183** or arm **157** and rocks this arm clockwise against the bias of spring **161**. Feeler **149** is blocked from working movement by disk **9***a* (which is now two steps forward of its zero position). However, arm **157** may swing clockwise relative to feeler **149**, spring **159** yielding to permit this. With feeler **149** blocked from working movement, switch **121** remains closed. Accordingly, the motor **175** and device **173** remain energized, and the cam **175** continues to rotate. During the second revolution of the cam, lever **189** is again actuated to actuate lever **83** to effect escape of ratchet cluster **57***a* and disk **9***a* through another step. Near the end of the second revolution of the cam, arm **157** is again swung clockwise, but feeler **149** is still blocked from working movement by disk **9***a*, and spring **159** yields to allow arm **157** to swing. Accordingly, the motor **175** and device **173** remain energized, and the cam continues to rotate. During the third revolution of the cam, lever **189** is again actuated to actuate lever **83** to effect escape of ratchet cluster **57***a* and disk **9***a* through a third step, which brings them back to zero position. Near the end of the third revolution of the cam, arm **157** is again swung clockwise, and this time it swing feeler **149** through a working stroke, since notch **15***a* in disk **9***a* is now in register with projection **153** on the feeler.

When feeler **149** swings clockwise through a working stroke, it drives link **147** to move the trip **133** away from its retracted position. The trip **133** releases the latch **129**, but switch trip wire **123** is prevented from swinging back up to switch-open position by finger **145** on the trip. This keeps switch **121** closed and motor **175** and cam **179** in operation until the cam lobe **181** has passed by the cam follower **183** at the lower end of arm **157**. Then arm **157** is released to return counterclockwise to its retracted position, carrying feeler **149** back to its retracted position, and dragging link **147** back to allow trip **133** to return to its retracted position. As trip **133** returns to its retracted position, finger **145** releases wire **123** to allow it to complete its upward swing to open the switch **121**. Motor **175** then stops (with cam **179** in the FIG. 2 position) and device **173** is deenergized.

If only one nickel is deposited, the ratchet cluster **57***a* and disk **9***a* will be advanced only one step, and will escape back one step to zero position on the first revolution of the cam **179**. Thus, device **173** will be energized for the length of time it takes cam **179** to make one revolution. If two nickels are deposited, the ratchet cluster **57***a* and disk **9***a* will be advanced two steps, and will escape back one step on the first revolution of the cam, and another step back to zero position on the second revolution of the cam. Thus, device **173** will be energized for the length of time it takes cam **179** to make two revolutions. The operation on deposit of three nickels has been described, and the operation on deposit of four, five or more nickels will be apparent. One nickel provides for energization of device **173** for a unit of time, and deposit of a plurality of nickels provides for operation of device **173** for this unit of time multiplied by the number of nickels. Accordingly, the FIG. 2 apparatus is particularly adapted for controlling the time of operation of a coin-controlled appliance in accordance with the total value of coins deposited. The FIG. 2 apparatus may be made a multiple coin apparatus by adding coin chutes for coins of additional denominations. For example, a dime chute a quarter chute may be used as in U.S. Patent 2,991,867.

The FIG. 2 apparatus could also be used to control vending operations by having motor **175** drive a dispensing mechanism, effecting one vending cycle on each revolution of the cam **179**, for example. In such case, the apparatus would perform a number of vending cycles corresponding to the amount deposited. For example, if a nickel is a coin of unit value as above described, deposit of three nickels would effect three vending cycles. It is also possible that the arrangement could be used to perform change-making operations, a first cycle thereof accomplishing a vending operation and successive cycles accomplishing change-dispensing operations.

