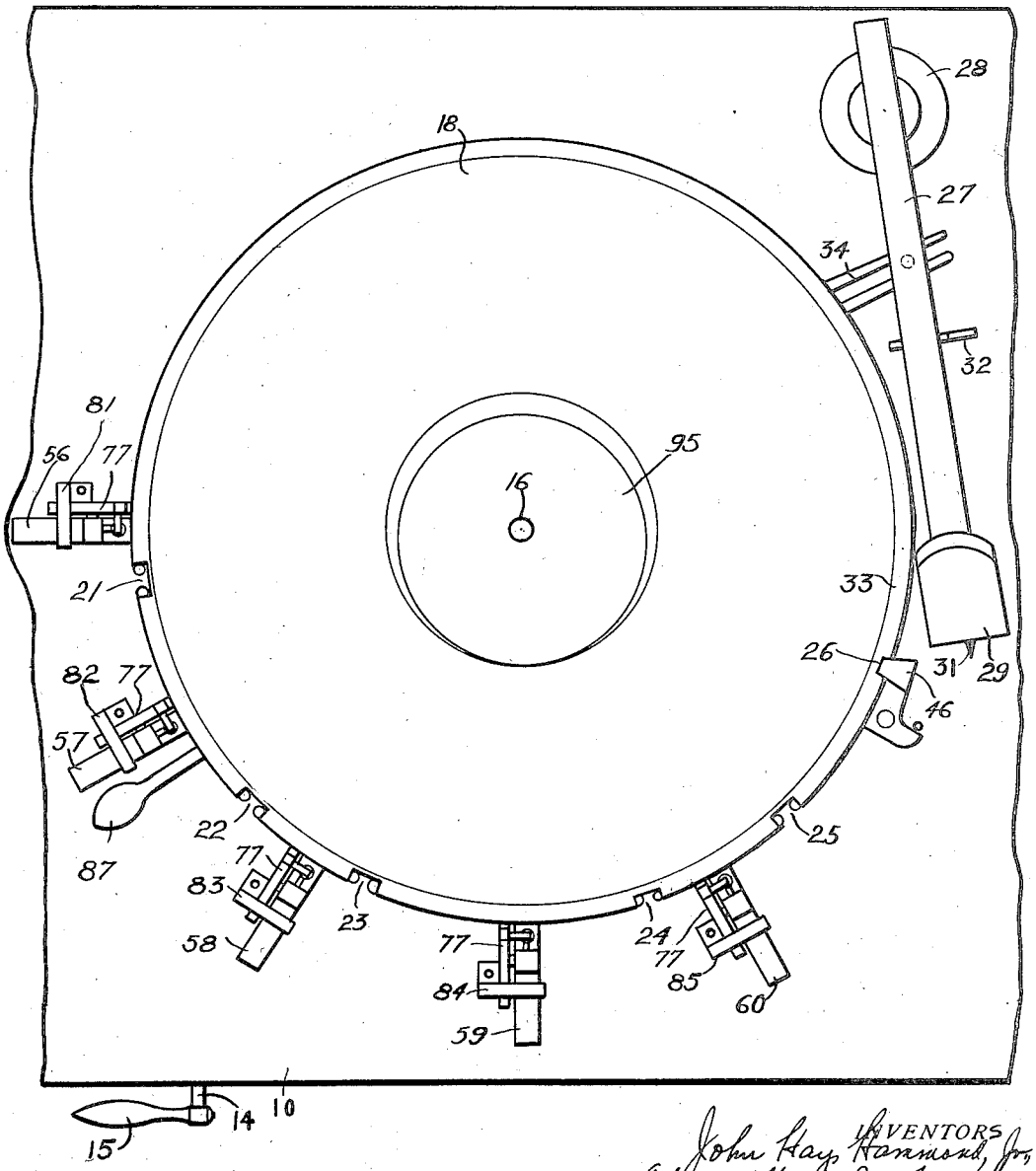
Jan. 14, 1936. J. H. HAMMOND, JR., ET AL 2,027,426

PHONOGRAPH CONTROL BY SOUND RECORD

Filed June 20, 1932 5 Sheets-Sheet 1

Fig. 1



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Filed June 20, 1932 5 Sheets-Sheet 2

