R. WATSON.

COIN CONTROLLED MECHANISM.

APPLICATION FILED NOV. 17, 1910.

1,084,305.

Patented Jan. 13, 1914.

4 SHEETS—SHEET 1.

Fig. 1.

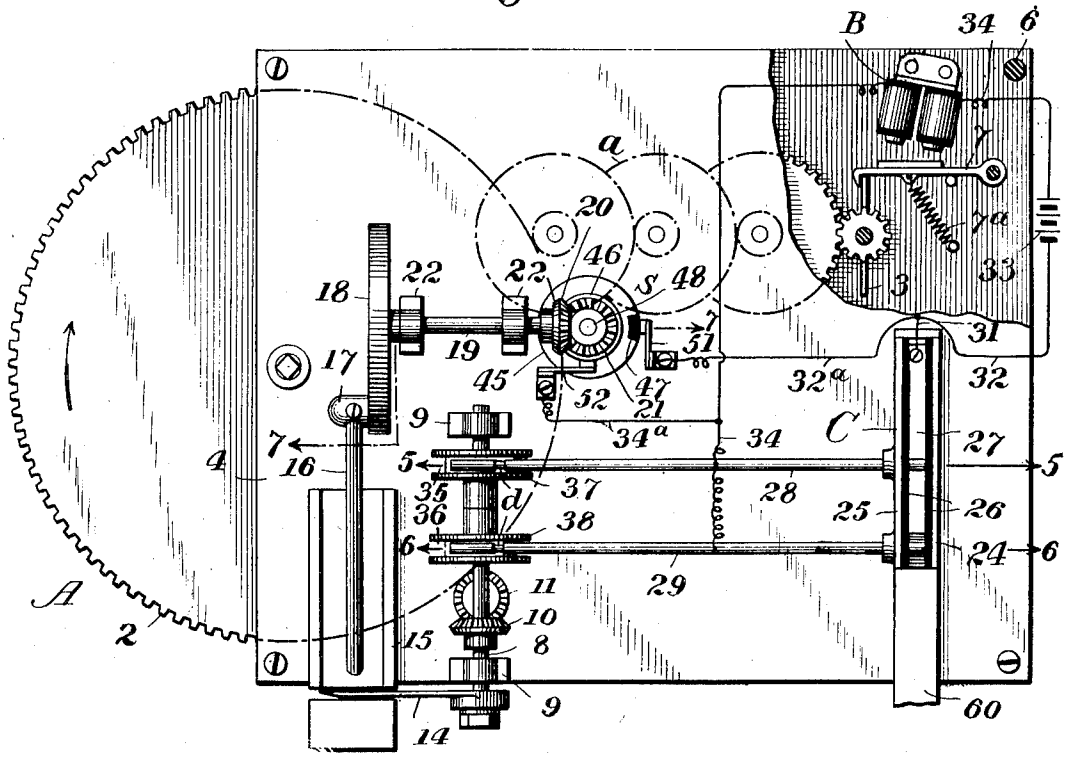
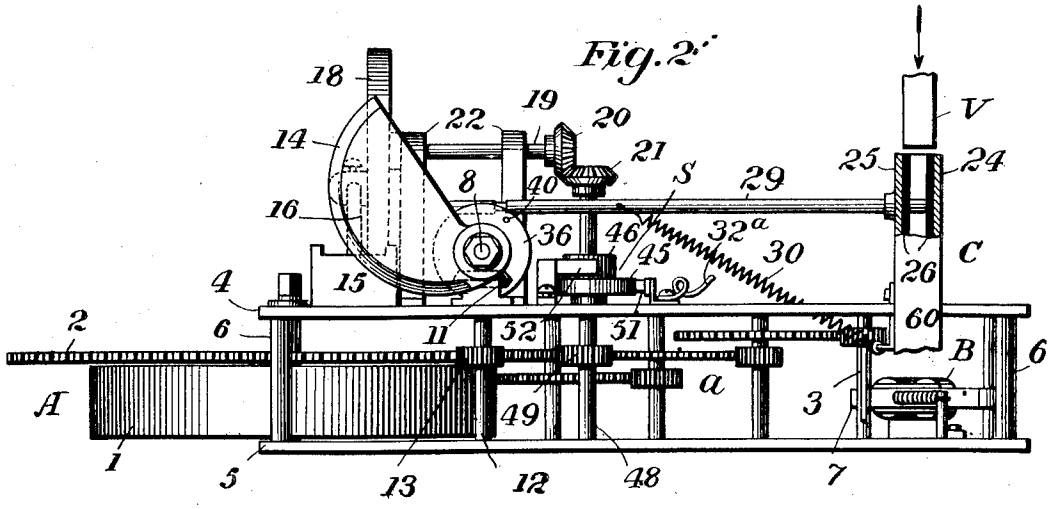


Fig. 2.



Witnesses

J. Gottlieb

Newton P. Wills

Inventor

Robert Watson

R. WATSON.

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4 SHEETS—SHEET 2.

Fig. 3.