FIG. 5 illustrates an adaptation of certain features of the FIG. 2 apparatus to a manual vending machine for allowing a number of successive manual vending operations in accordance with the amount deposited. In the FIG. 5 apparatus, the switch **121** of FIG. 2 is replaced by a latch mechanism including a trip wire **201** pivoted at **203** and having finger **205** at one end (corresponding to finger **125** of FIG. 2) extending across coin chute C through slot **127**. A latch **207** hangs down from the other end of wire **201** and controls the operation of a manually operable pull-out rod **209**. This rod has a lug **211** engageable with the lower end of latch **207** when the latter is down. Latch **207** is normally biased down (as by gravity) and hence tends to swing wire **201** counterclockwise to its FIG. 5 retracted position. Cam **179**, instead of being driven by an electric motor as in FIG. 2, is mechanically driven by a one-way drive such as pawl and ratchet mechanism **213** which is actuated each time the rod **209** is pulled out from its FIG. 5 retracted postion and returned to its retracted position by return spring **215**. The pawl and ratch mechanism **213** comprises a ratchet **217** and a pawl **219** carried by the rod **209** adapted to advance the ratchet one step upon each reciprocation of the rod **209**. The ratchet is connected by suitable gearing **221** to rotate cam **179** one revolution upon each advance step of the ratchet. In other respects, the FIG. 5 apparatus corresponds to the FIG. 2 apparatus.

Assuming that chute C of the FIG. 5 apparatus is a nickel chute, like the chute C of the FIG. 2 apparatus, each nickel deposited in the chute will step the disk **9***a* one step forward. Assuming that three nickels are deposited, for example, one after another, disk **9***a* will be advanced three steps from its FIG. 5 zero position. The first of the three nickels hits trip wire **201** and swings it clockwise, and the wire **201** becomes latched down by the latch **129** in the same manner as the wire **123** is latched down in the FIG. 2 apparatus. When the trip wire **201** is swung downward, latch **207** is pulled up clear of the lug **211** on the pull-out rod **209**, and latch **207** remains in its raised retracted position as long as trip wire **201** is latched down by the latch **129**. Now the pull-out rod **209** is free to be pulled out.

Upon a first actuation of the pull-out rod **209** (which, as will be readily understood, accompanies a first dispensing operation), the ratchet mechanism **213** functions to rotate the cam **179** counterclockwise through one revolution. This effects return rotation of the disk **9***a* through one step to a position two steps forward from zero position via actuation of lever **189**, the operation being the same as above described in conjunction with the FIG. 2

apparatus. Feeler **149** is then blocked from working movement by disk **9***a*. Upon a second actuation of pull-out rod **209**, which effects another dispensing operation, the cam **179** is driven through a second revolution, which effects escape of disk **9***a* through another step to a position one step forward of zero position. Again, feeler **149** is blocked from working movement by disk **9***a*. On a third actuation of the rod **209**, which effects a third dispensing operation, the disk **9***a* escapes to zero position, and as the cam **179** completes the third revolution, it swings feeler **149** through a working stroke, since notch **15***a* in disk **9***a* is now in register with projection **153** on the feeler. When feeler **149** swings clockwise through a working stroke, it drives link **147** to move the trip **133** away from its retracted position. The trip **133** then releases the latch **129**, but the trip wire **201** is prevented from swinging all the way back up by finger **145** on the trip. Finally, when the cam lobe **181** has passed by the cam follower **183** at the lower end of arm **157**, the arm **157** is released to return to its retracted position, carrying feeler **149** back to its retracted position, and dragging link **147** back to allow trip **133** to return to its retracted position. As trip **133** returns to its retracted position, finger **145** releases wire **201** to allow it to complete its upward swing, thereby moving the latch **207** back down to latching position. This locks out the pull-out rod **209** from further operation until further coins are deposited.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. Coin apparatus comprising a totalizer member adapted for advance movement in a forward direction from a retracted position and biased for return movement toward retracted position, a coin chute, means operable by a coin falling in the chute for advancing said totalizer member and for holding said totalizer member in any attained advanced position thereby to add up and register the total value of coins deposited in the chute, a feeler adapted for movement away from a retracted position toward the totalizer member, said totalizer member being so formed that in one position thereof it allows working movement of the feeler and in other positions thereof it prevents working movement of the feeler, means for releasing said totalizer member to allow for return movement thereof under its bias, electrically powered means for actuating said releasing means connected in a circuit including a switch controlled by the feeler, the feeler on working movement thereof being adapted to operate the switch, and being blocked out from operating the switch by said totalizer member when the latter is in a position preventing working movement of the feeler, and means actuated by a coin falling in the chute for closing the switch and holding it closed, the feeler being adapted on working movement thereof to open the switch.

2. Coin apparatus as set forth in claim 1 wherein said means for closing the switch and holding it closed comprises a switch-actuating member movable from a retracted position to an operative position by a coin falling in the chute, and means for latching said switch, actuating member in operative position, the feeler being adapted on working movement thereof to release said latching means.