Fig. 2

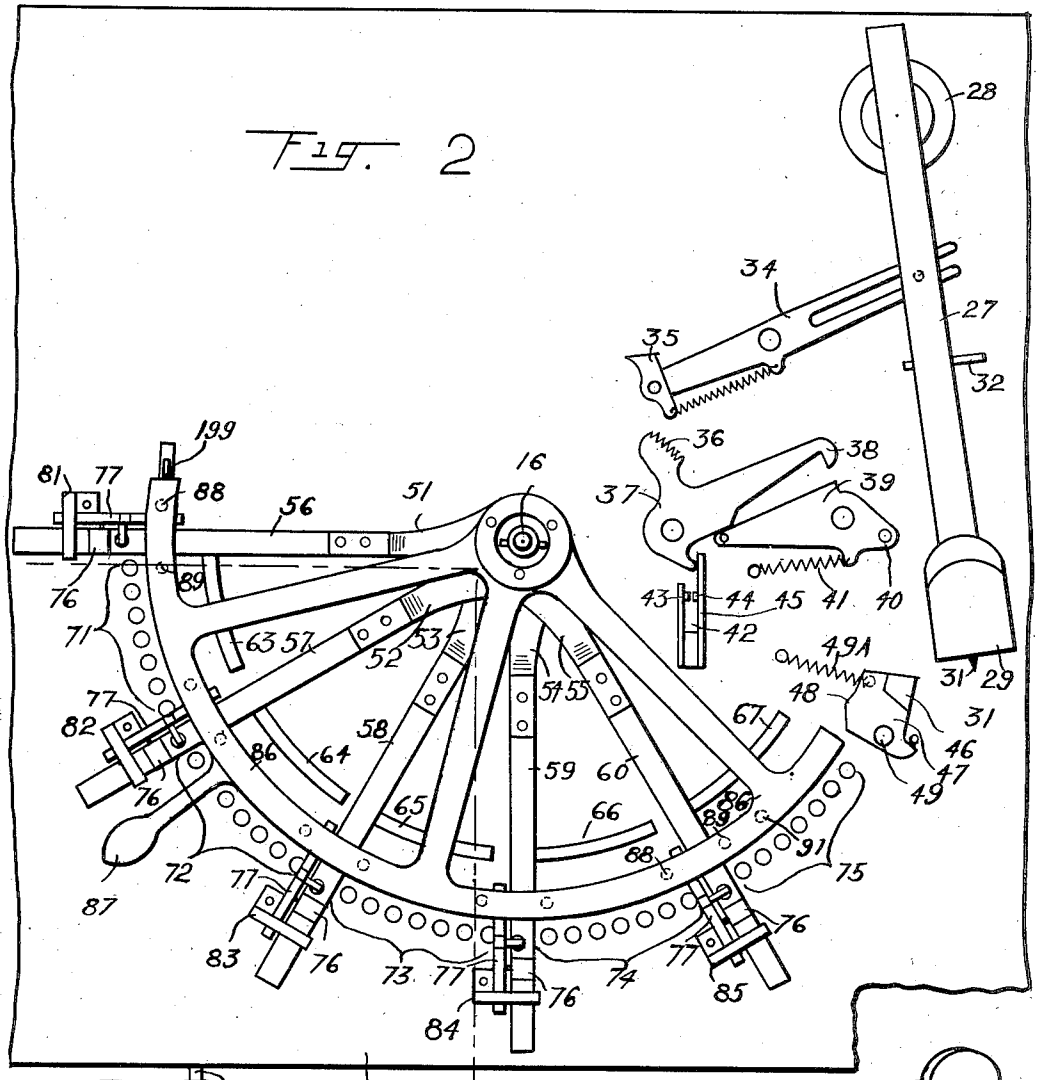
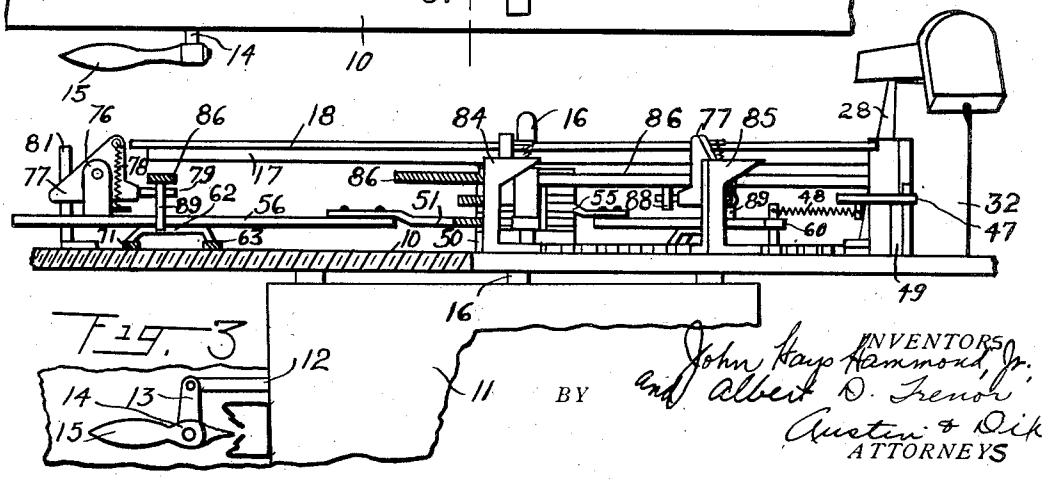


