Nov. 13, 1962 W. S. McVETTY 3,063,535

COIN CONTROLLED PHONOGRAPH

Filed Nov. 16, 1959 6 Sheets-Sheet 1

Fig. 1.

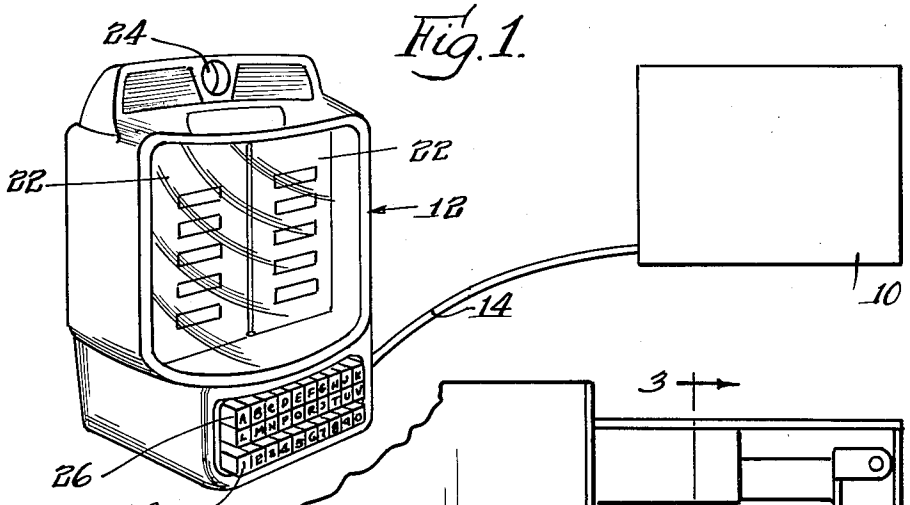
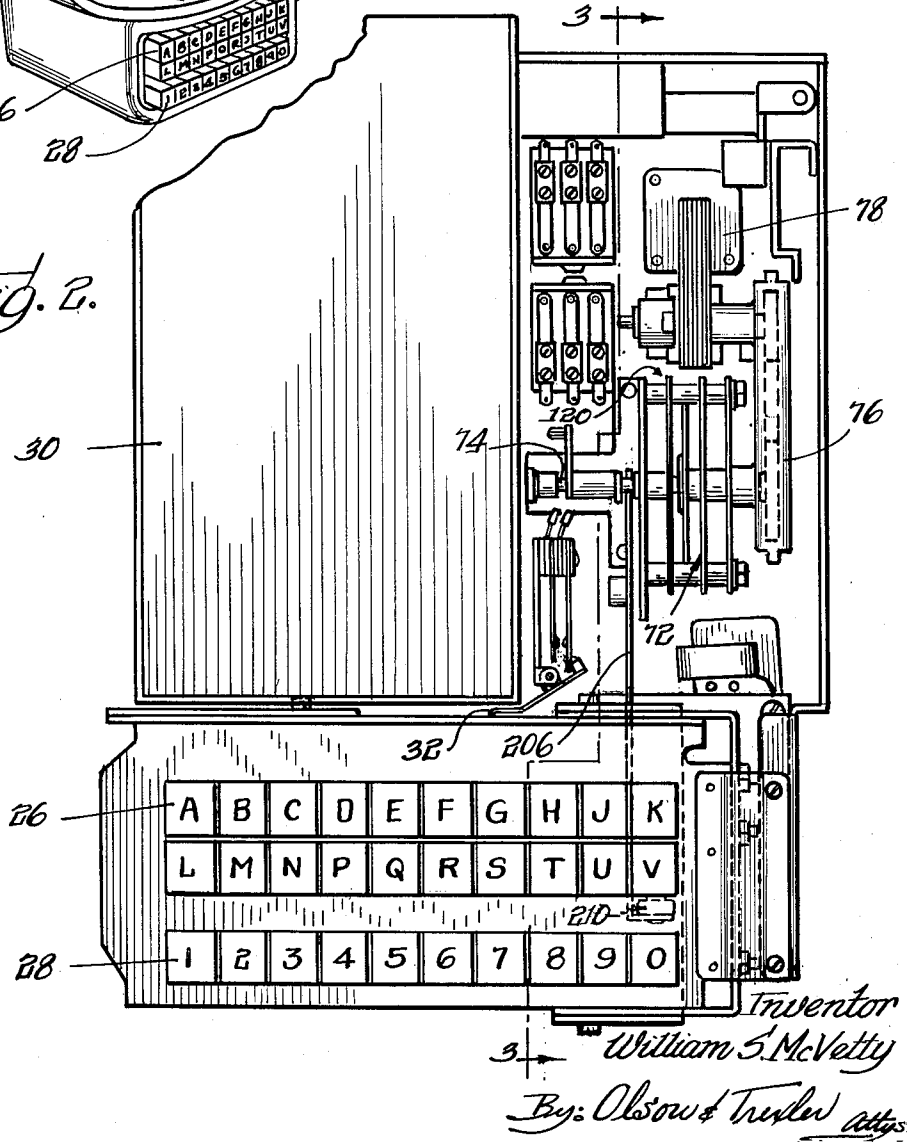


Fig. 2.



Inventor
William S. McVetty
By: Olson & Trevor attys

Nov. 13, 1962 W. S. McVETTY 3,063,535

COIN CONTROLLED PHONOGRAPH

Filed Nov. 16, 1959 6 Sheets-Sheet 2

Fig. 3.

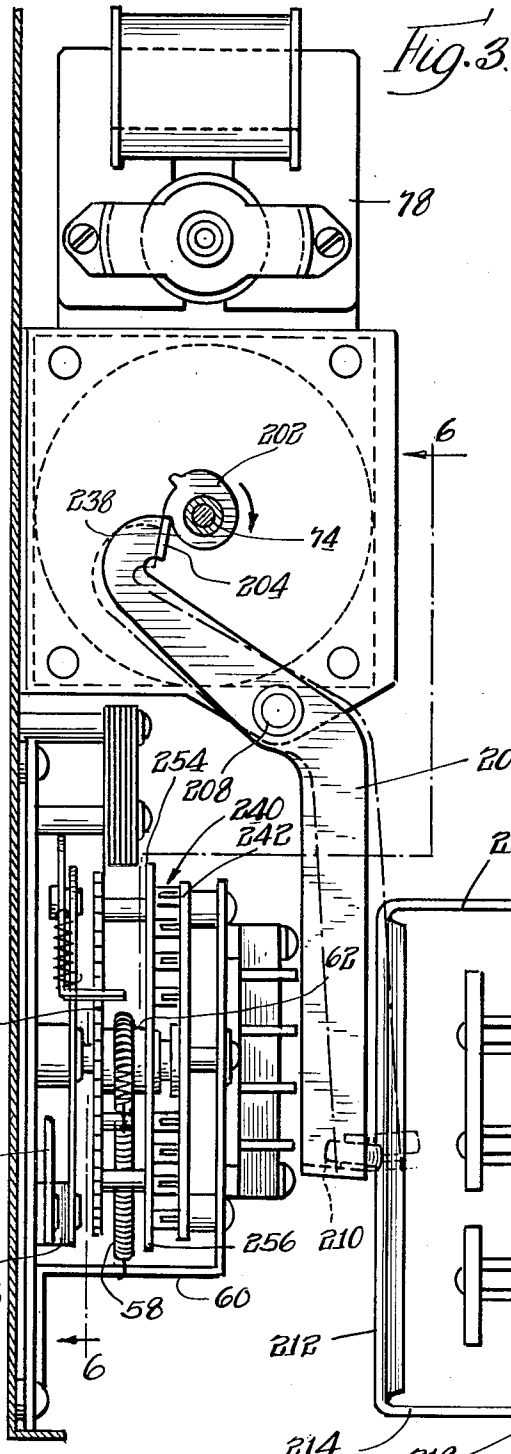


Fig. 4.

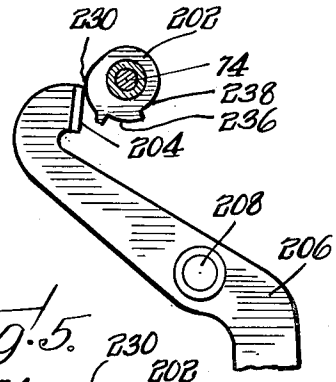
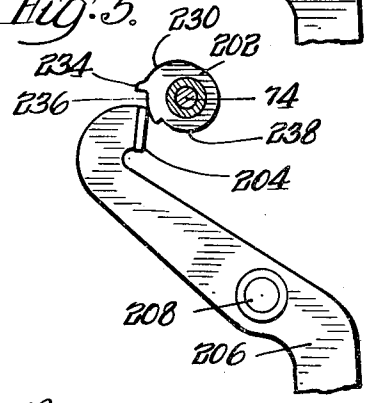


Fig. 5.



INVENTOR.
William S. McVetty
By: Olson & Trexler
Attys

Nov. 13, 1962 W. S. McVETTY 3,063,535

COIN CONTROLLED PHONOGRAPH

Filed Nov. 16, 1959 6 Sheets-Sheet 3

Fig. 6.

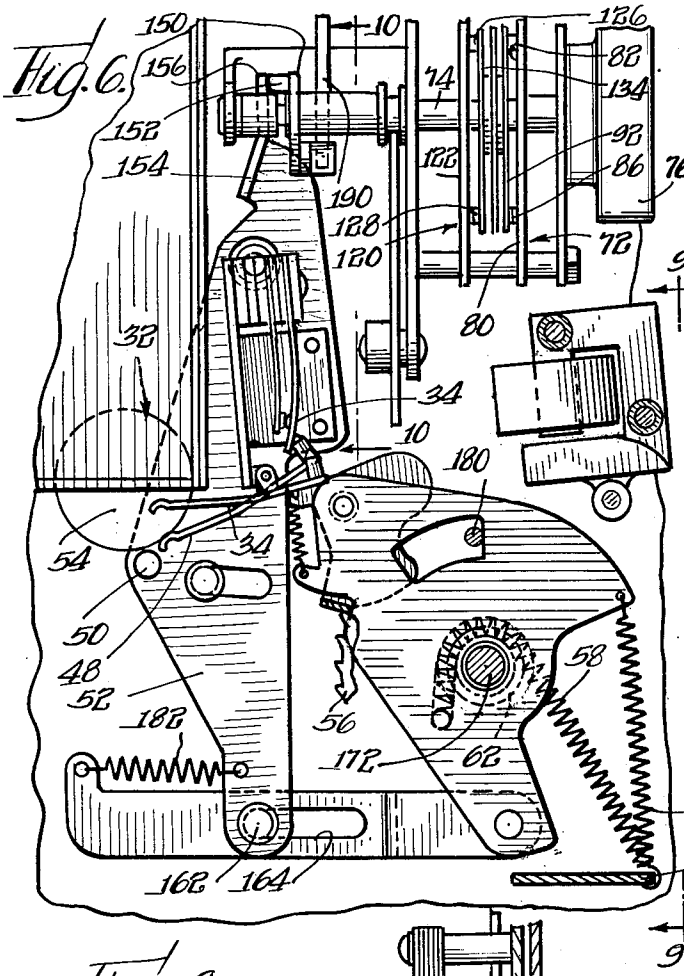


Fig. 10.

