Oct. 15, 1940. E. C. MUELLER 2,217,845

CONTROL MECHANISM

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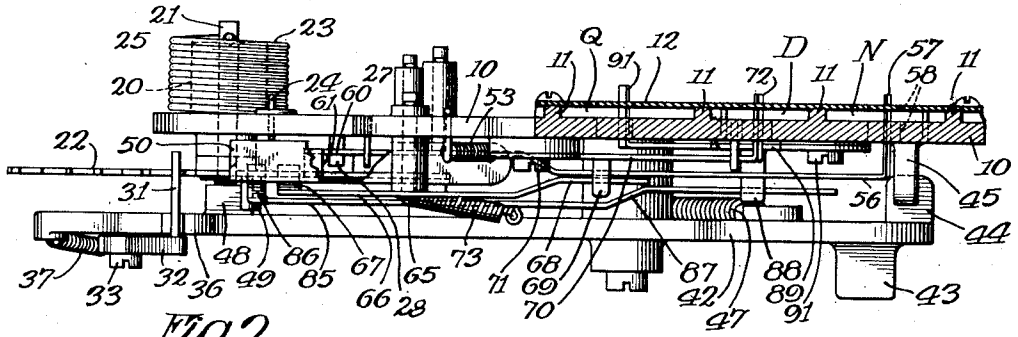


Fig. 2.

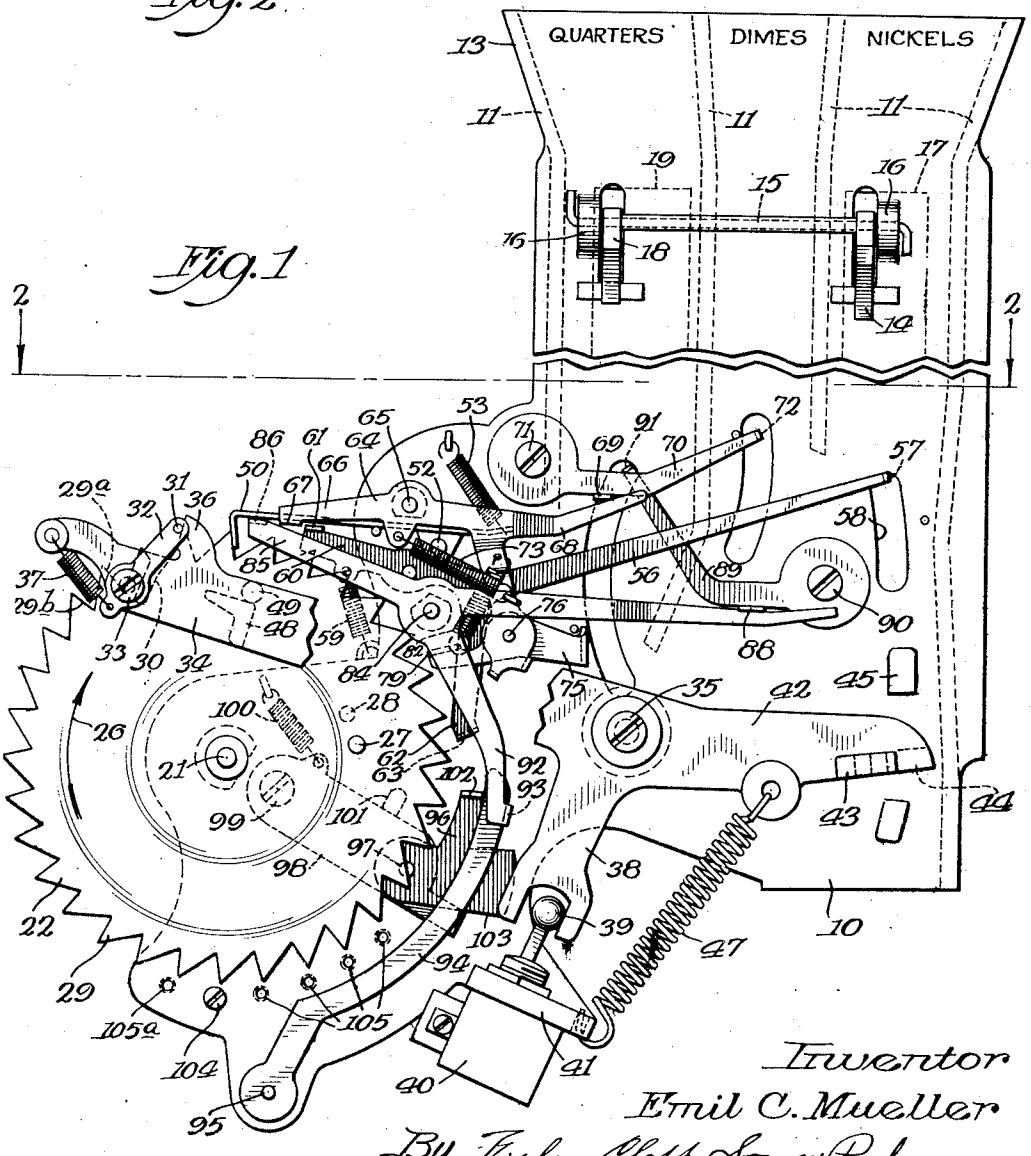


Fig. 1.