2. Coin apparatus as set forth in claim 1 wherein said capement means for permitting return of said totalizer member one step from any advanced position upon actuation of said releasing means.

4. Coin apparatus as set forth in claim 3 wherein said electrically powered means is adapted to move said feeler in the direction toward said totalizer member.

5. Coin apparatus as set forth in claim 4 including a yieldable connection between said electrically powered means and said feeler adapted to yield to allow operation of said electrically powered means when said feeler is blocked out by said totalizer member.

6. Coin apparatus comprising a totalizer member adapted for advance movement in a forward direction from a retracted position and biased for return movement toward retracted position, a coin chute, means operable by a coin falling in the chute for advancing said totalizer member and for holding said totalizer member in any attained advanced position thereby to add up and register the total value of coins deposited in the chute, a feeler adapted for movement away from a retracted position toward the totalizer member, said totalizer member being so formed that in one position thereof it allows working movement of the feeler and in other positions thereof it prevents working movement of the feeler, manually operable means movable away from a retracted position for moving said feeler away from retracted position, an electric motor, cam means driven by the motor, said motor being connected in a circuit including a first switch actuable by the feeler on working movement of the feeler for starting the motor and a second switch actuable by the cam means adapted to hold the motor in operation for a cycle of the cam means upon return of the feeler to retracted position, and means actuable by the cam means for releasing said totalizer member to allow for return movement thereof under its bias.

7. Coin apparatus as set forth in claim 6 including a yieldable connection between said manually operable means and said feeler allowing said feeler to be returned to retracted position if said manually operable means is held away from its retracted position.

8. Coin apparatus as set forth in claim 7 wherein said releasing means is adapted to move said feeler toward its retracted position before the release of said totalizer member.

9. Coin apparatus comprising a ratchet and a totalizer member rotatable together in a forward direction away from a retracted position and biased for return movement toward retracted position, a coin chute, a driving pawl for the ratchet, a member engageable by a coin falling in the chute and operable by the weight of the coin for actuating the driving pawl to rotate the ratchet and totalizer member forward, a holding pawl engageable with the ratchet for holding the ratchet and totalizer member in any attained position, means for releasing the pawls to allow for return rotation of the ratchet and totalizer member under their return bias, a feeler adapted for movement away from a retracted position toward the totalizer member, said feeler when in retracted position being out of engagement with the totalizer member so as not to impede the rotation of the ratchet and totalizer member by a coin, said totalizer member being so formed that in one position thereof it allows working movement of the feeler and in other positions thereof it prevents working movement of the feeler, manually operable means movable away from a retracted position for moving said feeler away from retracted position, an electric motor, cam means driven by the motor, said motor being connected in a circuit including a first switch actuable by the feeler on working movement of the feeler for starting the motor and a second switch actuable by the cam means adapted to hold the motor in operation for a cycle of the cam upon return of the feeler to retracted position, and means actuable by the cam means for actuating said pawl releasing means to allow for return rotation of the ratchet and totalizer member.

10. Coin apparatus as set forth in claim 9 including a yieldable connection between said manually operable means and said feeler allowing said feeler to be returned to retracted position if said manually operable means is held away from its retracted position.

11. Coin apparatus as set forth in claim 8 wherein said pawl releasing means is adapted to move said feeler toward

its retracted position before the release of said pawls.

12. Coin apparatus comprising a totalizer member adapted for advance movement in a forward direction from a retracted position and biased for return movement toward retracted position, a coin chute, means operable by a coin falling in the chute for advancing said totalizer member and for holding said totalizer member in any attained advanced position thereby to add up and register the total value of coins deposited in the chute, a feeler adapted for movement away from a retracted position toward the totalizer member, said totalizer member being so formed that in one position thereof it allows working movement of the feeler and in other positions thereof it prevents working movement of the feeler, an electric motor connected in a circuit including a switch, cam means driven by the motor for actuating the feeler, means actuated by a coin falling in the chute for closing the switch and holding it closed thereby to energize the motor, and means actuated by the feeler on working movement thereof for opening the switch thereby to deenergize the motor.

13. Coin apparatus as set forth in claim 12 wherein said means for closing the switch and holding it closed comprises a switch-actuating member movable from a retracted position to an operative position by a coin falling in the chute and biased to return to retracted position, and a latch adapted to latch said switch-actuating member in operative position, said means for opening the switch being adapted to release said latch.