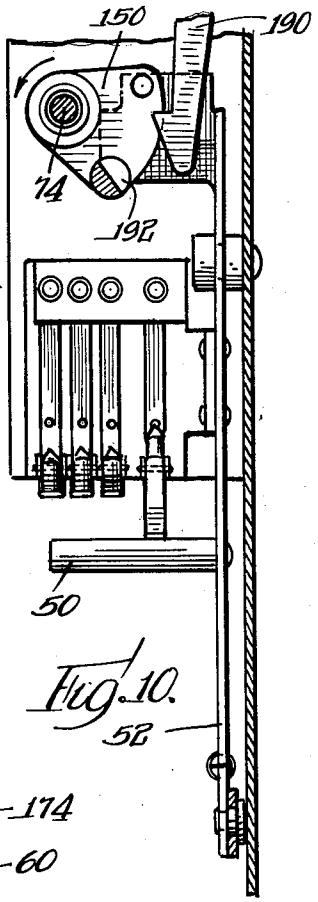
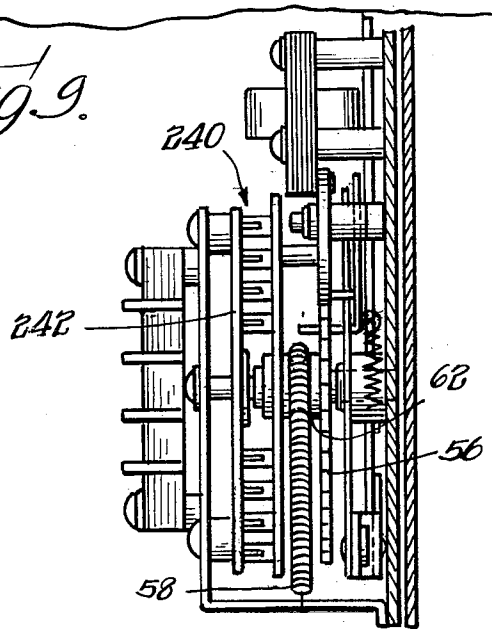


Fig. 9.



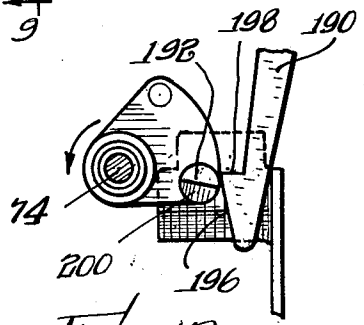


Fig. 12.

INVENTOR.
William S. McVetty
BY:
Olson & Trexler
attys

Nov. 13, 1962 W. S. McVETTY 3,063,535

COIN CONTROLLED PHONOGRAPH

Filed Nov. 16, 1959 6 Sheets-Sheet 4

Fig. 7.

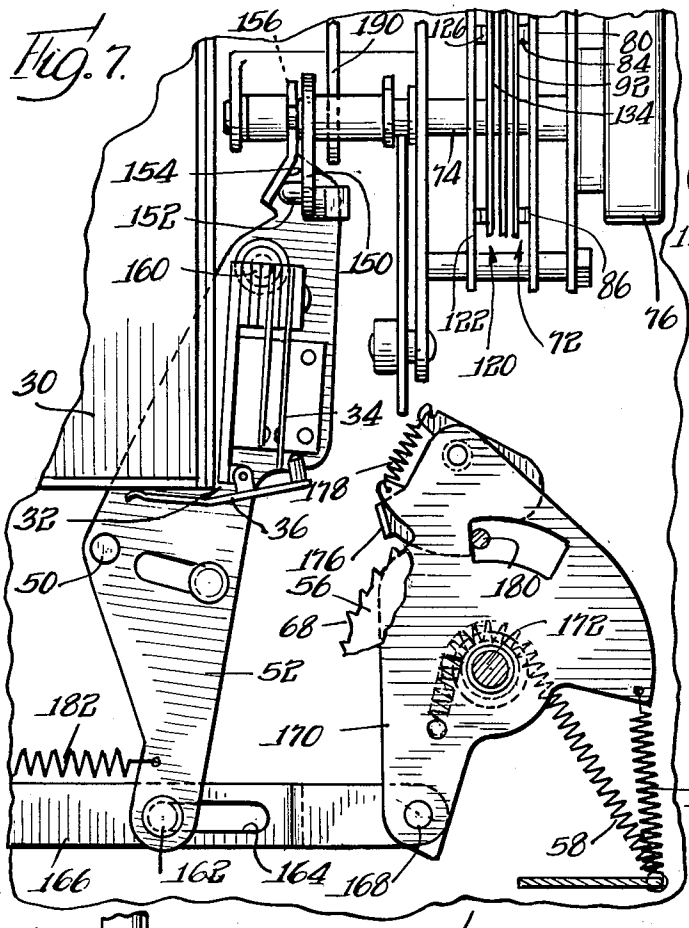


Fig. 11.

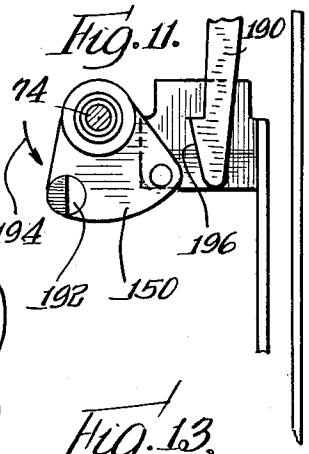


Fig. 13.

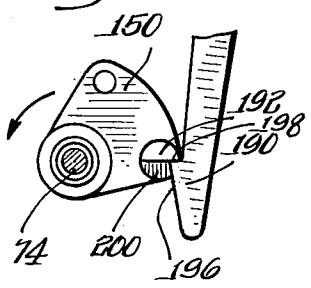


Fig. 14.

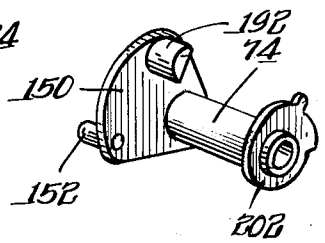
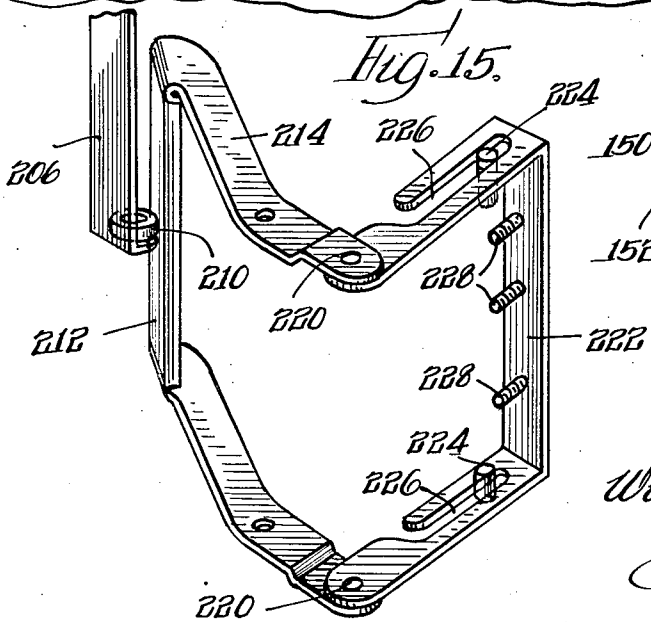


Fig. 15.



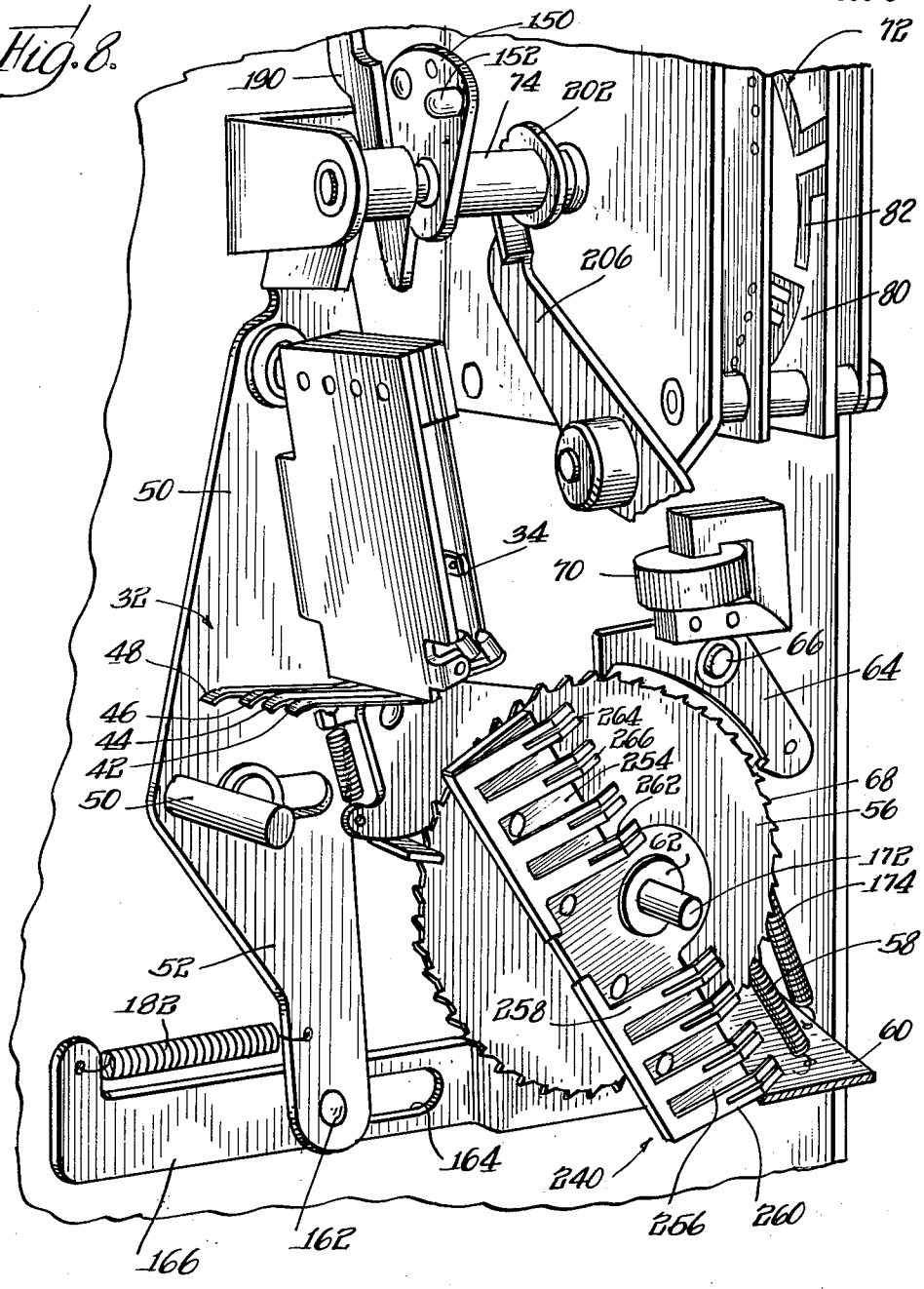
INVENTOR.
William S. McVetty
BY:
Olson & Trexler
Attys.

Nov. 13, 1962 W. S. McVETTY 3,063,535

COIN CONTROLLED PHONOGRAPH

Filed Nov. 16, 1959 6 Sheets-Sheet 5

Fig. 8.