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Fig. 3

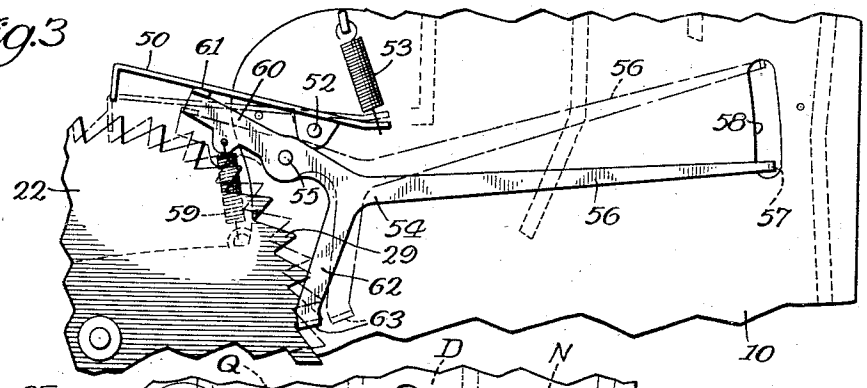


Fig. 4

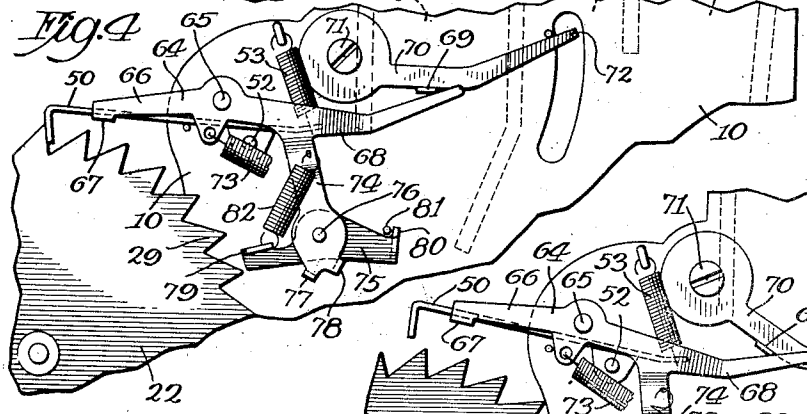


Fig. 5

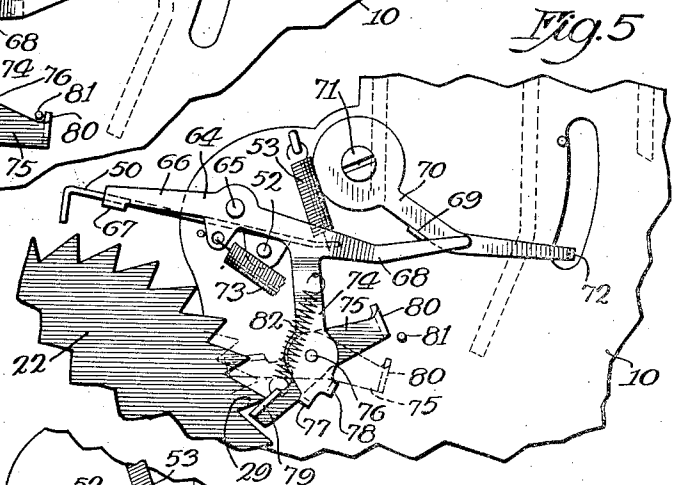
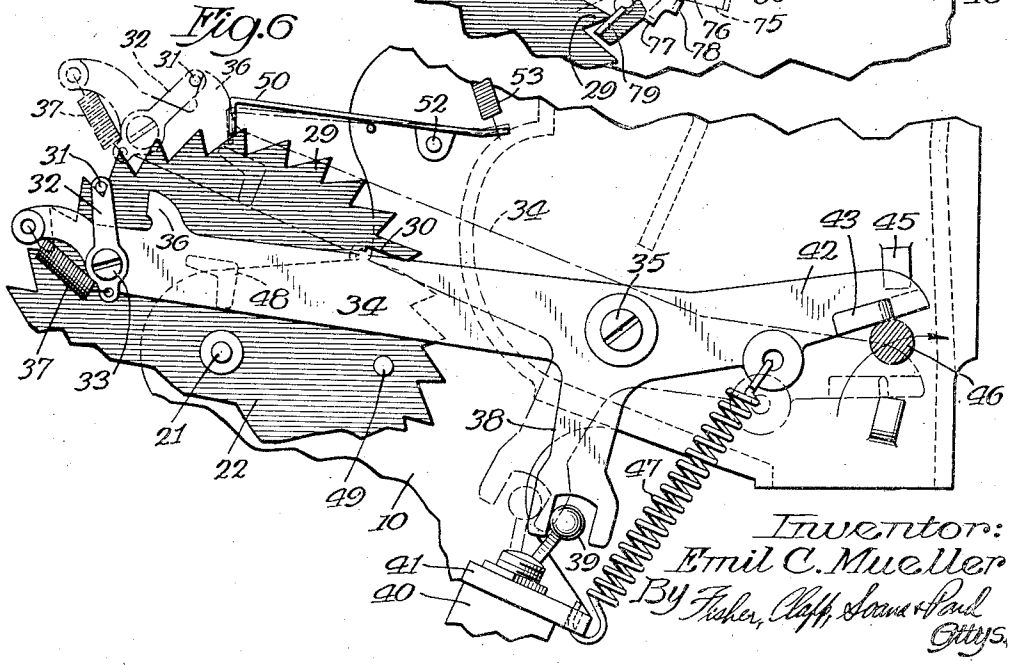