14. Coin apparatus as set forth in claim 12 further comprising means actuable by the cam means for releasing the totalizer member to allow for return movement thereof under its bias.

15. Coin apparatus comprising a totalizer member adapted for advance movement in a forward direction from a retracted position and biased for return movement toward retracted position, a coin chute, means operable by a coin falling in the chute for stepping said totalizer member forward and for holding said totalizer member in any attained stepped position, the number of steps through which the totalizer member is advanced corresponding to the total value of coins deposited in the chute, a feeler adapted for movement away from a retracted position toward the totalizer member, said totalizer member being so formed that in the retracted position thereof it allows working movement of the feeler and in advanced positions thereof it prevents working movement of the feeler, escapement means adapted on actuation thereof to permit return of said totalizer member one step from any stepped position, an electric motor connected in a circuit including a switch, cam means driven by the motor for actuating the feeler and said escapement means, means actuated by a coin falling in the chute for closing the switch and holding it closed thereby to energize the motor, and means actuated by the feeler on working movement thereof for opening the switch thereby to deenergize the motor, the feeler being blocked from working movement by the totalizer member whenever the totalizer member is stepped forward from retracted position and the motor and cam means then remaining in operation until the totalizer member has been stepped back to retracted position by actuation of said escapement means.

16. Coin apparatus as set forth in claim 15 including a yieldable connection between said cam means and feeler adapted to yield to allow continued operation of said cam means when said feeler is blocked out by said totalizer member.

17. Coin apparatus as set forth in claim 16 wherein said means for closing the switch and holding it closed comprises a switch-actuating member movable from a retracted position to an operative position by a coin falling in the chute and biased to return to retracted position, and a latch adapted to latch said switch-actuating member in operative position, said means for opening the switch being adapted to release said latch.

18. Coin apparatus as set forth in claim 17 wherein the means for opening the switch includes a trip movable away from a retracted position by the feeler on working movement of the feeler and adapted to trip said latch on movement away from retracted position, said trip including means for holding the switch-actuating member against return to retracted position until the trip returns toward its retracted position.

19. Coin apparatus comprising a ratchet and a totalizer member rotatable together in a forward direction from a retracted position and biased for return movement toward retracted position, a coin chute, a driving pawl for the ratchet, a member engageable by a coin falling in the chute and operable by the weight of the coin for actuating the driving pawl to rotate the ratchet and totalizer member forward, a holding pawl engageable with the ratchet for holding the ratchet and totalizer member in any attained position, escapement means for releasing the pawls to allow for return rotation of the ratchet and totalizer member one step from any stepped position, a feeler adapted for movement away from a retracted position toward the totalizer member, said feeler when in retracted position being out of engagement with the totalizer member so as not to impede rotation of the ratchet and totalizer member by a coin, said totalizer member being so formed that in the retracted position thereof it allows working movement of the feeler and in advanced positions thereof it prevents working movement of the feeler, an electric motor connected in a circuit including a switch, cam means driven by the motor for actuating the feeler and said escapement means, means actuated by a coin falling in the chute for closing the switch and holding it closed thereby to energize the motor, and means actuated by the feeler on working movement thereof for opening the switch thereby to deenergize the motor, the feeler being blocked from working movement by the totalizer member whenever the totalizer member is moved to an advanced position and the motor and cam means then remaining in operation until the totalizer member has been returned to retracted position by actuation of said escapement means.

20. Coin apparatus as set forth in claim 19 wherein said circuit also has connected therein an electrically powered means for control by said switch and adapted to be energized as long as said switch is closed.

21. Coin apparatus as set forth in claim 19 including a yieldable connection between said cam means and feeler adapted to yield to allow continued operation of said cam means when said feeler is blocked out by said totalizer member.

22. Coin apparatus as set forth in claim 21 wherein said means for closing the switch and holding it closed comprises a switch-actuating member movable from a retracted position to an operative position by a coin falling in the chute and biased to return to retracted position, and a latch adapted to latch said switch-actuating member in operative position, said means for opening the switch being adapted to release said latch.

23. Coin apparatus as set forth in claim 22 wherein the means for opening the switch includes a trip movable away from a retracted position by the feeler on working movement of the feeler and adapted to trip said latch on movement away from retracted position, said trip having means for holding the switch-actuating member against return to retracted position until the trip returns toward its retracted position.