INVENTOR.
William S. McVetty
BY:
Olson & Trexler
Attys

Nov. 13, 1962 W. S. McVETTY 3,063,535

COIN CONTROLLED PHONOGRAPH

Filed Nov. 16, 1959 6 Sheets-Sheet 6

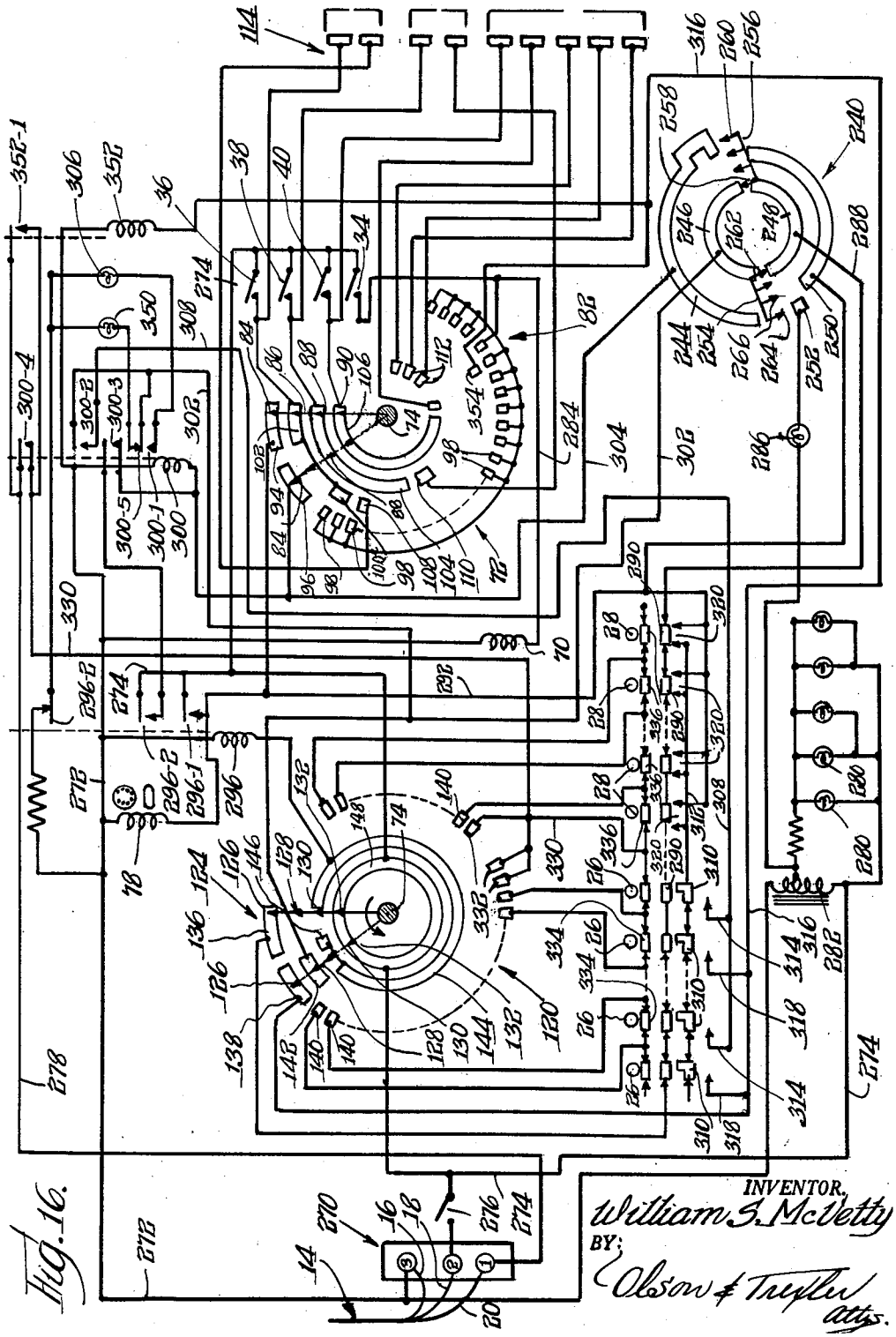


Fig. 16.

INVENTOR.
William S. McVetty
BY:
Olson & Treyler
Attys.

United States Patent Office 3,063,535 Patented Nov. 13, 1962

3,063,535

COIN CONTROLLED PHONOGRAPH

William S. McVetty, North Tonawanda, N.Y., assignor to The Wurlitzer Company, Chicago, Ill., a corporation of Ohio

Filed Nov. 16, 1959, Ser. No. 853,159
16 Claims. (Cl. 194—15)

The present invention relates to coin controlled phonographs and more particularly to coin controlled means for controlling the selection of records for playing by an automatic phonograph.

One object of the invention is to provide new and improved coin controlled means for controlling the selection of records for playing by an automatic phonograph.

A further object is to provide improved, coin activated, phonograph control means which is inherently well adapted for controlling the selection of records by a phonograph from a remote control station.

Another object is to provide for controlling the operation of an automatic phonograph, new and improved coin controlled means in which the setting of selector buttons in accordance with the balance of established credit, the reception of coins into the control means, the cancellation of credit upon selection of a record for playing, and the generation of record selecting electrical impulses are all accomplished by operation of a single electric motor.

A further object is to provide an improved phonograph control as recited in the preceding objects in which the functions listed in the preceding objects, together with the establishment of credit in accordance with the value and denomination of coins deposited in the control means and the cancellation of credit for individual records selected in accordance with the different playing price schedules of different records selected for playing are all accomplished by the operation of a single electric motor with the aid of a single crediting solenoid.

An additional object is to provide new and improved phonograph control means as recited in the preceding objects which is inherently reliable in operation and well adapted for manufacture on a mass production basis.

Other objects and advantages will appear from the following description of the exemplary embodiment of the invention illustrated, in which:

FIGURE 1 is a perspective view showing the external features of phonograph control structure embodying the invention and illustrating diagrammatically the connection of the control structure to a coacting phonograph;

FIG. 2 is a fragmentary elevational view of the phonograph control with the outer casing removed to reveal the internal construction;

FIG. 3 is a fragmentary vertical sectional view taken along the line 3—3 of FIG. 2;

FIG. 4 is a fragmentary detail view showing the positional relationship of the pushbutton latch control lever and its coacting control cam during a phase in the operation of the control which follows that corresponding to the position of the parts as shown in FIG. 3;

Fig. 5 is a view similar to FIG. 4 but showing the positional relationship of the parts during another phase of the operation of the control;

FIG. 6 is a fragmentary sectional view taken along the irregular line 6—6 of FIG. 3;

FIG. 7 is a sectional view generally similar to FIG. 6 but illustrating a different phase in the operation of the control;

FIG. 8 is a perspective view illustrating the structure of FIG. 7, together with additional coacting parts;

FIG. 9 is a fragmentary sectional view taken with reference to the line 9—9 in FIG. 6;

FIG. 10 is a fragmentary sectional view taken along the line 10—10 of FIG. 6;

FIG. 11 is a fragmentary sectional view corresponding to the upper portion of FIG. 10 but illustrating the positional relationship of the parts in a somewhat different phase of the operating cycle;

FIG. 12 is a sectional view similar to FIG. 11 but illustrating the relative position of the parts when no credit is established in the machine;

FIG. 13 is a view similar to FIG. 12 but showing the positional relationship of the parts during an early phase of an operating cycle;

FIG. 14 is a perspective view of master control elements in the machine;

FIG. 15 is a perspective view of the selector button control linkage; and

FIG. 16 is a diagrammatic illustration of the electrical circuitry used in the control.

The improved phonograph control means provided by the invention is particularly well suited for controlling operation of an automatic phonograph 10 from a remote control station or wall box 12 connected to the phonograph by a cable 14 as shown in FIG. 1.

The connecting cable 14 comprises only three wires. The wall box 12 is energized from the phonograph 10 through two wires 16, 18 of the cable and the selection of records for playing by the phonograph 10 is controlled by record selecting electrical pulses transmitted from the wall box to the phonograph through the third wire 20 of the cable, FIG. 16.

As will presently appear, the phonograph control provided by the invention is adapted to control the selection of records from two different categories of records which are priced differently for playing. Moreover, the control operates automatically to charge the player for the records selected in accordance with the playing price of the respective records.

The records available for playing are stored in the phonograph 10 and listed on title strip holders 22 in the wall box 12 in accordance with the playing price of the individual recordings.

The player deposits coins in a coin slot 24 in the wall box 12 and makes selections of records for playing by depressing one of a series of letter buttons 26 and one of a series of number buttons 28 on the wall box.

The wall box 12 must operate automatically to perform and correlate with each other a number of complex functions, including those which are listed as follows:

(1) Automatic establishment of credit to the player for the value of the coins deposited and the automatic award of bonus credit for the depositing of coins in the larger denominations as an inducement to the depositing of the larger coins.

(2) Automatic control of the operation of the selector buttons in accordance with the relationship of the established credit to the prices charged for playing different records.

(3) Automatic response to the depressing of a letter button and a number button to produce a sequence of record selecting control pulses which enable the phonograph to differentiate between and properly select any one of the selections available for playing in the machine.

(4) Automatic selection of records for playing from different categories of records, which are priced differently for playing, and automatically making charges for the records selected in accordance with the playing price of the respective records.

(5) Automatically control the deposited coins in a manner to assure proper crediting for each coin deposited.

As will presently appear, the improved phonograph control means provided by the invention and incorporated into the wall box 12 for the purpose of illustration, accomplishes all of the above listed functions by operation

of a single motor aided by the action of a single crediting solenoid.

Having reference to the drawings in greater detail, coins deposited into the slot **24**, FIG. 1, are received into a slug rejector **30** of conventional construction, FIGS. 2 and 7, which directs the individual coins into a crediting zone **32** to occupy positions in the zone corresponding to the denomination of the respective coins. The instant control is adapted to receive coins in the denominations of 5¢, 10¢, 25¢ and 50¢ and is provided with four coin sensing switches **34**, **36**, **38** and **40**, equipped respectively with four coin sensing actuators **42**, **44**, **46** and **48**, extending into the crediting zone **32** for operation by coins moving into the crediting zone in the respective denominations mentioned above.

Coins in the denomination of 5¢ engage the actuator **42**, to momentarily close the switch **34** and drop on through the crediting zone **32** into an underlying cash box (not shown). The brief closing of the switch **34** operates in a manner to be described presently to establish one unit of credit in the control.

Coins in denominations larger than 5¢, which enter the crediting zone **32**, are supported in the crediting zone by a transverse support bar **50** projecting laterally from the medial portion of a combined coin release and credit cancelling lever **52**, FIGS. 6, 7 and 8. FIGURE 6 illustrates the position in which a 50¢ coin **54** is supported in the crediting zone **32** by the coin support bar **50**.

As previously intimated, closure of any one of the coin sensing switches **34**, **36**, **38** and **40** operates to establish playing credits in accordance with a value scheduled which gives credit for both the value and the denomination of the coins deposited. Moreover, as will presently appear, provision is made for varying the schedule of playing credits established in response to the depositing of coins of different denominations.

Playing credits are established and accumulated by the incremental rotary displacement of an accumulator wheel **56**, FIG. 8, in a crediting direction away from its no credit or zero balance position. The accumulator wheel **56** is continuously urged rotatably in its crediting direction by a tension spring **58** anchored to a bracket **60** and connected to a rotary support **62** for the wheel, as shown in FIGS. 3, 6 and 9. Incremental displacement of the accumulator wheel **56** in a crediting direction is effected by cyclic operation of a double ended escapement pawl **64**, FIG. 8, medially pivoted on a stud **66** to coact with the serrated periphery **68** of the wheel. A crediting solenoid **70** connected with the escapement pawl **64** operates the pawl to effect movement of the wheel **56** by the spring **58** through an increment of movement corresponding to one credit unit, in response to a single energization of the crediting solenoid.

As will be explained in greater detail, the momentary closing of the coin sensing switch **34** in response to the depositing of a 5¢ coin effects a momentary energization of the crediting solenoid **70** which effects displacement of the wheel **56** by one credit unit.

The number of credits established in response to the depositing of coins in larger denominations is determined by a credit computer or credit value assigning means **72** operated by a master, rotary output shaft **74**, FIG. 6, of a speed reducing transmission **76** energized by a single electric motor **78**, FIGS. 2, 3 and 8.

The credit computing means **72** used for this purpose is well adapted for economical manufacture and comprises a flat circuit board **80**, one side of which supports a plurality of credit impulse contacts or patches disposed in a credit assigning pattern, to be more specifically described presently. The credit impulse contacts are designated generally in FIG. 16 by the number "82."