Fig. 6



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Fig. 7

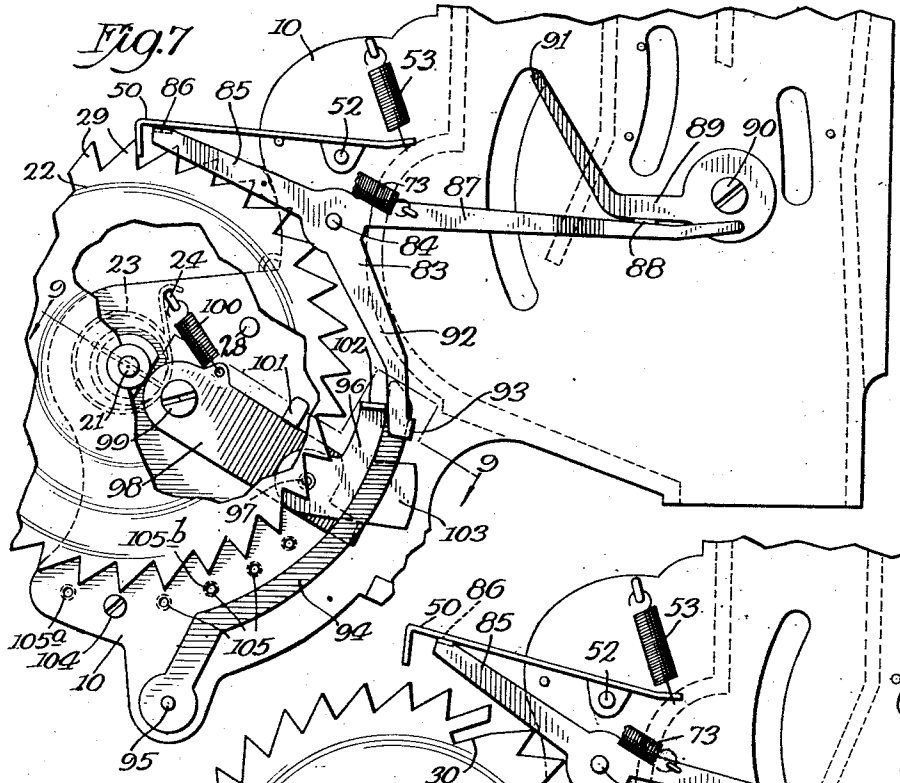


Fig. 8

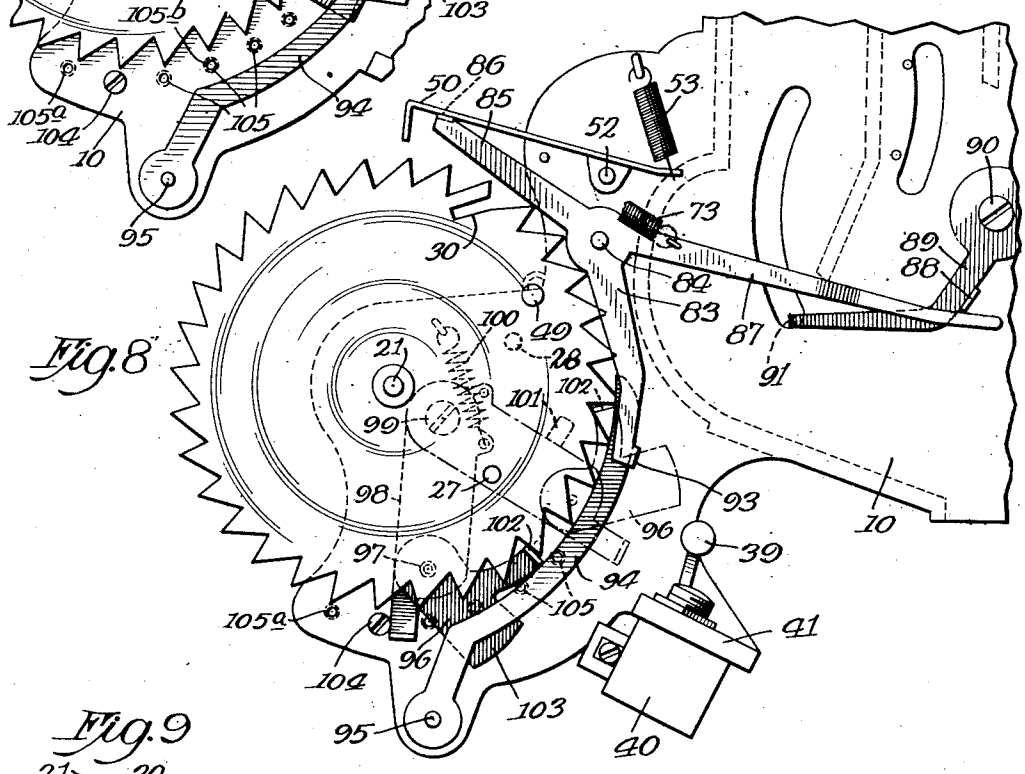
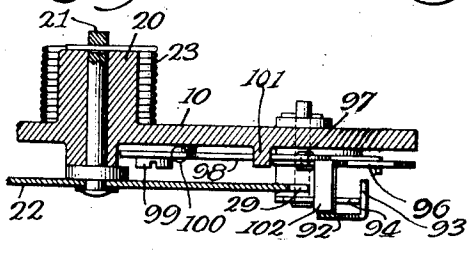


Fig. 9



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Patented Oct. 15, 1940 2,217,845

UNITED STATES PATENT OFFICE

2,217,845

CONTROL MECHANISM

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Application April 19, 1937, Serial No. 137,723

7 Claims. (Cl. 194—9)

This invention relates to mechanisms for controlling automatically operable devices such as automatic phonographs and other forms of vending apparatus. The mechanism is particularly designed for coin controlling automatic phonographs, but it will be understood that it may be adapted to other similar uses.