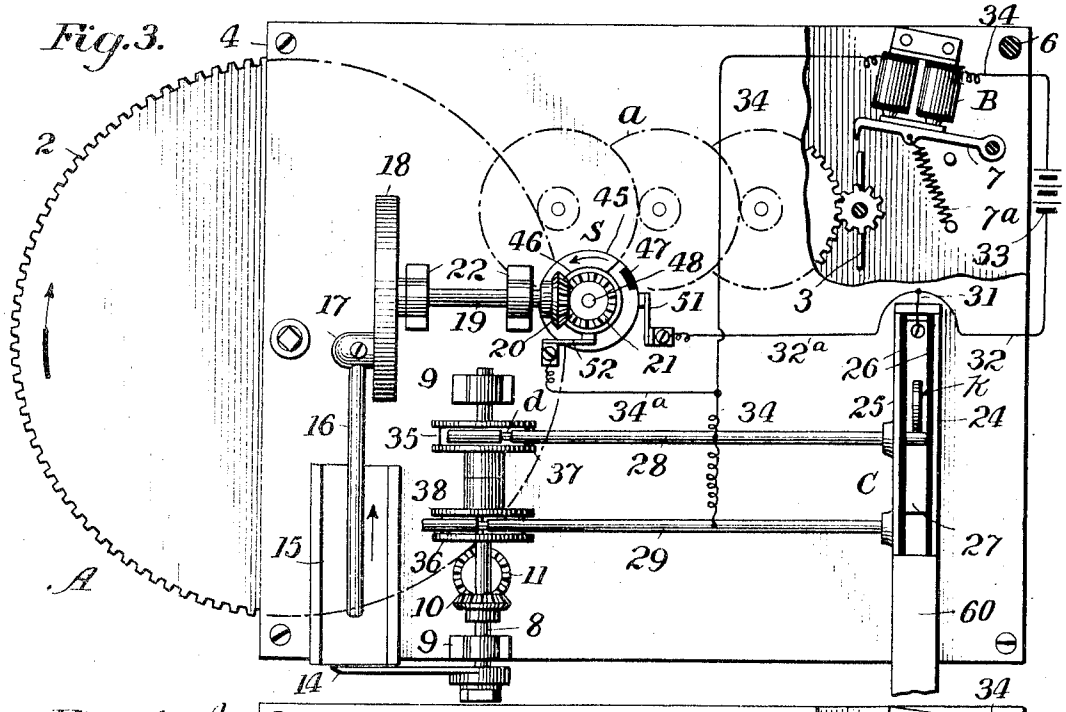
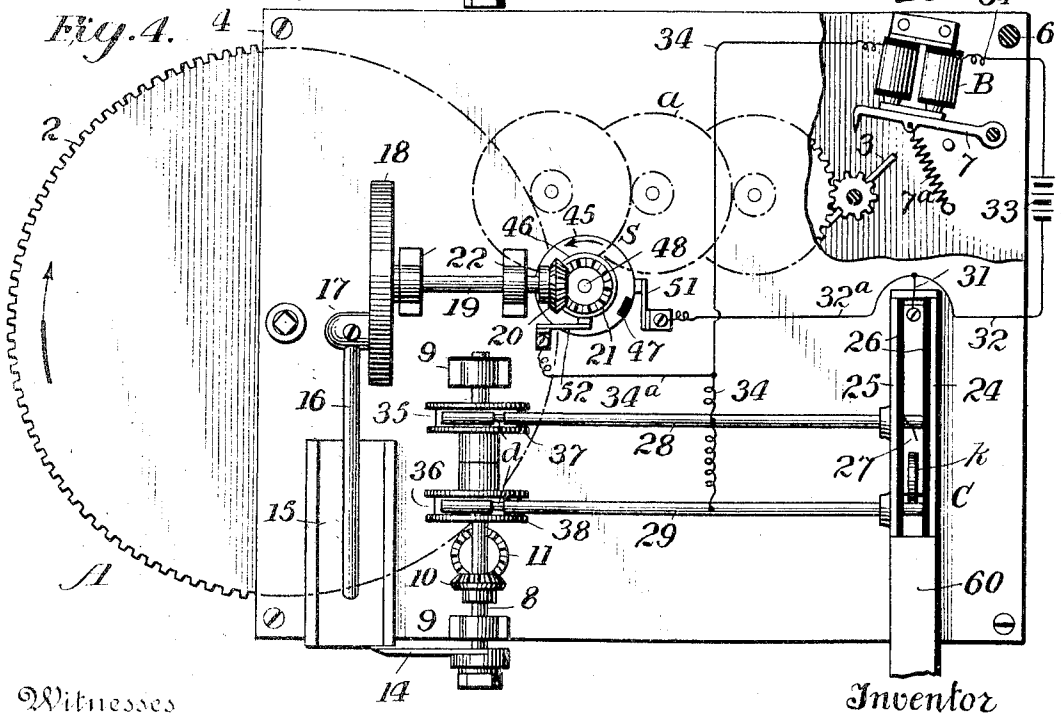


Fig. 4.