The credit assigning contacts **82** are arranged, as will presently appear, to coact with a plurality of radially spaced scanning or wiper contacts **84**, **86**, **88** and **90** mounted on the transmission output shaft **74** by a resilient conductor disk **92**, FIGS. 6 and 7, which continuously urges the supported contacts against the contact board **80** for rotation with the shaft **74**. The four contacts **84**, **86**, **88** and **90** (only two of which are shown in FIGS. 6 and 7) are circumferentially spaced from each other around the shaft **74**. However, for simplicity in illustration and description, the four scanning contacts are shown in circumferential alinement with each other in FIG. 16. The circumferential positions of the coating contacts **82** relative to the positions of the scanning contacts **84**, **86**, **88** and **90** as shown in FIG. 16 correctly depict the positional relationships of these coacting contacts to each other and the physical structure of the machine.

The radial spacing of the wiper contacts **84**, **86**, **88** and **90** from each other is depicted in FIG. 16. The outermost contact **84** is moved through a circular path in the course of which the contact moves across an annular series of discrete circuit board contacts or patches which include, as shown in FIG. 16, a motor starting patch **94**, a "select" patch **96**, and a series of credit pulsing contacts **98** which are at least equal in number to the maximum number of credit units to be given for the largest denomination coin which the machine will receive.

The wiper contact **86** immediately inward of the outermost contact **84** sweeps through a path which carries the contact over two grounding contacts **100**, **102** spaced from each other and connected to ground through the 10¢ coin sensing switch **36** upon closure of the switch **36**, which is grounded by the grounded conductor **274**. The next wiper contact **88** similarly coacts with a grounding contact patch **104** connected to ground through the normally open 25¢ switch **38**. In like manner, the radially innermost contact **90** coacts with a patch **106**, which is grounded upon closure of the 50¢ switch **40**.

The grounding contact patches **100**, **102**, **104** and **106** are circumferentially dimensioned and positioned, as will presently appear, to award a predetermined minimum number of playing credits for 10¢, 25¢ and 50¢ coins deposited in the machine.

Provision is made for selectively increasing the number of credits awarded for the deposit of coins in the denominations larger than 5¢. For this purpose, auxiliary grounding contacts **108**, **110** and **112** are provided in the paths of the respective wiper contacts **86**, **88** and **90** and wired to a terminal board **114**. Connections are made from the terminal board **114** to the grounding patch sides of the switches **36**, **38** and **40**, as shown in FIG. 16. The number of the auxiliary contacts **108**, **110** and **112** which are grounded upon closing of the respective switches **36**, **38** and **40** is determined by the use of suitable jumpers on the terminal board **114**.

The transmission output shaft **74** has a starting position which it normally assumes when less than 10¢ credit is established in the machine. The positions occupied by the credit computing wiper contacts **84**, **86**, **88** and **90** when the shaft **74** is in its normal position are illustrated in solid lines in FIG. 16. Thus, as shown, location of the shaft **74** in its starting position engages the wiper contact **84** with the motor starting patch **94**.

As will be explained presently in detail, the machine responds to the establishment of two or more units of credit to shift the shaft **74** in the counterclockwise direction with reference to FIG. 16 through an acute angle which swings the wiper contacts **84**, **86**, **88** and **90** to "select" positions, illustrated in phantom in FIG. 16. This brings the radially outermost contact **84** into engagement with the "select" contact patch **96**.

Rotation of the shaft **74** away from its starting position to its "select" position conditions the machine for making a record selection, as will be described in greater detail presently. In brief, however, rotation of the shaft **74** to its "select" position conditions latch structure to be described to hold in depressed position any one of the letter buttons **26** and any one of the number buttons **28** which is actuated subsequent to movement of the shaft **74**

to its "select" position. While the shaft 74 occupies its starting position, depression of the letter buttons 26 and number buttons 28 is of no consequence. Any button depressed immediately returns to its normal position as soon as it is released from manual pressure.

Upon depression of a letter button 26 and a number button 28 after the shaft 74 has been turned to its "select" position, the motor 78 is energized to rotate the shaft 74 through the remainder of a single revolution, to bring the shaft back to its starting position, as will presently appear. This movement of the shaft 74 performs a number of functions, a major one of which is the production of a sequence of record selecting, electrical pulses corresponding to the selection made by the depressed letter and number buttons.

Thus, the shaft 74 operates selector pulse generating means 120 which is similar in its physical construction to the previously mentioned credit value computing means 72. Thus, as shown in FIGS. 6 and 7, the selector pulse generating means 120 comprises a fixed contact board 122 mounted in opposed, spaced relation to the previously mentioned contact board 80. The contact board 122 carries a pattern of fixed contact patches illustrated in FIG. 16 and designated generally in this figure by the number "124." The contacts 124 are opposed by four radially and circumferentially spaced sweep or wiper contacts 126, 128, 130 and 132 supported on the shaft 74 by a resilient conductor 134 which urges the wiper contacts against the board 122 for rotation with the shaft 74. Only two of the wiper contacts 126, 128 are shown in FIGS. 6 and 7. All four contacts appear in FIG. 16 in which the contacts are illustrated in circumferential alinement for simplicity of description.

The relative positions occupied by the contacts 126, 128, 130 and 132 when the shaft 74 is in its starting position are depicted in solid lines in FIG. 16. Thus, as shown, this position of the shaft engages the radially outermost wiper contact 126 with a shaft advancing patch 136. Rotation of the shaft 74 to its "select" position moves the wiper contacts 126, 128, 130 and 132 to the positions illustrated in phantom in FIG. 16. This brings the contact 126 into engagement with a credit sufficiency patch 138.

Rotation of the shaft 74 from its "select" position on through to its starting position carries the contact 126 over an annular series of discrete selector pulse contacts or patches 140.

The contact 128 engages a second credit sufficiency contact 142 only when the shaft 74 is in its "select" position. The next contact 130 coacts with two motor energizing contacts 144, 146, while the innermost contact 130 continuously engages a circular grounding patch 148.

In addition to producing electric selector pulses corresponding to the desired record selection, continued rotation of the shaft 74 from its "select" position back to its starting position automatically cancels credit for the selection made.

It will be recalled that credit is established in the machine by energization of the crediting solenoid 70 which works through the escapement pawl 64 to effect rotation of the accumulator wheel 56 in a crediting direction by the spring 58. Credits are cancelled by displacing the accumulator wheel 56 rotatably in the opposite direction, the design of the pawl 64 being such that it does not interfere with forced movement of the wheel 56 in a debiting direction.

As shown in FIGS. 6, 7 and 8, a radial arm 150 fixed to the shaft 74 carries an axially extending credit cancelling button 152 in radially spaced relation to the shaft for coaction with an actuating cam 154 and an abutment 156 on the upper end of the previously mentioned credit cancelling lever 52 which is swingably supported on a pivot stud 160 located a short distance below the cam 154.

The lower end of the lever 52 carries a support pin 162 in a horizontal slot 164 in a horizontal connecting link 166.

The right end of the link 166, with reference to FIGS. 6, 7 and 8, is connected by a pivot 168 with a credit cancelling sector 170 swingably mounted on the support shaft 172 for the credit wheel 56. The sector 170 is continously urged in the clockwise or crediting direction of the wheel 56 by a tension spring 174.

A detent dog or pawl 176 pivotably mounted on the sector 170 and urged toward the serrated periphery 68 of the accumulator wheel 56 by a spring 178 is normally held out of engagement with the wheel 56 by a stationary stud 180, FIG. 7, which engages the pawl to swing it to its inoperative position as an incident of movement of the sector 170 to its normal position by the spring 174. Upon rotary movement of the sector 170 in the counterclockwise direction with reference to FIG. 7, the pawl 176 moves away from the stud 180 and swings down into engagement with the wheel periphery 68 to transmit a counterclockwise credit cancelling movement of the sector 170 to the accumulator wheel 56.

The relative positions of the parts are such that rotation of the shaft 74 from its "select" position back to its starting position engages the button 152 with the lever cam 154 as shown in FIG. 7. Movement of the button 152 in its circular path forces the cam 154 to the left with reference to FIG. 7, causing pivoting of the lever 52 which moves its lower end to the right.

The lower end of the lever 52 is connected by a tension spring 182 to the link 166 to move the link to the right. thus effecting counterclockwise movement of the sector 170, which causes the pawl 176 to engage and move the accumulator wheel 56 in its debiting direction. The kinematics of the linkage is such that the button 152 acting on the cam 154 and abutment 156 displaces the sector 170 through an angle which rotates the wheel 56 through three credit units of movement in a debiting direction. Before reaching its starting position, the button 152 moves off the lever abutment 165, allowing the sector 170 to be returned to its initial position by the spring 174.

The shaft 74 operates the described linkage to cancel three units of credit for each complete revolution of the shaft.

As previously intimated, the control provided by the invention and incorporated into the wall box 12 is capable of selecting records from different categories, which are priced differently for playing, and charging players for the records selected in accordance with the playing price of the selected records. Thus, some records such as extended play records or stereophonic records may have a playing price of three units of credit or 15¢. Standard records may be played for two units of credit or 10¢. Yet, the control operates as described to cancel three units of credit as an incident to selecting of either a 10¢ or a 15¢ record. However, upon selection of a10¢ record a price compensating unit of credit is added to the accumulator wheel 56 by an automatic energization of the crediting solenoid 70, upon operation of the shaft 74, as will be described presently.

Temporary swinging of the credit cancelling lever 52 away from its normal position as an incident to rotation of the shaft 74 also serves to swing the coin support bar 50 into an inoperative position to release the supported coin from the crediting zone 32 to drop into the cash box, as previously described.

This same control shaft 74 is used to control the reception of coins into the crediting zone 32 in a manner which allows coins to move into the crediting zone only when less than 10¢ credit is established in the machine.

As previously stated, the establishment of at least 10¢ credit in the machine energizes the motor 78 to shift the shaft 74 over to its "select" position. Moreover, as will presently appear, if at least 10¢ credit remains in the credit wheel 56 after operation of the lever 52 to cancel credit, rotary movement of the shaft 74 will continue on past

the normal starting position of the shaft, to automatically locate the shaft in its "select" position in readiness for the making of another selection.

As mentioned, the slug rejector 30 itself is of a conventional construction. A coin control lever 190, FIGS. 6, 7, 10, 11 12 and 13, projects from the slug rejector 30 and coacts with the rejector in a conventional manner well understood in the art, to control movement of coins downwardly into the crediting zone 32.

When located in its normal position, illustrated in FIGS. 10 and 11, the lever 190 serves to block movement of coins into the crediting zone 32 and diverts the deposited coins to the return chute. Depression of the lever 190 from its normal position activates the slug rejector 30 to direct coins into the crediting zone 32, as described.

The coin reception control lever 190 is controlled automatically in accordance with the rotary position of the shaft 74 by means of a lug 192 fixed to the arm 150 on the shaft 74 and projecting from the arm 150 in a direction opposite from the previously mentioned button 152 and in a position radially spaced from the shaft 74. The orientation of the lug 192 with respect to the shaft 74 is such that the rotary movement of the shaft 74 toward its starting position, as indicated by the arrow 194 in FIG. 11, carries the lug 192 into engagement with a cam surface 196 on the free end of the lever 190. As the shaft 74 comes to rest in its starting position, the lug 192 comes to rest adjacent a high point of the lever cam surface 196, as shown in FIG. 12, holding the lever in its depressed position to direct deposited coins into the crediting zone. Rotary movement of the shaft 74 from its starting position to its "select" position moves the lug 192 over a ledge 198 at the end of the cam surface 196 to allow the cam defining portion of the lever 90 to move into a relief 200 on the lug 92, as shown in FIG. 13, to immediately block the reception of additional coins into the crediting zone.

The rotary shaft 74 also operates, as previously mentioned, to effect an automatic control of the setting of the letter and number selector buttons 26 and 28 which is properly synchronized with the establishment of credit in the machine and operation of the control to effect selection of a record.

Thus, as shown in FIGS. 3 to 5, the shaft 74 supports and rotates a button latch control cam 202 which coacts with a pointed cam follower 204 formed on one end of a button control lever 206 medially pivoted on a support stud 208. The lower end of the latch control lever 206 carries a roller 210, FIGS. 2, 3 and 15, which engages a vertical transverse element 212 on a button latch controlled bail 214.