The main objects of the invention are to provide a mechanism which will afford a predetermined range of selection as to the goods to be vended, for example, a selection of the number of selections to be played on an automatic phonograph; to provide mechanism whereby coins of different values may be employed for affecting predetermined operation of the mechanism controlled; to provide mechanism in which a plurality of coins of the same denomination or of different denominations may be successively deposited to effect successive operation of the control mechanism in accordance with the value of all of the coins deposited; to provide mechanism for the purpose indicated which is of durable but simple construction and which will be efficient in operation; and in general it is the object of the invention to provide an improved control mechanism of the type indicated.

Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawings (three sheets) wherein there is illustrated coin control mechanism particularly designed for controlling an automatic phonograph.

In the drawings:

Figure 1 is an elevation.

Figure 2 is a section on the line 2—2 of Figure 1.

Figure 3 is a fragmentary view corresponding to a portion of Figure 1 and showing one portion of the mechanism for effecting predetermined operation of the controlled mechanism.

Figures 4 and 5 are fragmentary views showing a portion of the mechanism shown in Figure 1, which is operative to secure a more extended or different operation of the controlled mechanism, Figure 5 showing the parts of Figure 4 in a changed position.

Figure 6 is a fragmentary view corresponding to a portion of Figure 1, but showing certain parts in a changed position.

Figures 7 and 8 also correspond to certain portions of Figure 1, but show changed positions of a third mechanism for securing a still more extended or different operation of the controlled mechanism; and

Figure 9 is a section on the line 9—9 of Figure 7.

Referring now to the drawings, the mechanism illustrated comprises a main frame or supporting member 10 which may conveniently be made of cast metal. The member 10 has an upstanding part formed with generally vertically disposed ribs 11, 11 which provide coin chute spaces between them. A sheet metal covering plate 12 may be secured to the member 10 in any suitable manner so as to complete the coin chutes formed between the ribs 11, 11. For the purpose of this application the respective coin chutes may be designated Q, D and N and it may be assumed that these chutes are respectively proportioned to receive quarters, dimes, and nickels.

The upper end portion 13 of the cast metal frame structure 10 is preferably formed so as to provide widened mouths both lengthwise and transversely of the coin chutes for facilitating deposit of coins in said chutes. Near the upper ends of the coin chutes Q and N there are provided devices for ejecting coins improperly inserted into the chute. It will, of course, be understood that at the upper ends of the chutes, i. e., over the mouths thereof, there will be provided a cover plate having slots of proper size to permit coins such as quarters, dimes or nickels to be passed therethrough. Such slots will prevent the insertion of nickels or quarters into the dime chute and the insertion of quarters into the nickel chute, however, they will not prevent the insertion of dimes into the nickel chute or the insertion of dimes and nickels into the quarter chute.

To prevent the operation of the mechanism by means of a dime or penny inserted into the nickel chute, there is provided a lever 14 pivotally supported on a shaft 15 which is carried by lugs 16 formed integral with the frame member 10. The arm 14 includes a portion which extends across the chute N and through an opening 17 provided in the closure plate 12. The opening 17 is of such size that any coin smaller than a nickel may escape through the opening 17 from the chute N. The arm 14 also includes a portion which extends laterally away from the frame member 10 so as to constitute a counter-weight for maintaining the other arm portion in its normal transverse position across the coin chute. In the event that a penny or a dime is deposited in the nickel chute, the counter-weighted arm arrangement described will operate to throw such smaller coin out of the chute N through the opening 17. If the coin is of proper size, it cannot escape through the opening 17 and is heavy enough to rock the weighted lever 14 to displace it and permit the coin to continue its descent in the chute.

A similar counter-weighted arm 18 is provided in the chute Q, the closure plate 12 being provided with an opening 19 of such size that any coin smaller than a quarter will be discharged from that chute through said opening 19.

At its lower end, the frame member 10 is equipped with an extension provided with a hub portion 20 which is suitably bored out to rotatably receive the shaft 21 of a ratchet wheel 22. The shaft 21 in non-rotatably secured to the ratchet wheel and a coil spring 23 is disposed around the hub 20 with one end 24 of the spring anchored to the frame member 10 and its other end 25 anchored to the adjacent end of the shaft 21. The arrangement is such that the ratchet wheel may be rotated through approximately one full turn to thereby wind up the spring 23 so that the latter normally tends to cause the ratchet wheel to move in the direction indicated by the arrow 26.

The ratchet wheel is provided with a fixed stop pin 27 projecting from one face thereof and adapted to engage a stop pin 28 carried by the frame 10. The stop pins 27 and 28 are shown slightly separated in Figure 1, this being the position which they assume when the toothed wheel 22 is held in fixed position by pawl mechanism which will presently be described. The space between the stops 27 and 28 is not sufficient to permit the ratchet wheel to be turned to the extent of one of its teeth against the force of the spring 23.

The teeth 29 of the ratchet wheel 22 are of uniform size and spacing and there is provided at one point in the periphery of the ratchet wheel a slot 30 which is adapted to receive a pawl pin 31 which, under proper circumstances, is adapted to engage the teeth 29 to turn the ratchet wheel step by step.