Witnesses

J. G. Stinkel

Thos. P. Wells

Inventor

Robert Watson

R. WATSON.

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4 SHEETS—SHEET 3.

Fig. 5.

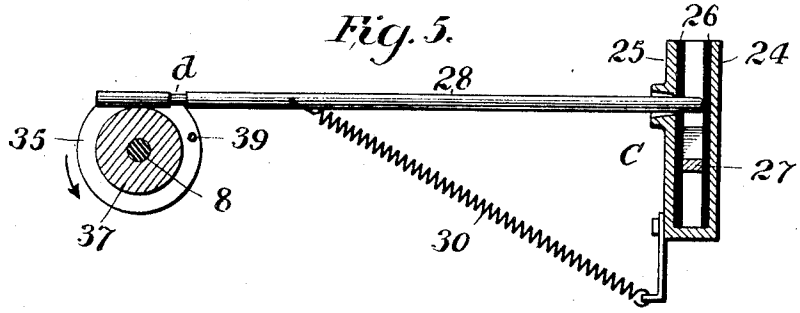


Fig. 6.

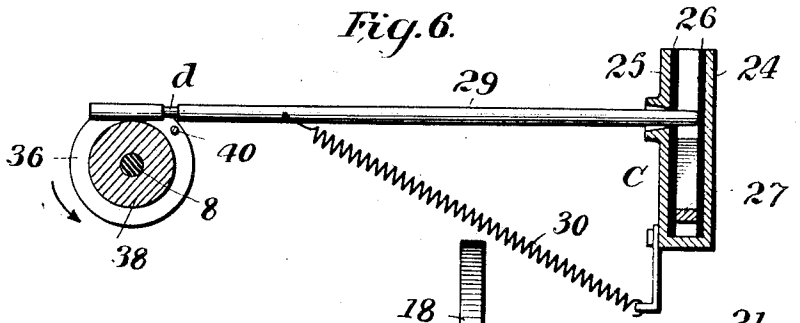


Fig. 7.

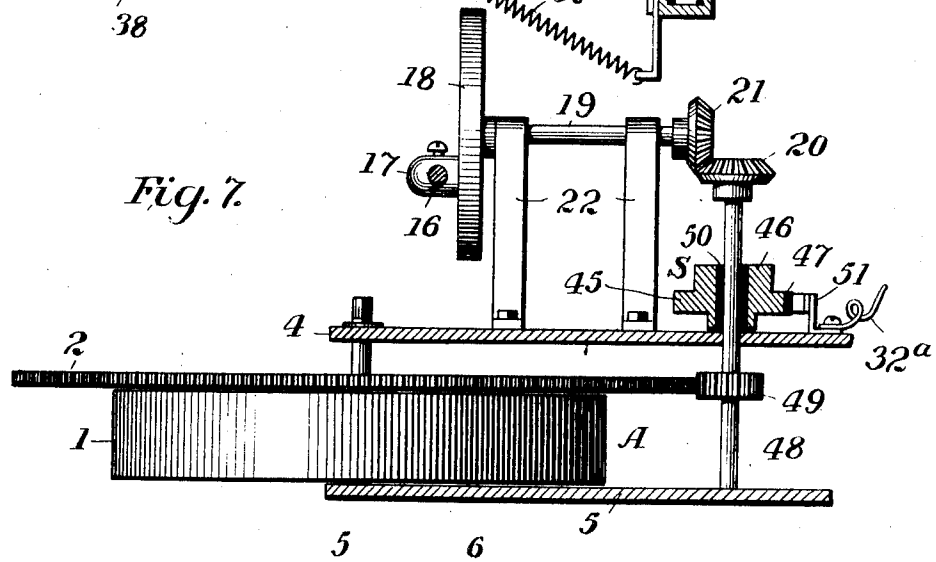
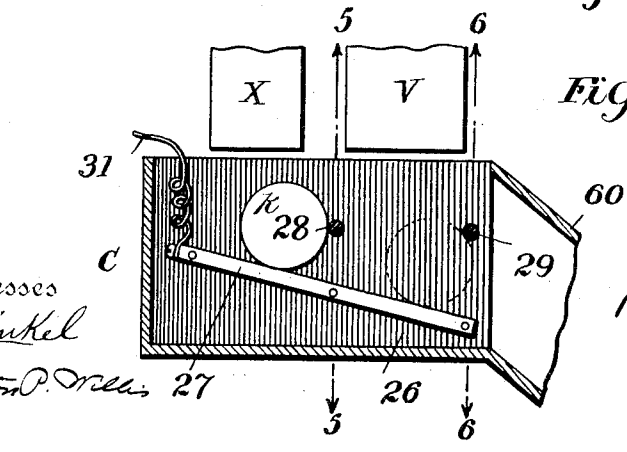


Fig. 8.



Witnesses

J. G. Hinkel

Newton P. Wills

Inventor

Robert Watson

R. WATSON.

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4 SHEETS—SHEET 4.

Fig. 9.