The bail 214 straddles a support frame 216 for the selector buttons, as shown in FIG. 3, and is swingably supported on the frame 216 by two pivot studs 218. Two generally parallel arms of the bail 214 extend beyond the pivots 218 and are connected by pivots 220 with the respective ends of a U-shaped button latch control element 222, FIG. 15, supported for generally horizontal sliding movement on the button frame 216 by guide pins 224 on the frame which extend into parallel slots 226 formed in the control element 222.

Three latch control elements 228 carried by the U-shaped control member 222 coact with conventional latching means (not shown) for the selector buttons to control the buttons, as will be described presently.

As a prerequisite to the selection of a record for playing, it is necessary to establish at least 10¢ credit in the controls. Before this minimum credit is established, the shaft 74 occupies its normal starting position, as explained.

Location of the shaft 74 in its normal starting position engages a raised arcuate cam surface 230 on the cam 202 with the cam follower 204, as shown in FIG. 4, to swing the lower end of the lever 206 outwardly to a button releasing position. Thus, the lever 206, when held in its button releasing position, operates through the bail 214 and U-shaped member 222 to hold the latch control elements 228 in positions which free the selector buttons from the coacting button latching structure 232 carried in the frame 216. Hence, any selector button depressed while the cam follower rests on the cam surface 230 will immediately return to its normal position as soon as it is manually released.

Rotation of the shaft 74 from its starting position shown in FIG. 4 to its "select" position shown in FIG. 5, swings the cam surface 230 out of engagement with the cam follower 204, which moves over a radially projecting ear 234 on the cam 202 and drops down onto an arcuate cam surface 236 on the cam 202. This allows the lower end of the lever 206 to swing inwardly and operate through the described linkages to adjust the position of the latch control elements 228 to a degree which activates the conventional button latch structure 232 to latch any one of the letter buttons 26 and any one of the number buttons 28 in depressed positions.

Continued rotation of the shaft 74 beyond its "select" position as an incident to producing electrical selecting pulses as described moves the cam surface 236 out of engagement with the follower 204 to allow the follower to move radially inward into engagement with an innermost arcuate cam surface 238, as shown in FIG. 3. The lower end of the lever 206 moves inwardly to the position shown in solid lines in FIG. 3 and operates through the described linkage to locate the latch control elements 228 in positions which cause the button latch structure 232 to lock or block the buttons against manual actuation until such time that continued rotation of the shaft 74 brings the cam surface 230 back into engagement with the follower 204 to release all the depressed selector buttons.

It should be mentioned that while the latch structure 232 will operate to latch any depressed selector button in depressed position while the cam follower 204 is resting on the "select" cam surface 236, the selector buttons are not "locked" or "blocked" at this time. Thus, before the cam surface 236 moves out of engagement with the follower 204 the depression of a second letter button after a first letter button has been depressed and latched in depressed position will operate to release the first letter button pressed and latch the second letter button in its depressed position. However, after the cam follower 204 is moved onto the cam surface 238 all depressed selector buttons are locked in their depressed positions and can not be released by depressing other selector buttons.

Control of the machine in accordance with the amount of the established credit is effected through the agency of a control switch assembly 240 operated by the credit accumulator wheel 56. As shown in FIGS. 3, 8 and 9, the control switch assembly 240 comprises a stationary contact board 242, which supports a pattern of contact patches 244, 246, 248, 250 and 252 in positions illustrated in FIG. 16. The contacts of the board 242 are opposed by two pairs of four contacts each carried by two arms 254 and 256 mounted on the support hub 62 for the credit wheel 56, as shown in FIG. 3, and projecting in opposite directions from each other, as shown in FIG. 8. The contacts carried by each of the arms 254, 256 have flexible supports which urge the contacts continuously into engagement with the contact board 242. Of the four contacts carried by the arm 256, only the radially innermost contact 258 and the radially outermost contact 260 are actively used. These contacts are electrically connected together and coact respectively with the previously mentioned contact patches 246 and 244, as illustrated in FIG. 16.

The radially innermost contact 262 carried by the other arm 254 coacts with the contact patch 248. The radially outermost contact 264 on the arm 254 coacts with the patch 252, and the next adjacent contact 266 on the arm 254 coacts with the contact patch 250. The fourth contact on the arm 254 is not used. The positions of the

contacts carried by the arms 254 and 256 relative to the coacting contact patches are determined by the instantaneous rotary position of the accumulator wheel 56 and operate in controlling the machine in a manner to be described presently.

However, it will be observed, with reference to FIG. 16, that the arms 254 and 256 have a range of rotary movement from their starting positions which is somewhat less than 180 degrees. The inner contact 258 on the arm 256 remains in continuous engagement with the contact patch 246 for all positions of the arm 256. The contact patch 244 is shaped to engage the outermost contact 260 for all positions of the arm 256 except two, the starting position of the arm and the position assumed by the arm 256 when two units of credit are established by the wheel 56.

The contact 262 of the arm 254 engages the coacting patch 248 for all positions of the arm 254. The outermost contact 264 on the arm 254 engages the 5¢ contact patch 252 only when the arm 254 is displaced by one unit of credit from its starting position. The adjacent arm contact 266 engages the coacting control patch 250 when the arm 254 is displaced two or more credit units of movement from its starting position.

MISCELLANEOUS ELECTRICAL COMPONENTS AND OVERALL OPERATION OF CONTROL CIRCUITRY

The matter of describing operation of the control circuitry used in the illustrated embodiment of the invention is complicated by the necessity for describing the various functions and automatic features which are performed and coordinated by the control structure. Among the factors which must be taken into account in this regard is the capability of the control to make different charges for the selection of different records while at the same time enabling the player to select only a lower priced record for playing when the control contains only sufficient credit for covering the playing price of the lower priced records.

For convenience in presentation, the ensuing description will be presented under appropriate subheadings, which are necessarily interrelated with each other.

Indexing of the Master Shaft 74 From Its Starting Position to Its Select Position

As previously stated, the phonograph control provided by the invention is adapted to select records from two different categories which are priced differently for playing. Moreover, the instant embodiment of the invention is designed to charge two units of credit for playing the lower priced records and to charge three units of credit for playing the higher priced records.

The player or customer is given one unit of credit for each 5¢ coin deposited. Multiple units of credit are given for the deposit of coins in larger denominations, as will presently appear.

As previously stated, the machine will operate automatically to index the master shaft 74 from its starting position to its "select" position when the player has by depositing coins in the control become entitled to at least two units of credit, which is sufficient to cover the playing price of the lowest priced record. The operation of the control circuitry to provide this automatic indexing of the shaft will appear presently.

Having reference to FIG. 16 in greater detail, the control cable 14 from the phonograph 10 connects to the wall box 12 through a terminal panel 270, which connects the power lead 16 to a power line 272, the ground lead to a ground line 274 through a service switch 276, and the pulse signal lead 20 to a pulse signal conductor 278. Closure of the service switch 276 grounds the line 274 and energizes a number of program lights 280 in the wall box 12 through a power transformer 282. It should be mentioned that even though the incoming lead 18 is grounded, the two leads 16 and 18 together supply alternating current to the power lines 272, 274.

Each of the coin sensing switches 34, 36, 38 and 40 is connected at one side to the ground conductor 274.

The depositing of a 5¢ coin momentarily closes the switch 34 to ground a conductor 284 and effect momentary energization of the crediting solenoid 70, which is connected between the conductor 284 and the power line 272.

This effects a displacement of the credit wheel 56 and the arm 254 by one credit unit from their starting positions to engage the contact 264 with the patch 252 to energize a 5¢ credit light 286 connected between the patch 252 and the ungrounded side of the transformer 282. The patch 252 is grounded through the contact 264, the contact 262, patch 248, a conductor 288 connecting the patch 248 through a series of interconnected switches 290 to the contact patch 136 in the selector pulse generator 124, the contact 126, contact 132, and contact patch 148, which is continuously connected to the ground conductor 274.

It has been assumed that at the time the 5¢ coin was initially deposited the control contained a zero balance of credit. The establishing of 5¢ credit in the wheel 56 turns on the 5¢ credit light 286 but does not effect displacement of the shaft 74 away from its starting position.

With regard to the previously mentioned circuit for the 5¢ credit light 286, it should be noted that the contact patch 148 in the selector signal generator 124 has a continuous, circular form and engages the contact 132 for all positions of the shaft 74. The contact patch 136 is engaged by the contact 126 so long as the shaft 74 remains in its starting position.

With one credit established in the wheel 56, the depositing of a 5¢ coin operates the solenoid 70 in the manner described to index the credit wheel 56 to a position displaced by two credit units from its starting position. This moves the credit wheel controlled contact 264 out of engagement with the contact patch 252 to deenergize the 5¢ credit light 286 and engages the contact 266 with the contact patch 250. As the shaft 74 is still in its starting position, the conductor 288 and patch 248 are grounded as previously explained.

The ground circuit is continued through the contact 262, the contact 266, and the patch 250 to a conductor 292 leading to one side of the motor 78, the other side of which connects with the power line 272. Thus, the establishing of at least two units of credit in the wheel 56 automatically energizes the motor 78 to drive the shaft 74 from its starting or home position toward its "select" position.

Movement of the shaft 74 to a position substantially midway between its starting position and its "select" position disengages the contact 126 from the patch 136 in the pulse generator 124 to break the ground circuit through which the motor 78 is initially energized. However, energization of the motor 78 is continued through another circuit until it reaches its "select" position.

By the time the contact 126 separates from the patch 136, the contact 130 engages and grounds the short motor energization contact 146, which is connected to a full cycle relay 296, the side of which connects with the power line 272. Energization of the relay 296 closes relay switch 296–1 to connect the ground line 274 to the motor 78 to continue energization of the motor.

As the shaft 74 reaches its "select" position, the contact 130 moves off the patch 146 to drop out the relay 296 and deenergize the motor 78 leaving the shaft 74 in its "select" position.

It should be noted at this point that in the event two or more credit units remain in the wheel 56 upon return of the shaft 74 to its starting position at the end of a record selecting and credit cancelling cycle, the contact 266 is in engagement with the patch 250 and the controls operate automatically to move the shaft 74 on to its "select" position in the same manner as when two units of credit are established by depositing 5¢ coins into the machine in the manner described.

When the shaft 74 is in its starting position the deposit of a coin in any denomination larger than 5¢ operates automatically to index the shaft to its "select" position.

Thus, with reference to FIG. 16, location of the shaft 74 in its starting position engages the contact 84 with the motor contact starting patch 94 and engages the contacts 86, 88 and 90 with the respective contact patches 102, 104 and 106, which are connected respectively to the 10¢, 25¢ and 50¢ switches 36, 38 and 40. The contact patch 94 is connected directly to the motor energization conductor 292.

Hence, closure of any one of the coin sensing switches 36, 38 and 40 connects the motor energizing conductor 292 to the grounding conductor 274 to energize the motor 78 and move the shaft 74 away from its starting position. The contact 84 moves out of engagement with the patch 94 before the shaft 74 reaches its "select" position but energization of the motor 78 is continued until the shaft 74 reaches its "select" position by the coaction of the contact 130 with the patch 146 in the selector pulse generator 124 in the same manner as previously described.

Operation of Circuitry to Select Records When Machine Has a Credit Balance or Has Received a Coin Large Enough to Cover the Playing Price of the Highest Priced Record

As previously described, a credit balance of two or more credits in the accumulator wheel 56 or the deposit of a coin in a denomination larger than 5¢ operates automatically to effect displacement of the shaft 74 to its "select" position.

Since three credit units are charged for playing the higher priced records, it is assumed under this subheading that the shaft 74 is displaced to its "select" position either in response to the existence of a credit balance of three or more credits in the accumulator wheel 56, or in response to the deposit of a 25¢ or a 50¢ coin in the machine.