The pawl pin 31 is carried by a finger 32 which is pivoted as indicated at 33 on a lever 34, the latter being in turn pivotally mounted as indicated at 35 on the frame 10. The pawl finger 32 is normally urged to rock so as to cause the pin 31 to rest against an abutment 36 formed on the arm 34 by means of a spring 37 which is connected between an end extension of the finger 32 and the free end of the arm 34.

The lever 34 is provided with an arm 38 having a bifurcated end formation which receives the operating lever 39 of an electric switch 40. The switch 40 is rigidly mounted on an ear 41 formed integral with the frame member 10. The arm 34 is also provided with an an end extension 42 and said end extension is formed with oppositely extending ears 43 and 44. The ear 44 is adapted to engage a stop lug 45 formed integrally with the frame member 10 and the ear 43 is adapted to receive an operating connection from a moving part of the controlled mechanism. The connection is preferably of some form which transmits upwardly directed force to the end 42 of the lever 34. But in this instance there is shown a pin 46 (Figure 6) which may be assumed to be a crank pin carried by the rotating part of the controlled mechanism and located so as to effect the desired upward movement on the end portion 42 of the lever at the proper times. A spring 47 connected between the end portion 42 of the lever 34 of the ear 41 of the frame 10 serves to yieldingly resist rocking movement of the lever 34 and to maintain it in the position illustrated in Figure 1 wherein a stop lug 48 formed integral with the lever engages a stop pin 49 carried by the ratchet wheel.

A pawl 50 pivoted at 52 to the main frame normally engages the teeth of the ratchet wheel 22 to resist turning thereof under the force of the wound up spring 23. The pawl 50 is maintained in operative relation to the ratchet wheel teeth by means of a spring 53, which is stretched between a fixed point of the frame member 10 and the end of the pawl 50.

In this instance, there are three relatively independent pawl-actuating mechanisms provided, one for each of the three coin chutes. The pawl-actuated mechanism associated with the coin chute N is best shown in Figure 3. It includes a three armed member 54 pivoted as indicated at 55 on the frame member 10. One arm 56 has an end portion 57 bent to approximately right angles to the length of the arm and extended through slots indicated at 58 in the frame 10 and cover plate 12 so that any coin passing through the chute N will engage the end portion 57 of the arm. The arm 56 is normally in the raised position indicated in dotted lines in Figure 3, it being yieldingly maintained in that position by means of a spring 59 which is stretched between the fixed point in the frame 10 and a suitable point in the arm portion 60 of the three armed member. The arm 60 includes a transversely extending lip portion 61 which is normally located under the pawl 50 so that upon upward movement of the arm 60 (incident to the lowering of the arm 56 by a descending coin) the pawl 50 will be elevated from its normal position indicated in dotted lines in Figure 3 to its full line position wherein the toothed member 22 is released for movement induced by the spring 23. The third arm of the member 54 is indicated at 62 and it is provided with a laterally extending end portion 63. The portion 63 constitutes a detent adapted to be engaged by one of the teeth 29 of the toothed member when the latter has moved, in this instance, the distance of one tooth. The pawls 50, arms 60 and arm 62 constitute in effect a form of escapement mechanism which permits movement of the toothed member 22 one tooth at a time.

The pawl-actuating mechanism associated with the coin chute D is best shown in Figures 4 and 5. It includes a three armed actuating member 64 pivoted as indicated at 65 on the frame part 10. One arm 66 is equipped with a laterally extending ear 67 which underlies the pawl 50 so as to be adapted to raise the pawl out of engagement with the toothed wheel when properly actuated. Another arm 68 of the three armed member 64 extends under an ear 69 of an arm 70 which is pivoted as indicated at 71 on the frame part 10. The arm 70 includes a laterally extending end portion 72 which extends through suitable slots in the frame part and cover plate so as to traverse the coin chute D. When a coin descends in the chute D it engages the arm portion 72 and causes the arm 70 to swing downwardly to thereby rock the member 64 on its pivot 65. A spring 73 stretched between a suitable portion of the member 64 and a point which is relatively stationary serves to yieldingly support the member 64 in its normal position as indicated in full lines in Figure 4.

The third arm 74 of the member 64 has a detent member 75 pivoted to it as indicated at 76; the detent member is adapted to rock on the pivot between stops 77 and 78 formed on the arm 74 and adapted to respectively engage portions of the lower edge of the detent 75. One end of the detent 75 is equipped with a laterally extending ear 79 which is adapted to be engaged by the

teeth of the ratchet member 22 when the member 64 is rocked to disengage the pawl 50 from the ratchet. The other end of the detent 75 is provided with a laterally extending ear 80 which under normal operation travels a path around a pin 81 carried by the frame member 10. A spring 82 stretched between a fixed point in the arm 74 and an appropriate part of the detent 75 normally holds the detent 75 at the limit of its movement about the pivot 76.

When a coin is deposited in the coin chute D, the arm 70 is rocked downwardly and transmits clockwise rocking movement through its ear 69 to the member 64, whereby the arm 66 is moved upwardly to effect disengagement of the pawl 50 from the ratchet 22 as will be apparent from an inspection of Figures 4 and 5 of the drawings. When the arm 74 moves toward the ratchet, it causes the ear 79 of the detent 75 to move into the path of one of the teeth 29 of the ratchet wheel, the detent assuming such position before the pawl 50 releases the ratchet wheel for movement. When the ratchet wheel is released, one of the teeth 29 of the ratchet engages the ear 79 of the detent and effects rocking movement of the detent on its pivot 76. The extent of such rocking movement of the detent is limited by its engagement with the stop 77 so that when the detent reaches that limit of movement, it serves to prevent further movement of the ratchet wheel. The impact of the coin on the operating arm 70 is, of course, only momentary, the coin rolling off the end portion 72 of the arm and continuing its descent into a suitable coin receptacle. When the coin has passed the arm portion 72, the spring 73 is operative to effect restoration of the member 64 to normal position. The member 64 will then commence its reverse or return movement and the pawl 50 will be caused by its spring 53 to again engage one of the ratchet teeth 29 to hold the ratchet wheel against further movement. The extent of movement permitted the detent 75 by the stops 77 and 78 is, in this instance, so proportioned that the ratchet wheel will be permitted to move the distance of two teeth.