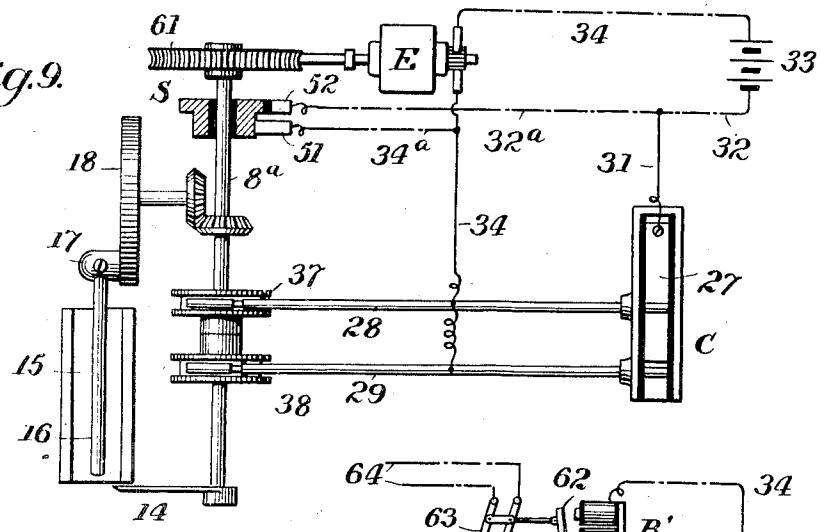


Fig. 10.

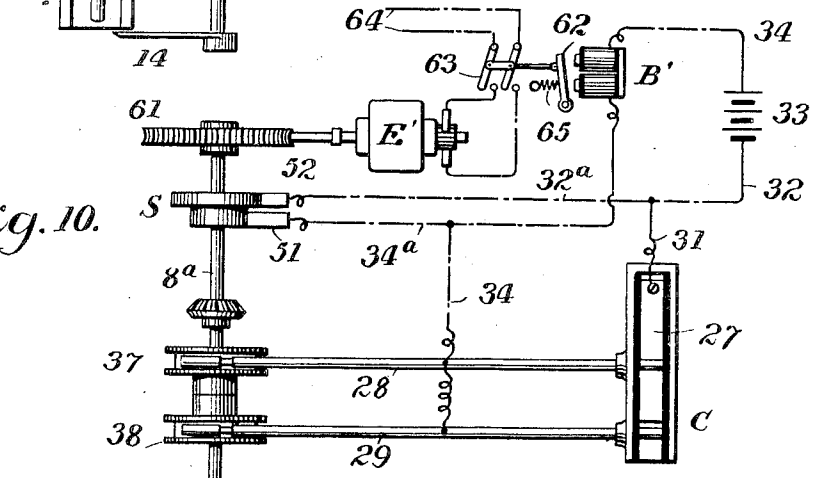
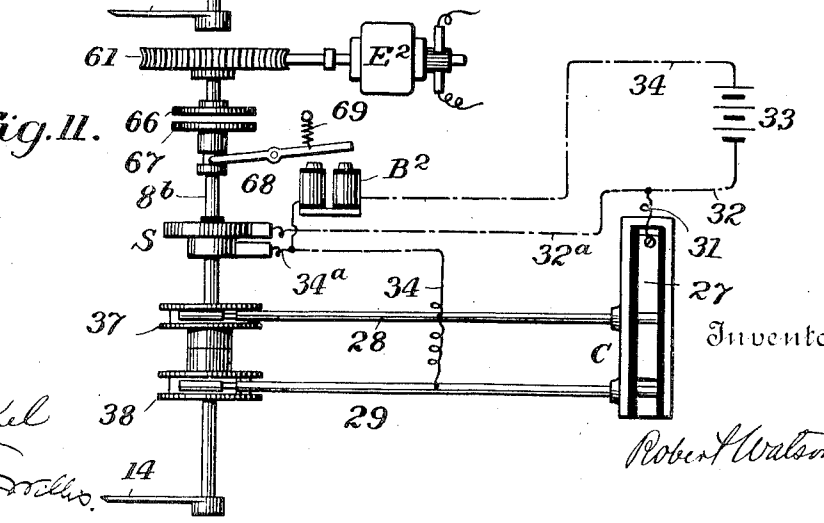


Fig. 11.



Witnesses

J. G. Finkel

Newton P. Wills.

Inventor

Robert Watson

UNITED STATES PATENT OFFICE.

ROBERT WATSON, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO GEORGE C. YOCUM, OF SCRANTON, PENNSYLVANIA.

COIN-CONTROLLED MECHANISM.

1,084,305. Specification of Letters Patent. Patented Jan. 13, 1914.

Application filed November 17, 1910. Serial No. 592,800.

To all whom it may concern:

Be it known that I, ROBERT WATSON, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Coin-Controlled Mechanism, of which the following is a specification.

This invention relates to means for controlling a motor by means of coins of various denominations, so that the motor, or apparatus operated thereby, may perform a given movement or cycle of operations when a coin of one value is inserted in the machine, and further movements or operations when a coin of higher value is inserted in the machine.