Starting first with the assumption that the accumulator wheel 56 contains a credit balance of at least three units of credit, which have been established either by the deposit of 5¢ coins or as a credit balance remaining after the previous operating cycle of the machine, it will be recalled that a credit balance of three or more credit units in the wheel 56 engages the credit wheel controlled contact 260 with the contact patch 244, FIG. 16. The effect of this is to energize a transfer relay 300, FIG. 16, through a circuit including the power line 274, contact patch 148 in the selector pulse generator 124, contact 132, contact 128, contact patch 142, contact patch 246 connected through a conductor 302 with the contact patch 142, contact 258, contact 260, contact patch 244, and a conductor 304 leading from one side of the contact patch 244 to one side of the transfer relay 300, the other side of which is connected to the other power line 272.

Operation of relay 300 closes relay switch 300–1 to connect the grounded conductor 302 to one side of an "any selection" light 306, the other side of which connects through a normally closed relay switch 296–2 with the hot power line 272. This energizes the light 306 to indicate to the player that he can make any desired record selection from either of the two price categories of records available for playing.

Energization of the relay 300, as described, also closes relay switch 300–2 to connect the grounded conductor 302 with a 15¢ pricing conductor 308.

It should be pointed out here that each letter button 26 controls the selection of 5 records each of which has two playing sides. All the records controlled by any one letter button have the same playing price.

A plurality of normally open pricing switches 310 are mounted for operation by the respective letter buttons 26 and are individually connected at one side to a common output conductor 312. The input sides of the pricing switches 310 controlled by the letter buttons 26, which control the selection of the higher priced records, are connected by jumpers 314 with the previously mentioned 15¢ pricing conductor 308.

A 10¢ pricing conductor 316 is connected to the contact patch 138 in the selector pulse generator 124 and is grounded through the contact 126, the contact 132, and grounded patch 148 automatically as an incident to movement of the shaft 74 to its "select" position. Jumpers 318, similar to the previously mentioned jumpers 314, connect the 10¢ pricing conductor 316 to the letter button switches 310 corresponding to the letter buttons which control the selection of 10¢ records.

It should be clear from the description thus far that the presence of three or more credit units in the wheel 56 effects a grounding of both the 15¢ and 10¢ pricing conductors 308 and 316.

Hence, a depression of any one of the letter buttons 26 connects the common output conductor 312 of the switches 310 to ground. The conductor 312 is connected through jumpers with the input sides of normally opened switches 320 mounted for operation by the respective number buttons 28. The output sides of the respective switches 320 are all connected to the motor energizing conductor 292 previously mentioned.

Hence, upon depression of any one of the letter buttons 26 and any one of the number buttons 28, the motor 78 is energized by grounding of the conductor 292 through one of the switches 320 and one of the switches 310 to either the grounded conductor 308 or the grounded conductor 316.

This initial energization of the motor 78 starts a continued rotation of the shaft 74 in the same direction it moved from its starting position to its "select" position.

It will be recalled that the ground circuit which initially energizes the motor 78 to rotate the shaft 74 beyond its "select" position has been established through the engagement of the contact 128 with the patch 142 in the pulse generator 124. Rotary movement of the shaft 74 away from its "select" position disengages the contact 128 from the patch 142 before the contact 126 engages the first pulsing contact 140.

However, energization of the motor 78 is continued by engagement of the contact 130 with the extended motor energizing patch 144 to ground the latter and energize the motor relay 296 connected to the patch 144. The patch 144 is of sufficient extent to remain in engagement with the contact 130 and continue energization of the motor 78 until the shaft 74 reaches its starting position, whereupon the contact 130 is disengaged from the patch 144 to stop the motor.

Energization of the full cycle relay 296 continues energization of the transfer relay 300 independently of the previously described circuit which initially energizes the transfer relay. Thus, upon energization of the full cycle relay 296, relay switch 296–2 closes to connect the ground line 274 through a closed relay switch 300–3 to the ground side of the transfer relay 300.

In the description thus far under this sub-heading, it has been assumed that the control was conditioned for selecting a record by at least three credits having been established in the credit wheel 56, to engage the contact 260 with the patch 244. It will now be assumed that the shaft 74 is in its starting position and that no credit has been established in the wheel 56. Under these conditions, the control is activated to select a 15¢ record or a 10¢ record in response to the depositing of either a 25¢ or a 50¢ coin, either of which covers the playing price of the most expensive record.

The depositing of either a 25¢ or a 50¢ coin effects displacement of the shaft 74 to its "select" position as previously described, bringing the contact 84 into engagement with the contact patch 96, as shown in phantom in FIG. 16. Closure of the switch 38 by a 25¢ coin grounds the contact patch 104 and provides a grounded connection through the contact 80, contact 84, and patch 96 to

the conductor 304 to energize the transfer relay 300. Similarly, closure of the 50¢ coin switch 40 grounds the patch 106 to ground the conductor 304 through the contact 90, contact 84 and patch 96 to energize the relay 300. The relay 300 operates in the manner previously described to ground the 15¢ pricing conductor 308. The 10¢ pricing conductor 316 is grounded through the patch 138 in the same manner as previously described.

Thus, with both the 15¢ pricing conductor 308 and the 10¢ conductor 316 grounded, the control is ready to select either a 10¢ or a 15¢ record in the same manner as when at least three credit units have been established in the wheel 56, as described. Punching of a letter button 26 and a number button 28 operates under these conditions to effect rotation of the shaft 74 from its "select" position on back to its starting position, as described.

The selector pulse generator 124 operates during rotation of the shaft 74 from its "select" position back to its starting position to send out a series of record selecting pulses through the pulse conductor 278 in accordance with a conventional code which enables the connected phonograph 10 to make the desired record selection.

Upon energization of the transfer relay 300, a relay switch 300–4 connects the pulse conductor 278 with a conductor 330 connected directly with three of the pulsing contacts 140 in the pulse generating means 134. The three pulse contacts connected directly to the conductor 330 lie between twenty pulse contacts 140 controlled by the respective letter buttons 26 as will presently appear and ten pulse contacts 140 controlled by the respective number buttons 28. The contacts connected directly to the conductor 330 are designated in FIG. 16 by the number 332.

A plurality of normally closed switches 334 are connected in series with each other and mounted to be opened by depression of the respective letter buttons 26. One end of the series of switches 334 is connected to the pulse conductor 330. The sides of the respective switches 334 more remote electrically from the conductor 330 are connected to the respective pulse contacts or patches 140 ahead of the three pulse patches 332 with respect to the approach of the contact 126. The contacts 140 connected to the switches 334 correspond to the respective letter buttons 26.

The number of the contacts 140 connected through the switches 334 with the conductor 330 is determined by which of the letter buttons 26 is depressed. Opening of one of the switches 334 cuts out all of the pulse contacts normally connected through the switch to the conductor 330.

The pulse conductor 330 is also connected to one electrical end of a plurality of normally closed switches 336 connected in series and mounted to be opened individually upon depression of the respective number buttons 28. The sides of the switches 336 remote from the conductor 330 are connected with the respective pulse patches 140 located between the pulse patches 332 and the starting position of the contact 126. Opening of any one of the switches 336 by the depression of its corresponding number button 28 cuts out all the pulse patches 140 normally connected through the switch with the conductor 330.

It will be observed with reference to FIG. 16 that middle contact 332 has a spacing from the trailing one of the contacts 332 which greatly exceeds the normal spacing of the other pulse contacts 140.

Upon movement of the shaft 74 from its "select" position back to its starting position the contact 126 moves across the successive pulse patches 140, momentarily grounding the pulse conductor 272 each time the contact 126 engages one of the patches 140 which is not disconnected from the conductor 330 by the switches 334 and 336.

Operation To Select a Record After Deposit of Ten Cent Coin or When Machine Contains Two Unit Credit Balance

As previously explained, a two credit unit balance may be established in the accumulator wheel either by depositing 5¢ coins or as a credit balance remaining after a previous operating cycle.

Displacement of the accumulator wheel 56 by two credit units from its starting position does not connect the accumulator wheel controlled contact 260 with the contact patch 244 to energize the transfer relay 300. Consequently, the relay switch 300–2 remains open and the 15¢ pricing conductor 308 remains ungrounded and ineffective. Hence, upon depression of a number button 28 and a letter button 26 corresponding to a 15¢ record, the motor energizing conductor 292 is connected in the manner described to the pricing conductor 308, which is in this instance "dead." Hence, nothing happens.

However, the 10¢ pricing conductor 316 is connected to ground through the contact patch 138 and contact 126 in the pulse generating means 124. Hence, upon depression of a letter button 26 corresponding to a group of 10¢ records and a number button 28, the motor energizing conductor 292 is grounded to start rotation of the shaft 74, which is carried through to completion as previously described.

Thus, when the accumulator wheel 56 contains only two units of credit, the control will operate to select any 10¢ record but makes no response to an attempt to select a 15¢ record.

The deposit of a 10¢ coin in the machine closes the switch 36 to index the shaft 74 to its "select" position, as described. This moves the contact 86 out of engagement with both the patches 100 and 102, which are grounded through the switch 36. Hence, the patch 96 is not grounded as in the case when either the 25¢ switch 38 or the 50¢ switch 40 is closed. Consequently, the transfer relay 300 is not energized and the 15¢ pricing conductor 308 remains "dead." Hence, the motor 78 does not respond to an attempt to select a 15¢ record.

However, the 10¢ pricing conductor 316 is grounded in the manner previously described and the controls operate to go through a record selecting cycle in response to depression of a number button 28 and depression of a letter button 26 to select a 10¢ record.

Conditioning of the control to select only a 10¢ record, either by the depositing of a 10¢ coin or the establishment of only two units of credit in the accumulator wheel 56, is indicated by energization of a 10¢ selector light 350, FIG. 16, by a circuit extending from the power line 272 through relay switch 296–2, normally closed relay switch 300–5 and conductor 302 grounded as described upon movement of the shaft 74 to its "select" position.

Since energization of the transfer relay 300 is required to close the switch 300–4, an auxiliary relay 352 is provided to close relay switch 352–1 and connect the pulse output conductor 330 with the pulse signal conductor 278 during selection of any 10¢ record. The relay 352 is connected between the power line 272 and the 10¢ pricing conductor 316 and is energized automatically when the shaft 74 is in its "select" position. Upon rotation of the shaft 74 to select a 10¢ record, a connection between the pricing conductor 316 to ground is continued through the letter button switch 310 which makes the initial ground connection to the motor energizing conductor 292, grounding of the conductor 292 being continued through the full cycle switch 296–1 as described.

It may be noted here that the pricing conductor 316 is also connected to a price compensating contact patch 354 mounted on the contact board of the credit value assigning means 82 for engagement by the contact 86 to effect proper charging of the player for the selection of a 10¢ record as will be described later in detail.

It should be mentioned here, however, that the 10¢

pricing conductor 316 and the price compensating contact patch 354 are disconnected from ground upon movement of the contact 126 out of engagement with the contact patch 138 in the selector pulse means 124 in those instances in which the control operates to select a 15¢ record.

Operation to Establish Credit For Coins Deposited and to Cancel Credit For Records Selected

Operation of the circuitry to momentarily energize the crediting solenoid 70 and establish one unit of credit in the accumulator wheel 56 as an incident to momentary closing of the five-cent switch 34 has been previously described.

While 5¢ coins pass freely from the crediting zone 32 on into the cash box, coins in larger denominations are supported in the crediting zone by the coin support bar 50 until released near the end of an operating cycle of the shaft 74.

Thus, any one of the coin sensing switches 36, 38 and 40, upon being closed by a coin, remains closed after the shaft 74 has moved to its "select" position and serves to ground the associated grounding contact patches in the credit value computing means 82.