The function of the ear 80 and pin 81 is to prevent return or clockwise movement of the arm 74 and restoration of the pawl 50 before the ratchet 22 has moved the full distance of two teeth. This function is accomplished by reason of the fact that the detent 75 begins to rock about its pivot 76 under the influence of the ratchet 22 whereby the ear 80 moves upwardly (from the dotted line position shown in Figure 5) to a position in front of the pin 81 as distinguished from in back of the pin as shown in Figure 4. Under normal operating conditions the ear 80 should not actually engage the pin 81 but in the event that the coin leaves the trip lever portion 72 with unusual speed or if for any other reason the lever 74 is permitted or caused to commence its return movement too quickly, the ear 80 will engage the pin 81 and thus prevent such return movement. The detent 75 will continue to be rocked, however, by the force of the moving ratchet 22 until the ear 80 passes the pin 81 or reaches a position substantially as shown in full lines in Figure 5, whereupon the lever 74 may be permitted to return to its initial position, thereby to permit the pawl 50 to again engage and stop the movement of the ratchet 22. The arrangement is such that the ratchet 22 must move to substantially the full extent of two teeth in order to cause the detent ear 80 to pass the pin 81 so as to permit said ear to move laterally over the pin incident to the return movement of the lever 74. The pin 81 is of such short length that it does not lie in the plane of movement of the detent arm 75. The path of movement of the ear 80 is from the Figure 4 position downwardly to the dotted line position of Figure 5, upwardly, over and downwardly past the pin to the Figure 4 position.

The ratchet-controlling mechanism associated with the coin chute Q is best shown in Figures 7, 8 and 9. It includes a three armed member 83 pivoted as indicated at 84 on the frame plate 10. One of its arms 85 has an ear portion 86 extending under the pawl 50 so as to be adapted to lift the pawl upwardly when the member 83 is suitably rocked. Another arm 87 extends beneath an ear 88 of an arm 89 which is pivoted as indicated at 90 on the frame plate 10. The arm 89 has an end portion 91 extending through suitable slots in the frame plate 10 and cover plate 12 so as to traverse the coin chute Q. A coin descending in the chute Q engages the arm portion 91 and causes downward rocking thereof to thereby impart downward rocking movement to the arm 87 and upward movement of the arm 85. The third arm 92 of the member 83 is provided with an ear portion 93 which extends across the outer edge of an arcuate guide lever 94, the latter being pivoted as indicated at 95 on a portion of the frame plate 10.

The guide member 94 is adapted to control the position of a pawl 96 which is pivoted as indicated at 97 on an arm 98, the latter being in turn pivoted as indicated at 99 on the frame plate 10. A spring 100 stretched between a suitable point of the arm 98 and a fixed point in the frame plate 10 serves to normally hold the pivoted arm 98 in an elevated position against an abutment 101 carried by the frame plate 10. The pawl 96 is formed with an ear 102 which is adapted to be engaged by the teeth of the ratchet wheel and which is also engaged by the inner edge of the arcuate guide member 94. The pawl is also formed so as to provide a weight 103 which serves to cause the pawl to tend to rock in such direction that the ear 102 thereof will swing away from the ratchet wheel teeth.

When a coin is deposited in the coin chute Q, the pawl 50 will be swung upwardly so as to release the ratchet wheel 22 and at the same time the guide member 94 will be moved toward the ratchet wheel so as to thereby rock the pawl or detent 96 on its pivot 97 to cause its ear 102 to move into the path of travel of the ratchet wheel teeth. The arrangement is such that the ear 102 is moving into the path of travel of the ratchet wheel teeth before the ratchet wheel is fully released. The ratchet wheel will, upon its release, engage the ear 102 and thereby swing the pawl 96 and arm 98 about the pivot mounting 99 of the arm 98. The extent of movement available to the arm 98 under the power of the ratchet wheel 22 may be determined by a stop screw 104 which may be positioned in any one of a series of tapped holes 105 provided in the frame plate 10. As shown in Figure 7, the stop screw 104 is so positioned that it will permit the arm 98 to swing to the extent required for the travel of five teeth of the ratchet past a given point. By the time the arm 98 reaches its limit of movement as determined by the stop screw 104, the coin will, of course, be past the end portion 91 of the operating arm 89 so that the spring 73 will be operative to restore the parts to normal position and permit the pawl 50 to re-engage the ratchet wheel. The spring 73 is in this instance the one which also controls the three armed member 64 which

is relatively stationary when the three armed member 83 is being operated.