In the accompanying drawing which illustrates my invention, Figure 1 is a top plan view of a spring motor, with ticket feeding and cutting off mechanism operated thereby, and coin controlling means for regulating the movement of the motor, the top plate of the motor being partly broken away and the parts being shown in their normal positions; Fig. 2 is a front elevation of the same; Figs. 3 and 4 are top plan views of the mechanism shown in Fig. 1, illustrating the operation of the mechanism when a dime is inserted in the machine; Figs. 5 and 6 are sections on the lines 5—5 and 6—6 respectively, of Fig. 1; Fig. 7 is a section on the line 7—7 of Fig. 1; Fig. 8 is a longitudinal section through the coin receptacle, showing also parts of the chutes for delivering coins into the coin receptacle; Fig. 9 is a top plan view of a modification in which a small electric motor is employed to operate the mechanism, the motor circuit being arranged so that it will be completed directly by the coin; Fig. 10 is a top plan view of a modification in which a coin closes a circuit through an electromagnet which controls a switch for starting and stopping a motor; and, Fig. 11 is a similar view of a modification in which a constantly driven motor is employed and the delivery mechanism is connected to and disconnected from the motor by a magnetically controlled clutch, the controlling magnet having its circuit arranged so as to be completed by a coin.

Referring to Figs. 1 to 8 inclusive of the drawing A indicates a motor comprising a spring 1, a large operating gear 2 adapted to be rotated by the spring and a train of gearing *a* connected to the main operating gear and arranged to drive a fan governor 3 which prevents the motor from racing when released. The spring and the gears referred to are suitably mounted upon arbors between parallel plates 4 and 5 which are suitably spaced apart by studs 6 and form the frame work of the mechanism. The motor is normally held against movement by a spring detent 7 which engages the fan governor 3 as shown in Fig. 1. This detent is moved by a magnet B to release the motor, as shown in Fig. 3, when a coin is inserted in the machine, as will be presently described. The motor may be connected to any suitable mechanism which it is desired to operate once for a coin of one value and more than once for a coin of higher value. In the drawing I have shown, for the purpose of illustration, a mechanism for cutting off and delivering tickets from a ticket strip or roll but this feeding and cutting mechanism form no part of the present invention. As shown an operating shaft 8 is mounted in suitable bearings 9 upon the top plate 4 of the motor and this shaft is connected by beveled gears 10 and 11 to an arbor 12 carrying a pinion 13 which meshes with the main operating gear 2, so that when the gear 2 turns the shaft 8 will also rotate. The shaft 8 carries a knife or cutter 14 which is movable past the end of a bed plate 15 upon which a paper strip, not shown in the drawing, is fed forward by a pawl 16. The pawl 16 has one end journaled upon the crank pin 17 projecting from a wheel 18 which is mounted upon a shaft 19. The shaft 19 is geared to an arbor 48 by bevel pinions 20 and 21 of equal diameter and the arbor 48 carries a pinion 49, of the same diameter as the pinion 13, said pinion 13 meshing with the main gear 2. The arbors 12 and 48 and the shafts 8 and 19 are all turned in unison. The shaft 19 is mounted in suitable bearings 22. The pawl 16 and knife 14 are normally in the positions shown in Figs. 1 and 2. When the motor starts into operation the knife moves past the end of the bed plate 15 and cuts off a ticket, which has previously been fed forward, while the pawl is moving backward as indicated by the arrow in Fig. 3. While the knife is completing its revolution after having cut off a ticket, the pawl moves forward and feeds another ticket past the plane of the knife and the motor then stops if it has