24. Coin apparatus comprising a totalizer member adapted for advance movement in a forward direction from a retracted position and biased for return movement toward retracted position, a coin chute, means operable by a coin falling in the chute for advancing said totalizer member and for holding said totalizer member in any attained advanced position thereby to add up and register the total value of coins deposited in the chute, a feeler adapated for movement away from a retracted position

toward the totalizer member, said totalizer member being so formed that in one position thereof it allows working movement of the feeler and in other positions thereof it prevents working movement of the feeler, means for releasing said totalizer member to allow for return movement thereof under its bias, cam means for actuating said releasing means, and control means for said cam means, said feeler on working movement thereof being adapted to actuate said control means, said cam means comprising a cam rotatable in single-revolution cycles and adapted on each revolution to actuate said releasing means.

25. Coin apparatus comprising a ratchet and a totalizer member rotatable together in a forward direction away from a retracted position and biased for return movement toward retracted position, a coin chute, a driving pawl for the ratchet, a member engageable by a coin falling in the chute and operable by the weight of the coin for actuating the driving pawl to rotate the ratchet and totalizer member forward, a holding pawl engageable with the ratchet for holding the ratchet and totalizer member in any attained position, means for releasing the pawls to allow for return rotation of the ratchet and totalizer member under their return bias, a feeler adapted for movement away from a retracted position toward the totalizer member, said feeler when in retracted position being out of engagement with the totalizer member so as not to impede the rotation of the ratchet and totalizer member by a coin, said totalizer member being so formed that in one position thereof it allows working movement of the feeler and in other positions thereof it prevents working movement of the feeler, cam means for actuating said pawl releasing means, and control means for said cam means, said feeler on working movement thereof being adapted to actuate said control means, said cam means comprising a cam rotatable in single-revolution cycles and adapted on each revolution to actuate said releasing means.

26. Coin apparatus comprising a totalizer member adapted for advance movement in a forward direction from a retracted position and biased for return movement toward retracted position, a coin chute, means operable by a coin falling in the chute for stepping said totalizer member forward and for holding said totalizer member in any attained stepped position, the number of steps through which the totalizer member is advanced corresponding to the total value of coins deposited in the chute, a feeler adapted for movement away from a retracted position toward the totalizer member, said totalizer member being so formed that in the retracted position thereof it allows working movement of the feeler and in advanced positions thereof it prevents working movement of the feeler, escapement means adapted on actuation thereof to permit return of said totalizer member one step from any stepped position, cam means for actuating the feeler and said escapement means, manually operable means adapted to actuate said cam means, means for locking said manually operable means out of operation, means actuated by a coin falling in the chute for moving the locking means to retracted position and holding it therein to allow operation of said manually operable means, and means actuated by the feeler on working movement thereof for returning said locking means to locking position, the feeler being blocked from working movement by the totalizer member whenever the totalizer member is stepped forward from retracted position and the locking means remaining in retracted position until the totalizer member has been stepped back to retracted position by actuation of said escapement means in response to operation of said manually operable means.

27. Coin apparatus as set forth in claim 26 including a yieldable connection between said cam means and feeler adapted to yield to allow continued operation of said cam means when said feeler is blocked out by said totalizer member.

28. Coin apparatus as set forth in claim 26 wherein the means for moving the locking means comprises a member movable from a retracted position to an operative position by a coin falling in the chute and biased to return to retracted position, and a latch adapted to latch said member in operative position, said means for returning said locking means being adapted to release said latch.

29. Coin apparatus as set forth in claim 26 wherein said manually operable means comprises a member movable away from and back to a retracted position, and a one-way drive mechanism between this member and the cam.