When the described control mechanism is employed for controlling an automatic phonograph mechanism, the electric switch 40 is connected in the circuit of an electric motor which operates the phonograph. When the phonograph is inoperative, the arm 34 occupies the position indicated in Figure 1, where it is held by the spring 47 with the stop 48 against the stop 49, the latter being carried by the ratchet wheel 22. In that position of the arm 34, the electric switch 40 is in off or circuit-breaking position. When a coin is deposited, for example, in the chute N, for the purpose of causing the playing of one selection, the three armed member 54 is actuated to release the ratchet wheel for movement to the extent of the travel of one tooth past the pawl 50. Such movement of the ratchet wheel is sufficient to move the stop pin 49 carried thereby from over the stop 48 of the arm 34, which permits the spring 47 to rock the arm 34 upwardly and thereby incidentally adjusting the switch 40 to on or circuit-making position. Upon completion of the playing of the record, mechanism here typified by the crank pin 46 engages the arm portion 42 to rock the lever 34 in the reverse direction against the tension of the spring 47. Upon downward movement of the lever 34, the pawl pin 31 carried by the finger 32 will engage the tooth marked 29a in Figure 1 and return the ratchet wheel to its initial or original position. The extent of movement imparted to the arm 34 by the crank pin is, of course, made sufficient to impart the necessary reverse travel to the ratchet wheel to return it to its original position in which its stop pin 49 will again overlie the stop member 48 of the arm. When the crank pin 46 disengages the arm portion 42, the spring 47 will, of course, tend to swing the arm 34 upwardly again, but such movement will, of course, be terminated by the stop pin 49 as indicated. When the lever 34 was rocked downwardly its arm 38 also adjusted the switch to off position so as to stop the operation of the phonograph mechanism.

In the event that a coin is deposited in the chute D, which may be here contemplated as providing for the successive playing of two selections, the pawl-actuating mechanism shown in Figures 4 and 5 is operated to permit the ratchet wheel to move the distance of two of its teeth. Upon the completion of the playing of the first selection, the crank pin 46 will cause the lever 34 to move downwardly so that the pawl pin 31 engages the tooth marked 29b in Figure 1, thereby to turn the ratchet wheel in the reverse direction. The extent of movement imparted to the lever 34 is only sufficient to move the ratchet wheel rearwardly the distance of one tooth. Upon the rearward movement of the ratchet wheel 22, the pawl 50 rides upwardly on the inclined side of the tooth and drops behind the vertical or radial side without causing movement of any of the other mechanisms shown. This is, of course, permitted by the arrangement of the pawl 50 wholly independent and separate from the other mechanisms. When the crank pin 46 leaves the arm 42 of the lever 34 after the playing of the first record, the spring 47 will return the lever 34 to its elevated position as shown in dotted lines in Figure 6 wherein the switch 40 is again restored to on position so as to cause the phonograph mechanism to continue to operate. It will, of course, be understood that since the ratchet wheel 22 was initially advanced two teeth and is returned only the distance of one tooth after playing of the first record, the stop pin 49 will not have been returned to operative position after the playing of only one selection. When the playing of the second selection is completed, the lever 34 will again be operated, and restore the ratchet wheel 22 to its original position as shown in Figure 1 so that the stop pin 49 will again be operative to limit the upward movement of the lever 34 to thereby prevent the adjustment of the switch 40 to on position. Hence the phonograph mechanism will be rendered inoperative upon the playing of the second selection.

In the event that a coin is deposited in the coin chute Q, the pawl-actuating mechanism shown in Figures 7 and 8 will, of course, be operated to permit the ratchet wheel 22 to advance the distance of five teeth. Each time a selection is completed, the ratchet wheel will be restored to the extent of one tooth and the operation is repeated five times until the stop pin 49 is again returned to its operative relation to the stop 48 of the lever 34. The notch 30 provided in the ratchet wheel is located so that when the stop pin 49 is in operative engagement with the stop 48, the lever 34 may be moved downwardly without actuating the ratchet wheel. It will be observed that the pawl pin 31 will travel idly in the slot 30. Hence, unauthorized manipulation of the mechanism is hampered.

In the arrangement as shown and described, the mechanism is adjusted so that when a coin is deposited in the coin chute Q, a series of five selections would be played successively. For some purposes it may be desirable to promote the playing of large numbers of records in which circumstance it may be found advantageous to offer the patron an inducement of one free selection for each coin deposited in the coin chute Q. By moving the stop screw 104 to the hole 105a at the end of the row, the toothed wheel 22 would be permitted to move the distance of six teeth, thereby providing for the successive operation of the phonograph or the playing successively of six records. Similarly, in some instances it may be feasible to adjust the mechanism to provide for the playing of only three selections for each coin deposited in the coin chute Q. In such a case the stop screw 104 would be moved to the tapped opening designated 105b where the screw would permit movement of the ratchet wheel to the extent necessary for successively playing three selections.

Obviously, either of the three pawl-controlling mechanisms may be used alone where the indicated range of selection is not desired. For example, the coin chutes D and Q might be used together with their respective pawl-controlling mechanisms for operating an automatic phonograph or other mechanism once for each coin deposited in the chute D and three times for each coin deposited in the chute Q. The described and illustrated arrangement is, however, one which will be most commonly used for controlling automatic phonograph mechanisms.

In the described arrangement, enough coins may be inserted, one immediately after the other, to cause the ratchet wheel 22 to travel almost one complete turn, i. e., until its stop pin 27 engages the other side of the stationary stop pin 28. In the construction illustrated, the ratchet embodies thirty-two teeth, but because of the travel space lost due to the thickness of the stop pin 28, only thirty operative steps of the ratchet are available although all of the teeth are employed in the operation of the mechanism in connection with the various pawls which operate on the ratchet wheel.

This number is deemed entirely sufficient for practical uses, but it will be clear that other available numbers may be provided by enlarging or reducing the size of the ratchet wheel teeth or of the ratchet wheel itself.