been operated by a five cent piece, or continues in operation until the second ticket has been cut off and another ticket fed forward, if the machine is operated by a dime. A coin receptacle C is arranged above the top plate of the motor, beneath chutes X and V through which dimes and five cent pieces, respectively, may be delivered into the receptacle. This receptacle, as shown in the drawing, consists of a narrow pocket having vertical side walls 24 and 25 lined, on their inner sides, with fiber or other suitable insulating material 26. The bottom of the pocket or receptacle consists of an inclined metal bar or rod 27 which is supported between the insulating linings 26 so as to be free from any electrical connection with the metal sides of the receptacle. Two coin retaining rods 28 and 29 project through suitable openings in the side 25 of the coin receptacle and normally abut against the side 24 or the lining on said latter side, being held in their normal positions by springs 30. These rods are so positioned that a coin passing through the chute X (Fig. 8) into the receptacle will be detained in the receptacle by the rod 28 and a coin dropped through the chute V into the receptacle will be retained by the rod 29. The inclined bar 27 of the coin receptacle, and the retaining rods 28 and 29, form terminals of an electric controlling circuit which includes the release magnet B, so that whenever a coin enters the coin receptacle and rolls against one of the retainers, the circuit is completed by the coin, through the release magnet, and the detent 7 is thereby withdrawn from engagement with the fan governor, permitting the motor to start. As shown, the inclined bar 27 which forms the bottom of the coin receptacle is connected by conductors 31 and 32 to one pole of a battery 33 and the retainers 28 and 29 are connected by a conductor 34 through the coils of the release magnet B to the other side of the battery 33. It will be evident that whenever a coin engages one of the coin retainers and the bottom of the pocket or receptacle the circuit will be closed and the magnet B energized, and the motor will start. The retainers 28 and 29 are moved alternately by the motor, after it is in operation, for the purpose of releasing the coin from the receptacle. The free ends of the coin retaining rods 28 and 29 rest within grooves 35 and 36 in hubs 37 and 38, respectively, which are mounted upon the operating shaft 8. The rod 28 has an annular recess d adapted to be engaged by a tripping pin 39 as the hub 37 rotates and the rod 29 has a similar recess d adapted to be engaged by a tripping pin 40 carried by the hub 38. The tripping pin 40 is advanced closer to the recess in the rod 29 than is the pin 39 with respect to the recess in the rod 28, so that when the motor starts into operation the pin 40 first engages and moves the rod 29 outwardly against the action of its spring 30, said rod being then released from the tripping pin and drawn back by the spring 30 after the shaft 8 has made about one-quarter revolution. The tripping pin 39 then engages the recess in the rod 28 and moves the latter out of the coin receptacle, the rod 28 being then returned by its spring 30 after the pin 39 has become disengaged from the recess in the rod. Both rods are therefore tripped, in succession, during each revolution of the operating shaft 8. A rotary switch S is driven by the motor and turns once for each revolution of the operating shaft 8. This switch consists of a metal disk 45 having a cylindrical hub 46 and having a short block or strip of insulation 47 inserted in a notch in the periphery of the disk. The switch is mounted upon the spindle or arbor 48 having a pinion 49 which meshes with the main operating gear 2, and a bushing 50 of insulating material is interposed between the spindle and the metal disk and hub of the switch. A brush 51 is arranged to bear against the periphery of the disk and a brush 52 is arranged to bear against the hub 46. A branch wire 32^a connects the conductor 32 with the brush 51 and a branch wire 34^a connects the conductor 34 with the brush 52. Normally the brush 51 rests against the insulation 47 as shown in Fig. 1 so that the circuit cannot be completed through the switch; but when the motor starts into operation the insulation 47 passes from beneath the brush 51 and the latter then bears against the metal disk and is electrically connected through the disk and hub 46 to the brush 52. Current can then flow from one side of the battery through wires 32, 32^a, brush 51, switch S, brush 52, wires 34^a and 34 and the coils of the magnet B to the other side of the battery and this path for the current will be continued until the switch S, which turns in unison with the operating shaft 8, has completed one revolution and the insulation 47 has again moved under the brush 51, interrupting the electrical connection between said brush and the switch S.

In operation, if a dime is placed in the machine (which of course is inclosed in a suitable casing) it falls through the chute X (Fig. 8) on to the inclined rod or bar 27, which forms the bottom of the receptacle, and rests against the retainer 28, as shown in Fig. 3, thereby electrically connecting the part 27 with the retainer 28 and completing the circuit through the release magnet B by way of the conductors 32 and 34 which are connected, respectively, to the parts 27 and 28. The magnet B then moves the detent 7 against the action of its spring 7^a and releases the motor. As the motor starts into operation, the block of insulation 47 on the

switch S moves from under the brush 51, as shown in Fig. 3, so that another path for the current, through the release magnet, besides that through the coin, is formed at the switch S, through the brushes 51 and 52. During the first rotation of the operating shaft 8, and the switch S, the retaining rod 29 is drawn out and released, accomplishing no function thereby, and the retaining rod 28 is subsequently drawn out to release the coin and then moves back to normal position under the tension of its spring. When the rod 28 is drawn out the coin rolls from the position shown in Fig. 3, where it is against the rod 28, into the position shown in Fig. 4 where it engages and electrically connects the rod 29 with the bottom 27 of the coin receptacle. Of course, when the coin is released from the rod 28 the electrical circuit through the coin is temporarily broken but at this time it is maintained through the brushes 51 and 52 and the switch S, so that the release magnet B is continuously energized and the detent held out of engagement with the fan governor. When the coin reaches the rod 29 the circuit is completed through the coin and also through the switch S. After the operating shaft 8 has made one revolution and one ticket has been cut off and another one fed forward, the switch S carries the insulation 47 again under the brush 51, breaking the circuit at said brush; but as the coin is at this time in engagement with the rod 29 current flows through the coin and a circuit is thus maintained through the release magnet while the insulation 47 is passing beneath the brush 51 at the commencement of the second revolution of the switch and operating shaft. Fig. 3 shows the positions of the parts at the commencement of the first cycle of operations and Fig. 4 shows the positions of the parts near the end of the first cycle of operations. When the insulation 47 has passed the brush 51 at the commencement of the second cycle of operations, and the circuit through the release magnet has been completed through the brushes 51 and 52 and the switch S, the retaining rod 29 is moved out, to release the coin from the coin receptacle, and the coin drops into a chute 60 which conducts it to a suitable cash drawer, not shown in the drawing. The rod 29 then returns to normal position and the rod 28 is moved out and tripped, performing no function, however, and when the operating shaft 8 and the switch S have completed a second revolution the insulation 47 passes beneath the brush 51 and interrupts the circuit through the release magnet. The detent 7 is then retracted by its spring 7^a and engages the fan governor, causing the stoppage of the motor. Thus it will be seen that when a dime is inserted in the machine the motor will operate to a sufficient extent to cause two operations of the delivery mechanism, and the motor will then stop. If a five cent piece or "nickel" is inserted in the machine it drops through the chute V (Fig. 8) and engages the retaining rod 29, closing the circuit through the release magnet as before described. As soon as the motor starts into operation the rod 29 is tripped, thereby releasing the five cent piece from the coin receptacle, but before the circuit through the coin is broken, a circuit is established at the switch S through the brushes 51 and 52, and this circuit remains complete until the switch S and the operating shaft 8 have made one complete revolution, when the insulation 47 will pass beneath the brush 51 and open the circuit at said brush. The release magnet is thereby deënergized and the detent moves into engagement with the fan governor. When a five cent piece is inserted in the machine therefore the motor only moves to a sufficient extent to cause the delivery mechanism to perform one cycle of operations, whereas if a dime is inserted the movement of the motor is greater and the delivery mechanism performs two operations.