30. Coin apparatus comprising a ratchet and a totalizer member rotatable together in a forward direction from a retracted position and biased for return movement toward retracted position, a coin chute, a driving pawl for the ratchet, a member engageable by a coin falling in the chute and operable by the weight of the coin for actuating the driving pawl to rotate the ratchet and totalizer member forward, a holding pawl engeable with the ratchet for holding the ratchet and totailzer member in any attained position, escapement means for releasing the pawls to allow for return rotation of the ratchet and totalizer member one step from any stepped position, a feeler adapted for movement away from a retracted position toward the totalizer member, said feeler when in retracted position being out of engagement with the totalizer member so as not to impede rotation of the ratchet and totalizer member by a coin, said totalizer member being so formed that in the retracted position thereof it allows working movement of the feeler and in advanced positions thereof it prevents working movement of the feeler, cam means for actuating the feeler and said escapement means, manually operable means adapted to actuate said cam means, means for locking said manually operable means out of operation, means actuated by a coin falling in the chute for moving the locking means to retracted position and holding it therein to allow operation of said manually operable means, and means actuated by the feeler on working movement thereof for returning said locking means to locking position, the feeler being blocked from working movement by the totalizer member whenever the totalizer member is stepped forward from retracted position and the locking means remaining in retracted position until the totalizer member has been stepped back to retracted position by actuation of said escapement means in response to operation of said manually operable means.

31. Coin apparatus as set forth in claim 30 including a yieldable connection between said cam means and feeler adapted to yield to allow continued operation of said cam means when said feeler is blocked out by said totalizer member.

32. Coin apparatus as set forth in claim 30 wherein the means for moving the locking means comprises a member movable from a retracted position to an operative position by a coin falling in the chute and biased to return to retracted position, and a latch adapted to latch said member in operative position, said means for returning said locking means being adapted to release said latch.

33. Coin apparatus as set forth in claim 30 wherein said manually operable means comprises a member movable away from and back to a retracted position, and a one-way drive mechanism between this member and the cam.

34. Coin apparatus comprising a totalizer member adapted for advance movement in a forward direction from a retracted position and biased for return movement toward retracted position, a coin chute, means operable by a coin falling in the chute for advancing said totalizer member and for holding said totalizer member in any attained advanced position thereby to add up and register the total value of coins deposited in the chute, a feeler adapted for movement away from a retracted position toward the totalizer member, said totalizer member being so formed that in one position thereof it allows working

movement of the feeler and in other positions thereof it prevents working movement of the feeler, means for releasing said totalizer member to allow for return movement thereof under its bias, electrically powered means for actuating said releasing means connected in a circuit including a switch controlled by the feeler, the feeler on working movement thereof being adapted to operate the switch, and being blocked out from operating the switch by said totalizer member when the latter is in a position preventing working movement of the feeler, manually operable means movable away from a retracted position for moving said feeler away from retracted position, and a yieldable connection between said manually operable means and said feeler allowing said feeler to be returned to retracted position if said manually operable means is

held away from its retracted position, said electrically powered means being adapted to move said feeler toward its retracted position before the release of said totalizer member.

References Cited in the file of this patent

UNITED STATES PATENTS

2,251,994	Gallagher	Aug. 12, 1941
2,317,593	Dooley	Apr. 27, 1943

FOREIGN PATENTS

4,470	Great Britain	of 1912
29,102	Great Britain	of 1911
531,294	Great Britain	Jan. 1, 1941

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,053,370 September 11, 1962

James T. Schuller

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 62, for "conuterclockwise" read -- counterclockwise --; column 7, line 22, for "or" read -- on --; line 43, for "swing" read -- swings --; column 8, line 11, after "a", second occurrence, insert -- and --; line 45, for "ratch" read -- ratchet --; column 9, line 65, for "switch, actuating" read -- switch-actuating --; line 68, for claim "2" read -- 3 --; same line 68, for "wherein said" read -- including --; line 69, for "capement" read -- escapement --; column 10, line 74, for the claim reference numeral "8" read -- 10 --.

This certificate supercedes Certificate of Correction issued February 19, 1963.

Signed and sealed this 23rd day of April 1963.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,053,370 September 11, 1962

James T. Schuller

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 62, for "conuterclockwise" read -- counterclockwise --; column 7, line 22, for "or" read -- on --; line 43, for "swing" read -- swings --; column 8, line 11, after "a", second occurrence, insert -- and --; line 45, for "ratch" read -- ratchet --; column 9, line 65, for "switch, actuating" read -- switch-actuating --; line 68, for claim "2" read -- 3 --; same line 68, for "wherein said" read -- including --; column 10, line 74, for the claim reference numeral "8" read -- 10 --.

Signed and sealed this 19th day of February 1963.

(SEAL)
Attest:

ESTON G. JOHNSON
Attesting Officer

DAVID L. LADD
Commissioner of Patents