Various adaptations of the described mechanism may be made to fit various uses and other changes may be made without departing from the spirit of the invention, the scope of which should be determined by reference to the following claims, the same being construed as broadly as possible consistent with the state of the art.

I claim:

1. In a control mechanism of the class described, the combination of a movable toothed member, means urging said toothed member to move in a predetermined direction, a pawl for holding said toothed member against said movement, a pawl-actuating member independent of said pawl and having a portion adapted to effect disengagement of said pawl from said toothed member, a detent mounted so as to be movable by said toothed member and so as to be movable into and out of engagement therewith, movable guide means for normally supporting said detent in position free of engagement with said toothed member, means constituting part of said pawl-actuating member for shifting said movable guide member to adjust said detent into position for engagement by said toothed member when said pawl is disengaged therefrom whereby said detent is adapted to be moved by said toothed member, means for limiting the extent to which said detent may be so moved, and means for effecting return movement of said detent and pawl-actuating member to initial position.

2. In a control mechanism of the class described, the combination of a movable toothed member, means urging said toothed member to move in a predetermined direction, a pawl for holding said toothed member against said movement, a pawl-actuating member independent of said pawl and having a portion adapted to effect disengagement of said pawl from said toothed member, a detent mounted so as to be movable by said toothed member and so as to be movable into and out of engagement therewith, movable guide means for normally supporting said detent in position free of engagement with said toothed member, means constituting a part of said pawl-actuating member for shifting said movable guide member to adjust said detent into position for engagement by said toothed member when said pawl is disengaged therefrom whereby said detent is adapted to be moved by said toothed member, adjustable means for limiting the extent to which said detent may be so moved, and means for effecting return movement of said detent and pawl-actuating member to initial position.

3. In a control mechanism of the class described, the combination of a movable toothed member, means urging said toothed member to move in a predetermined direction, a pawl for holding said toothed member against said movement, a pawl-actuating member independent of said pawl and having a portion adapted to effect disengagement of said pawl from said toothed member, an arm mounted so that a portion thereof is movable substantially parallel with the path of movement of the teeth of said toothed member, a detent pivotally mounted on said portion of said arm and normally free of said teeth, a movable guide member for controlling the position of said detent, means constituting a part of said pawl-actuating member for adjusting said guide means when said pawl is disengaged from the toothed member to move said detent into position to be engaged by said toothed member whereby the latter is operative to effect movement of said detent and arm, means for limiting the extent to which said arm and detent may be moved by said toothed member, and means for restoring said detent and arm and said pawl-actuating member to initial position.

4. In control mechanism of the class described, the combination of a ratchet wheel, means urging said ratchet wheel to turn in a predetermined direction, a pawl normally engaging said ratchet wheel to hold it against said movement, a pawl-actuating member independent of said pawl but having a portion adapted to engage the pawl to effect disengagement thereof from said ratchet wheel, an arm pivotally mounted adjacent the center of rotation of said ratchet wheel so that an outer end portion of said arm is adapted to travel in an arc approximately concentric with the travel of the teeth of said ratchet wheel, a detent pivotally mounted on said end portion of the arm and normally maintained out of engagement with said ratchet wheel, a detent guide member pivotally mounted for movement toward and from the teeth of said ratchet wheel and operative to effect movement of said detent into position for engagement by the ratchet wheel so as to cause the latter to effect movement of said arm and detent as an incident to movement of said ratchet wheel when said pawl is disengaged therefrom, means for limiting the travel of said arm and detent so as to thereby limit the extent to which said ratchet wheel may turn when said pawl is disengaged therefrom, means comprising a part of said pawl-actuating member for controlling said guide member, and means for effecting restoration of said pivoted arm and said pawl-actuating member to initial position.

5. In control mechanism of the class described, the combination of a ratchet wheel, means normally urging said ratchet wheel to turn in a predetermined direction, a pawl engaging said ratchet wheel to hold the same against such turning movement, a plurality of relatively independent mechanisms independently operable and each operatively associated with said pawl for effecting disengagement thereof from said ratchet wheel to permit turning thereof, said relatively independent mechanisms being respectively adapted to permit different extents of turning of said ratchet wheel, a lever adapted to be actuated by apparatus controlled by said control mechanism for effecting restoration of said ratchet wheel to initial position tooth by tooth, and stop means carried by said ratchet wheel and adapted to engage said lever for limiting the movement of said lever when said ratchet wheel is restored to initial position, thereby to prevent continued operation of the controlled mechanism.

6. In a control mechanism of the class described, the combination of a movable toothed member, means urging said toothed member to move in a predetermined direction, a pawl for holding said toothed member against said movement, a lever associated with said pawl for effecting disengagement thereof from said toothed member to permit movement thereof, a movable detent carried by said lever for limiting the extent of movement permitted said toothed member upon actuation of said lever, said detent comprising a member pivoted intermediate its ends on said lever and having one end adapted to engage the teeth of said toothed member, and stop means adapted to be engaged by the other end of said

detent for insuring completion of one operation thereof before the starting of a second operation thereof.

7. In a control mechanism of the class described, the combination of a movable toothed member, means urging said toothed member to move in a predetermined direction, a pawl for holding said toothed member against said movement, movable means operatively connected to said pawl and adapted to be actuated to disengage said pawl from said toothed member to permit movement of the latter, a stop pawl engageable with said toothed member and adapted for movement therewith as an incident to the movement thereof in said predetermined direction, and adjustable means adapted to engage said stop pawl for limiting the extent of movement permitted said stop pawl to thereby limit the extent of movement of said toothed member.

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