Movement of the shaft 74 from its "select" position on around to its starting position carries the outermost contact 84 across the successive credit pulse contacts 98, all of which are individually connected to the credit solenoid ground conductor 284. The crediting solenoid 70 is momentarily grounded to add a credit unit to the wheel 56 each time the contact 84 engages one of the pulsing contacts 98 while one of the contacts 86, 88 and 90 is in engagement with a grounding patch connected to ground through the closed one of the coin sensing switches 36, 38 and 40.

Thus, closing of the 10¢ switch 36, for example, grounds the patch 100, which has sufficient arcuant extent to span a radial angle including two adjacent credit pulse contacts 98. Hence, the contact 86 will remain in engagement with the grounded patch 100 while the contact 84 engages two successive pulsing contacts 98 to register two credit units for the 10¢ coin deposited. In the event the auxiliary grounded contact 108 in the path of the contact 86 is connected through the terminal board 114 with the contact patch 100, the contact 86 will ground the contact 84 while it is in engagement with a third one of the pulsing contacts 98 to add an additional credit unit to the wheel 56 for the deposit of a 10¢ coin.

Operation of the computing unit 82 in response to closing of the switch 38 by 25¢ coin is similar to operation to establish credit for the depositing of a 10¢ coin except that the grounding patch 104 has an effective arcuate extent greatly exceeding that of the grounding patch 100 and operates through the contact 88 to ground the contact 84 as it traverses a number of the pulsing contacts 98 equal to the number of credit units to be given the player for depositing a 25¢ coin. Ordinarily at least 6 credit units are registered for a 25¢ coin. Additional credit units can be established by connecting the auxiliary patch 110 to the main grounding patch 104 through the terminal board 114.

Operation of the computing unit in response to closure of the switch 40 by 50¢ coin is similar to the described operation to give credit for a 25¢ coin except that the grounding patch 106 covers a greater radial angle to give more bonus credits for a 50¢ coin, which credits can be further increased by connecting the auxiliary patches 112 to the switch 140 as described.

Charging of the player for the individual record selected in accordance with the playing price of the respective records is accomplished by the described structure in an extremely efficient manner.

In moving from its "select" position onto its starting position to effect selection of a record, the shaft 74 operates through the previously described credit cancelling linkage to mechanically cancel three units of credit shortly before it reaches its initial starting position. This, of course, is the playing price of the higher priced or 15¢ records and serves to properly debit the established credit for the selection of a 15¢ record.

However the shaft 74 operates in the same maner to cancel three units of credit when a 10¢ record is selected. Yet, the player is automatically charged only two units of credit for a 10¢ record. This is accomplished by operation of the described control structure to automatically enter a single additional credit into the accumulator wheel 56 as an incident to operation of the control to select a 10¢ record and before the three credit units are cancelled by the shaft 74. This price compensating unit of credit is added only when the control selects a 10¢ record.

It will be recalled that after the contact 126 leaves the contact patch 138 in the selector pulse generating means 124, the 10¢ pricing conductor 316 is energized only in those instances in which a letter switch 310 corresponding to a 10¢ record has been actuated. Continued energization of the pricing conductor 316 during operation of the shaft 74 to select a 10¢ record grounds the pricing contact patch 354 in the path of the contact 86 in the credit computing means 82. While passing over the pricing patch 354, the contact 86 grounds the contact 84 while the latter moves over one of the credit pulsing contacts 98 to momentarily energize the crediting solenoid 70 to automatically add the desired price compensating credit unit into the wheel 56.

It will be understood that the invention is not limited to the illustrated embodiment but includes variants and alternatives within the scope of the invention as defined in the claims.

I claim:

1. In a coin controlled phonograph, the combination of means for supporting coins in a crediting zone, credit computing switch means including a series of credit impulse contacts and credit scanning contact means movably associated with said impulse contacts, a motor driven transmission having a normal starting position and connected to said scanning contact means to move the latter through individual crediting cycles of movement relative to said impulse contacts, coin sensing switches mounted to sense the presence of coins in said crediting zone and connected to electrically activate different groups of said impulse contacts to control the completion of circuits through said credit computing switch means, a plurality of selector impulse contacts, a plurality of selector switches for activating different numbers of said selector impulse contacts, selector scanning contact means movably associated with said selector impulse contacts, means connecting said motor driven transmission to drive said selector scanning contact means through individual cycles of movement relative to said selector impulse contacts simultaneously with movement of said credit scanning contact means, a movable credit accumulator element, a crediting solenoid coacting with said accumulator element to effect incremental displacement of the latter in a crediting direction, means connecting said solenoid for energization through said credit computing switch means, credit cancelling means operatively associated with said accumulator element to displace the latter in a credit cancelling direction, means connecting said motor driven transmission to said credit cancelling means to move the latter through individual credit cancelling cycles, means connecting said motor driven transmission to shift said coin supporting means temporarily to a coin releasing position as an incident to movement of said transmission through an operating cycle thereof, means for blocking movement of coins into said crediting zone, means interconnecting said motor driven transmission with said blocking means to displace the latter to an inoperative position thereof only when said transmission is in its starting position, a plurality of selector buttons for controlling said selector switches, latch control means for said buttons, means

connecting said transmission to control said latch control means in accordance with the position of the transmission, and control means for said motor driven transmission operatively interconnected with said accumulator element for control by the latter in accordance with the amount of credit established in said accumulator element.

2. Coin control means for controlling the selection of records for playing by an automatic phonograph, comprising, in combination, coin receiving means, coin sensing means, a movable credit accumulator, means for moving said accumulator in a crediting direction in response to the sensing of coins by said coin sensing means, a rotatable master control shaft having a starting position and a select position rotatably displaced from said starting position, an electric motor connected to rotate said shaft, first circuit means operated by said accumulator and coacting with said motor to energize the latter to move said shaft from said starting position to said select position thereof when said accumulator registers a predetermined minimum of credit, a plurality of manual selector elements, latch control means for said selector elements, an operating cam on said shaft coacting with said latch control means to effect releasing of all said selector elements when said shaft is in its starting position, said cam being shaped to coact with said latch control means to condition the latter to latch said selector elements in actuated position when said shaft is in its select position, a plurality of selector pulse contacts, selector contact means movably associated with said selector pulse contacts to produce electrical selector pulses, selector switch means operated by said selector elements and connected with said pulse contacts to control energization of the latter, means connecting said shaft to effect movement of said selector contact means relative to said selector pulse contacts, second circuit means operated by said selector elements and coacting with said motor to effect energization of the latter to move said shaft from its select position on around to its starting position, and said cam including a cam surface thereon coacting with said latch control means during movement of said shaft beyond the select position thereof toward its starting position to block all said selector elements against movement.

3. For controlling operation of an automatic phonograph, coin control means comprising, in combination, a movable operating element having a starting position and a select position, driving means for moving said operating element through individual operating cycles, first and second coin sensing means, means controlled by said operating element and coacting with both said coin sensing means to energize said drive means to move said operating element from said starting position to said select position thereof upon activation of either of said coin sensing means by a coin when said operating element in the starting position thereof, a plurality of record selector element, normally inoperative first circuit means interconnected between said driving means and a first plurality of said selector elements to activate said drive means to move said operating element through an operating cycle upon actuation of any one of said first plurality of selector elements, means for rendering said first circuit operative automatically as an incident to movement of said operating element to said select position thereof, normally inoperative second circuit means coacting with said drive means and a second plurality of said selector elements to activate said drive means to move said operating element through an operating cycle upon actuation of one of said second plurality of selector elements, means connecting said second coin sensing means to said second circuit means to render the latter operative, a movable credit accumulator, means for registering credit in said accumulator, means interconnecting said accumulator with said drive means to activate the latter to move said operating element from said starting position to said select position thereof automatically when a first predetermined minimum credit value is registered in said accumulator, and means controlled by said operating elements and interconnecting said accumulator with said second circuit means to render the latter operative automatically as an incident to movement of said operating element to said select position thereof when said accumulator registers a second minimum credit value exceeding said first minimum credit value.

4. For controlling operation of an automatic phonograph, coin controlled means comprising, in combination, a movable operating element having a starting position and a select position, driving means for moving said operating element through individual operating cycles, first and second coin sensing means interconnected with said drive means to effect movement of said operating element from said starting position to said select position thereof in response to the sensing of a coin by either of said coin sensing means, a plurality of record selector elements, normally inoperative first circuit means interconnected between said drive means and a first plurality of said selector elements to activate said drive means to move said operating element through an operating cycle upon actuation of any one of said first plurality of selector elements, means for rendering said first circuit operative automatically as an incident to movement of said operating element to said select position thereof, normally inoperative second circuit means coacting with said drive means and a second plurality of said selector elements to activate said drive means to move said operating element through an operating cycle upon actuation of one of said second plurality of selector elements, and means connecting said second coin sensing means to said second circuit means to render the latter operative in response to the sensing of a coin by said coin sensing means.

5. For controlling operation of an automatic phonograph, coin controlled means comprising, in combination, a movable operating element having a starting position and a select position, driving means for moving said operating element through individual operating cycles, a plurality of record selector elements, normally inactive first circuit means interconnected between said drive means and a first plurality of said selector elements to activate said drive means to move said operating element through an operating cycle upon actuation of selected ones of said first plurality of selector elements, normally inoperative second circuit means coacting with said drive means and a second plurality of said selector elements to activate said drive means to move said operating element through an operating cycle upon actuation of selected ones of said second plurality of selector elements, a movable credit accumulator, means for registering credit in said accumulator, means interconnecting said accumulator with said first circuit means to render the latter operative when a first minimum credit value is registered in said accumulator, means interconnecting said accumulator with said second circuit means to render the latter operative when said accumulator registers a second minimum credit value exceeding said first minimum credit value, selector pulse switch means connected for operation by said element, and means interconnecting said selector elements with said pulse switch means to control the electrical output thereof in accordance with the positions of said selector elements.

6. Coin control means for controlling the selection of records for playing by an automatic phonograph, comprising, in combination, means defining a coin sensing zone, means for controlling movement of coins through said zone, means for sensing coins in said zone, a movable credit accumulator, means for moving said accumulator in a crediting direction in response to the sensing of coins by said coin sensing means, a rotatable master control shaft, an electric motor connected to rotate said shaft, said shaft having a starting position and a select position rotatably displaced from said starting position, first circuit means operated by said accumulator and coacting with

said motor to energize the latter to move said shaft from said starting position to said select position thereof when said accumulator registers a predetermined minimum of credit, a plurality of manual selector elements, latch and blocking means for said selector elements, an operating cam on said shaft, control means for said latch and blocking means coacting with said cam to release said selector elements when said shaft is in its starting position, said cam being shaped to coact with said control means to effect latching of said selector elements in actuated position when said shaft is in its select position, selector pulsing means connected to said shaft for operation thereby, means interconnecting said selector elements with said selector pulsing means to control the pulsing action of the latter, means interconnecting said selector elements with said motor to effect energization of the latter to move said shaft from its select position on around to its starting position, said cam including a cam surface thereon coacting with said control means during movement of said shaft beyond the select position thereof toward its starting position to effect blocking of all said selector control elements against movement, and means interconnecting said shaft with said coin movement control means to operate the latter in timed relation to rotation of said shaft.

7. Coin controlled means for controlling the selection of records for playing by an automatic phonograph, comprising, in combination, coin sensing means, a movable control element having a starting position and a select position, driving means for moving said control element, means interconnecting said coin sensing means with said driving means to effect movement of said control element from said starting position to said select position thereof, a plurality of selector elements, control means coacting with said selector elements to control movement thereof, cam means on said control element coacting with said control means to effect releasing of said selector elements when said control element is in its starting position, cam means on said control element coacting with said control means to effect latching of said selector elements in actuated positions when said control element is in its select position, selector pulsing means operated by said control element, means interconnecting said selector elements with said pulsing means to control the output thereof, means interconnecting said selector elements with said driving means to effect an operating cycle of movement of said control element, and cam means on said control element coacting with said control means to effect blocking of said selector elements against movement during a phase of said operating cycle of said control element.