It will be noted that when a five cent piece is inserted in the machine the control circuit is initially closed by the coin and it is then maintained by the revolving switch, after the coin is released, until the delivery mechanism has operated once and returned to normal position, when the motor stops, and that when a dime is inserted in the machine, the dime initially closes the control circuit, to start the motor, and after the dime is released from the first retaining rod the circuit is maintained through the switch S during the first operation of the delivery mechanism, and at the commencement of the second operation of the delivery mechanism the circuit is maintained through the dime and then continued through the switch S, after the dime is released from the second retainer and until the delivery mechanism has performed the second operation.

In Fig. 9 is shown a modification in which a small electric motor E is arranged to drive the operating shaft 8^a of the delivery mechanism through the medium of a large worm gear 61. The switch S is arranged directly upon the shaft 8^a, in this view, and the motor circuit, leading from a suitable battery or generator 33 is connected to the coin retaining rods 28 and 29 and to the bottom 27 of the coin receptacle and to the brushes 51 and 52 in the same way that the circuit of the release magnet is connected in the previously described figures. The circuit arrangement is the same except that the conductor 34 leads through the motor instead of through the release magnet as in the before described figures, and the same reference numerals are used to indicate the same parts of the circuit.

In the operation of the mechanism shown in Fig. 9 the coin initially closes the circuit of the motor by connecting the bottom 27 of the receptacle with one of the coin retainers, and after the coin is released the circuit is maintained through the switch S, the operation being substantially the same as described in connection with the preceding figures so that no further description is required. If desired a brake, operated by a magnet, may be applied to the armature shaft of the motor to overcome its momentum at the time of stopping.

In Fig. 10 the magnet B′ is shown in a circuit arranged the same as the circuit of the magnet B in Figs. 1 to 4 inclusive, but the magnet in Fig. 10 is arranged to operate an armature 62 which is connected to a line switch 63 for connecting the windings of a small electric motor E′ to a line or supply circuit 64 which is independent of the circuit from the battery or generator 33. When a coin is inserted in the machine the circuit through the magnet B′ is completed, and the armature 62 is moved by the magnet so as to close the switch 63 and connect the motor E with the supply circuit 64. After the delivery mechanism has operated once or twice, depending upon the coin used, the circuit through the magnet B′ is broken and a spring 65 retracts the armature 62 and causes the switch 63 to disconnect the motor from the line or supply circuit, thereby causing the stoppage of the motor.

In Fig. 11 a small electric motor E^2 is driven constantly from a suitable source of current supply and rotates a worm gear 61, which in turn operates a clutch member 66 arranged opposite a clutch member 67 upon the operating shaft 8^b of the delivery mechanism. The circuit through the magnet B^2 is the same as the circuit through the magnet in Figs. 1 to 4 and Fig. 10. When the magnet B^2 is energized by the insertion of a coin it moves a clutch lever 68 to throw the clutch member 67 into engagement with the constantly driven member 66, so that the operating shaft is put into motion. After the coin has been released and the operating shaft has made one or two revolutions, as the case may be, the circuit through the magnet B^2 is interrupted and a spring 69 moves the clutch lever to disengage the clutch members, thereby causing the stoppage of the operating shaft of the delivery mechanism. The clutch may be simply two disks adapted to engage frictionally, as any slight slippage between the clutch members will not affect the operation of the delivery mechanism, the clutch members always remaining in engagement until one or two complete operations of the delivery mechanism have been accomplished. A suitable brake may be applied to the operating shaft to prevent over-rotation when the operating shaft is brought to the stop position.

What I claim is:—

1. The combination with a motor and an electric circuit for controlling the operation of the motor, of a coin receptacle and a coin retainer arranged to be electrically connected by a coin and forming terminals of said circuit, means controlled by the motor for moving the retainer to release the coin, and means independent of the coin and operated by the motor for closing said circuit before the coin is released from the retainer and for maintaining said circuit closed after the release of the coin until the motor has performed a given movement.