8. Coin control means for controlling the selection of records for playing by an automatic phonograph, comprising, in combination, means defining a coin sensing zone, means for controlling movement of coins through said zone, means for sensing coins in said zone, movable accumulator means, means for establishing credit in said accumulator means in response to the sensing of coins by said coin sensing means, a rotatable master control shaft, an electric motor connected to rotate said shaft, circuit means operated by said accumulator means and coacting with said motor to control operation of the latter in accordance with the credit established in the accumulator means, a plurality of manual selector elements, latch control means for said selector elements, operating means on said shaft coacting with said latch control means to control latching of said selector elements in accordance with the rotary position of the shaft, means interconnecting said selector elements with said motor to effect energization of the latter to rotate said shaft from its select position on around to its starting position, and means interconnecting said shaft with said coin movement control means to operate the latter in timed relation to rotation of said shaft.

9. Coin controlled means for controlling the selection of differently priced records for playing, comprising, in combination, a transmission, driving means for moving said transmission through individual operating cycles, selector pulse switching means and credit pulse switching means connected with said transmission for operation with the latter through individual operating cycles, a number of manual selector elements coacting with said selector pulse switching means to control the number of pulses produced by the latter as an incident to each operating cycle of said transmission, credit accumulating means controlled by said credit switching means to register credit in response to pulses from the credit switching means, a plurality of coin sensing switches connected with said credit switching means to control the number of output pulses of the latter in accordance with the actuation of the coin sensing switches, first circuit means controlled by one of said coin sensing switches and coacting with said driving means and with a first plurality of said manual selector elements to condition the driving means for moving said transmission through an operating cycle in response to actuation of one of said first plurality of selector elements, second circuit means controlled by another one of said coin sensing switches and coacting with said driving means and said selector elements to render all of the selector elements operative to effect movement of the transmission through an operating cycle, a debiting element operated by said transmission and coacting with said accumulator means to cancel multiple units of credit from the latter as an incident to each operating cycle of the transmission, said first circuit means including means coacting with said credit switching means to direct an extra crediting pulse into said accumulator means in response to actuation of any one of said first plurality of selector elements to effect movement of said transmission through an operating cycle, circuit means controlled by said accumulator and coacting with said first plurality of selector elements to render the latter effective to cause operation of said driving means when a first minimum credit value is established in the accumulator means, and circuit means controlled by said accumulator means and coacting with said selector elements to render all of said selector elements effective to cause operation of said driving means when a second minimum credit value higher than said first minimum credit value is established in the accumulator means.

10. Coin controlled means for controlling the selection of differently priced records for playing, comprising, in combination, common driving means operable through individual operating cycles, selector pulse switching means and credit pulse switching means connected for operation by said driving means through individual operating cycles, a number of manual selector elements coacting with said selector pulse switching means to control the number of pulses produced by the latter, credit accumulating means controlled by said credit switching means to register credit in response to pulses from the credit switching means, a plurality of coin sensing switches coupled with said credit switching means to control the output pulses of the latter in accordance with the actuation of the coin sensing switches, first circuit means controlled by one of said coin sensing switches and coacting with said driving means and with a first plurality of said manual selector elements to condition the driving means for operation through an operating cycle in response to actuation of one of said first plurality of selector elements, second circuit means controlled by another one of said coin sensing switches and coacting with said driving means and said selector elements to render all of the selector elements operative to effect operation of the driving means through an operating cycle, circuit means controlled by said accumulator and coacting with said first plurality of selector elements to render the latter effective to cause operation of said driving means when a first minimum credit value is established in the accumulator means, and circuit means controlled by said accumulator means and coacting with said selector

elements to render all of said selector elements effective to cause operation of said driving means when a second minimum credit value higher than said first minimum credit value is established in the accumulator means.

11. For controlling operation of an automatic phonograph, coin controlled means comprising, in combination, a movable operating element, driving means for moving said operating element through individual operating cycles, credit computing switch means including a series of credit impulse contacts and credit scanning contacts movably associated with said impulse contacts, said credit scanning contacts being connected with said operating element for movement with the latter through individual operating cycles, coin sensing switches adapted to sense coins in different denominations and being connected to electrically activate different groups of said impulse contacts to control the completion of circuits through said computing switch means, a credit accumulator, a credit actuator controlled by said computing switch means and coacting with said accumulator to register credit in the latter in response to the intermittent establishment of circuits through said computing switch means, a plurality of selector impulse contacts, a plurality of manually operable selector control elements connected to control activation of said selector impulse contacts, selector scanning contact means actuated by said operating element and being movably associated with said selector impulse contacts to produce selector pulses during each operating cycle of the operation element which pulses are controlled by the setting of said selector control elements, circuit means connecting predetermined ones of said coin sensing switches with said driving means to condition the driving means independently of the establishment of credit in said accumulator to respond to actuation of selected ones of said control elements to drive said operating member through an operating cycle which effects at once the production of selector control pulses and a registration in said accumulator of credit corresponding to the coin sensed by an actuated sensing switch, circuit means controlled by said accumulator and coacting with said driving means to condition the latter independently of said coin sensing switches to respond to selective actuation of said manual control elements to drive said operating member through an operating cycle to produce selector pulses corresponding to the setting of the control elements, and coin control means operated in timed relation to said operating element for controlling the physical movement of coins in relation to said sensing switches.

12. For controlling operation of an automatic phonograph, coin controlled means comprising, in combination, driving means operable through individual operating cycles, credit computing switch means connected with said driving means for movement by the latter through individual operating cycles, a plurality of coin sensing switches connected to control said computing switch means, a credit accumulator controlled by said computing switch means to register credit, selector switch pulsing means connected with said driving means for operation by the latter through individual operating cycles, circuit means connecting predetermined ones of said coin sensing switches with said driving means to condition the driving means independently of the establishment of credit in said accumulator to respond to actuation of selected ones of said control elements to operate through an operating cycle which effects at once the production of selector control pulses and a registration in said accumulator of credit corresponding to the coin sensed by the actuated sensing switch, and circuit means controlled by said accumulator and coacting with said driving means to condition the latter independently of said coin sensing switches to respond to selective actuation of said manual control element to operate through an operating cycle.

13. Coin controlled means for controlling the selection of differently priced records for playing by an automatic phonograph, comprising, in combination, a transmission, driving means for moving said transmission through individual operating cycles, selector pulse switching means connected with said transmission for operation by the latter through individual operating cycles, a number of manual selector elements coacting with said selector pulse switching means to control the number of pulses produced by the latter as an incident to each operating cycle of said transmission, credit pulse switching means connected with said transmission for operation by the latter through individual operating cycles simultaneously with operation of said selector pulse switching means, a credit accumulator, a crediting element coacting with said accumulator and controlled by said credit switching means to register credit in said accumulator in response to output pulses of the credit switching means, a plurality of coin sensing switches for sensing coins in different denominations, said coin sensing switches being connected with said credit switch means to control the number of output pulses of the latter in accordance with the actuation of the coin switches, first circuit means controlled by said coin sensing switches selectively and coacting with said driving means to condition the latter for moving said transmission through an operating cycle in response to selective actuation of said selector elements, a debiting element operated by said transmission and coacting with said accumulator to cancel multiple units of credit from the latter for each operating cycle of the transmission, a pricing circuit coacting with a plurality of said manual selector elements which correspond to low priced records and with said credit switching means to activate a pricing contact in the latter in response to actuation of any one of said plurality of selector elements, said credit switching means including means coacting with said pricing contact to produce an additional crediting pulse during each operating cycle of the transmission when the pricing contact is activated to produce a differential debiting of credit in said accumulator in accordance with the selective actuation of said selector controls, and circuit means controlled by said accumulator and with said driving means to control the responsiveness of the latter to actuation of said selector elements in accordance with the credit in the accumulator.

14. Coin controlled means for controlling the selection of differently priced records for playing by an automatic phonograph, comprising, in combination, driving means operable through individual operating cycles, selector switching means connected with said driving means for operation by the latter through individual operating cycles, a number of manual selector elements coacting with said selector switching means to control the switching action of the latter, credit assigning means connected with said driving means for operation by the latter through individual operating cycles concurrently with operation of said selector switching means, a credit accumulator controlled by said credit assigning means to register credit, a plurality of coin sensing switches, said coin sensing switches being connected with said crediting assigning means to control the latter in accordance with the actuation of the coin switches, first circuit means controlled by said coin sensing switches selectively and coacting with said driving means to condition the latter for operation through an operating cycle in response to selective actuation of said selector elements, a debiting element operated by said driving means and coacting with said accumulator to cancel multiple units of credit from the latter for each operating cycle of the driving means, and a pricing circuit coacting with a plurality of said manual selector elements which correspond to low priced records and with said credit assigning means to add credit to said accumulator upon actuation of one of said plurality of selector elements and operation of said driving means through an operating cycle.

15. In a coin controlled phonograph, the combination of means for supporting coins in a crediting zone, credit

pulsing switch means, a transmission having a normal starting position and being connected to said credit switch means to move the latter through individual crediting cycles, an electrical actuator for said transmission, coin sensing switches positioned to sense coins in said crediting zone and being connected to said credit switch means to control the output pulses produced by the latter during each operating cycles thereof in accordance with the selective actuation of the sensing switches, selector pulsing switch means connected with said transmission for operation with the latter through individual operating cycles concurrently with movement of said credit switch means through corresponding cycles, a plurality of manual selector elements coacting with said selector switch means to control the output pulses of the latter in accordance with the setting of the selector elements, a movable credit accumulator, a crediting solenoid coacting with said accumulator to register credit in the latter and being connected with said credit switch means for control by the output pulses of the latter, credit cancelling means operated by said transmission and coacting with said accumulator to cancel multiple units of credit from the latter as an incident to movement of said transmission through an operating cycle, means connecting said transmission to shift said coin supporting means temporarily to a coin releasing position as an incident to movement of the transmission through an operating cycle, means blocking the movement of said coins into said crediting zone, said transmission coacting with said blocking means to displace the latter to a non-blocking position only when said transmission is in its starting position, latch control means for said manual selector elements, means connecting said transmission to control said latch control means in accordance with the position of the transmission, circuit means controlled by said sensing switches and coacting with said electrical actuator to condition the latter to respond to selective actuation of said selector controls to move said transmission through an operating cycle thereof, circuit means controlled by said accumulator and coacting with said electrical actuator to condition the latter in response to the establishment of predetermined credit in the accumulator to respond to selective actuation of said selector elements to drive said transmission through an operating cycle, and circuit means controlled by said transmission and coacting with a predetermined group of said selector elements and with said accumulator to register a credit unit in the accumulator in response to operation of one of said group of selector elements and operation of said transmission.

16. In a coin controlled phonograph, the combination of a credit computing means, driving means connected to said credit computing means to move the latter through individual crediting cycles, coin sensing switches coupled to said credit computing means to control the latter during each operating cycle thereof in accordance with the selective actuation of the sensing switches, selector switch means connected with said driving means for operation by the latter through individual operating cycles concurrently with movement of said credit computing means through corresponding cycles, a plurality of manual selector elements coacting with said selector switch means to control the output of the latter during each operating cycle thereof in accordance with the setting of the selector elements, a movable credit accumulator controlled by said credit computing means to register credit for coins, coin control means for controlling the admission of coins into coacting relation to said coin sensing switches, means interconnecting said driving means with said coin control means to operate the latter in timed relation to operation of said credit computing means, circuit means controlled by said sensing switches and coacting with said driving means to condition the latter to operate through an operating cycle thereof in response to selective actuation of said selector controls, and circuit means controlled by said accumulator and coacting with said driving means to condition the latter in response to the establishment of predetermined credit within the accumulator to respond to selective actuation of said selector elements to operate through an operating cycle.

References Cited in the file of this patent

UNITED STATES PATENTS

2,323,255	Sutherland	June 29, 1943
2,378,557	Jensen et al.	June 19, 1945
2,621,770	Merrill	Dec. 16, 1952