2. The combination with a motor and an electric circuit for controlling the operation of the motor, of a coin receptacle and a coin retainer arranged to be electrically connected by a coin and forming terminals of said circuit, means controlled by the motor for moving the retainer to release the coin, and a rotary switch operated by the motor for closing said circuit before the coin is released from the retainer and for maintaining said circuit closed after the release of the coin until the motor has performed a given movement.

3. The combination with a motor and an electric circuit for controlling the operation of the motor, of a coin receptacle and a plurality of coin retainers arranged to be electrically connected to said receptacle by a coin, said receptacle and retainers forming terminals of said circuit, means for moving the retainers in succession to release the coin therefrom in succession, and means independent of the coin and operated by the motor for closing said circuit before the coin is released from each retainer and for maintaining said circuit closed while the motor performs a given movement after the release of the coin from each retainer.

4. The combination with a shaft, a motor for driving the same, and an electromagnetic device for controlling the operation of said shaft by said driving means, of a coin receptacle and a coin retainer arranged to be electrically connected by a coin and forming terminals of an electric circuit which includes said electromagnetic device, means operated by said motor for moving said retainer to release the coin, and means operated by the motor for closing said circuit before the coin is released from the retainer and for maintaining the circuit through said electromagnetic device after the release of the coin until the motor has completed a given movement.

5. The combination with a motor and an electromagnetic device for controlling the starting and stopping of the same, of a coin receptacle and a coin retainer arranged to

be connected by a coin and forming terminals of an electric circuit which includes said electromagnetic device, means controlled by the motor for moving said retainer to release the coin, and means operated by the motor for closing said circuit before the coin is released from the retainer and for maintaining the circuit through said electromagnetic device after the release of the coin and until the motor has completed a given movement.

6. The combination of a motor, a coin receptacle, a retainer for holding a coin in the receptacle, an electric circuit for controlling the starting and stopping of the motor, said circuit having terminals arranged to be closed by means of a coin when the latter is held by the retainer, means operated by the motor for moving the retainer to release the coin, and a switch operated by the motor and adapted to close said circuit before the coin is released from the retainer and to keep said circuit closed after the coin has been released from the retainer and until the motor has completed a given movement.

7. The combination of a motor, a coin receptacle, a plurality of coin retainers for holding a coin in said receptacle, means operated by the motor for moving said retainers to release the coin from successive parts of the receptacle, a control circuit adapted to be closed by means of a coin when the latter engages any of the retainers, and a switch, movable by the motor for closing said circuit before the coin is released from each retainer and for maintaining said circuit closed while the motor performs a given movement, after the coin has been released from any of the retainers.

8. The combination of a motor, a coin receptacle, a plurality of coin retainers, means for moving said retainers successively to release a coin from different portions of the receptacle, an electric circuit for controlling the starting and stopping of the motor, said circuit having terminals arranged to be closed by means of a coin when the latter engages any of the retainers, and a switch operated by the motor for closing said circuit before the coin is released from each retainer and for maintaining said circuit closed after the coin is released from any of the retainers and until the motor has completed a given movement.

9. The combination with a motor and an electric circuit for controlling the operation of the motor, of a coin receptacle arranged so that a coin may pass therethrough by gravity and a plurality of coin-retainers spaced apart from one another and extending into said receptacle in the path of the coins said receptacle and retainers forming terminals of said circuit, chutes for delivering coins of higher and lower denominations into higher and lower portions of said receptacle, respectively, so as to initially engage different retainers and close the circuit therethrough, means operated by the motor for moving the retainers in succession out of and into the path of the coins, and a switch operated by the motor for maintaining said circuit closed while the motor performs a given movement after the release of a coin from any of the retainers.

10. The combination with a motor of a coin receptacle, a coin retainer and an electric circuit for controlling the motor, adapted to be completed by a coin in said receptacle engaging said retainer, means operated by the motor for moving said retainer to release the coin, a normally open switch in a branch of said circuit, and means operated by the motor for moving said switch to closed position before the coin is released and to open position after the coin has been released and after the motor has performed a given further movement.

11. The combination with a motor of a coin receptacle, a plurality of coin retainers and an electric circuit for controlling the motor adapted to be closed by a coin in said receptacle engaging any of said retainers, means operated by the motor for moving said retainers to release the coin therefrom successively, a normally open switch in a branch of said circuit, and means operated by the motor for moving said switch to closed position prior to the release of the coin from each retainer and to open position after the motor has performed a given movement.

12. The combination with a motor, a coin receptacle and a coin retainer, of an electric circuit for controlling the motor adapted to be closed by a coin when the coin engages the retainer, means operated by the motor for releasing the coin from the retainer, and a normally open rotary switch geared to the motor so as to make one revolution while the motor is performing a given movement, said switch being arranged to close said circuit prior to the release of the coin and to open the circuit after the release of the coin.

In testimony whereof I affix my signature, in presence of two witnesses.

ROBERT WATSON.

Witnesses:

NEWTON P. WILLIS,

JOHN H. SIGGERS.