Fig. 3



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PHONOGRAPH CONTROL BY SOUND RECORD

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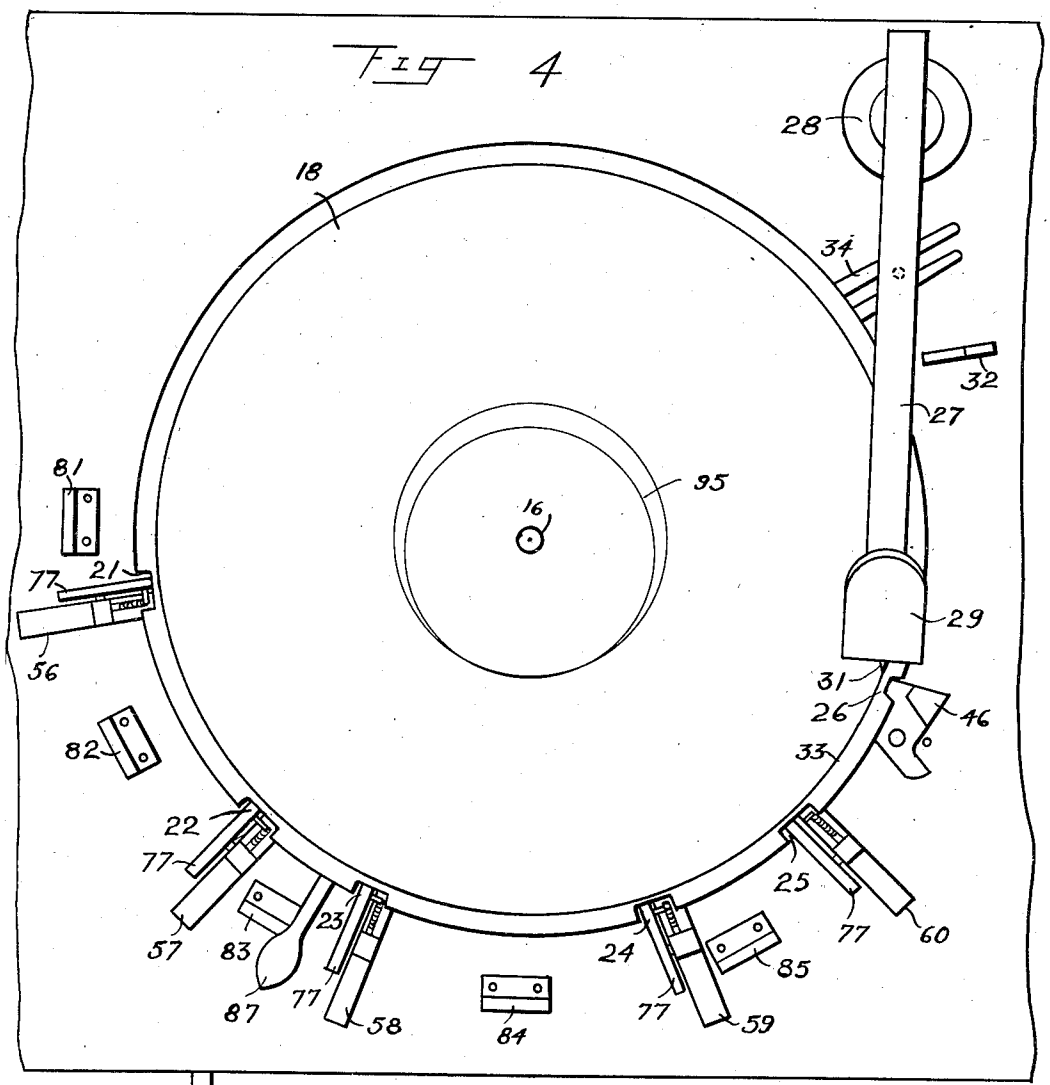
Fig. 4



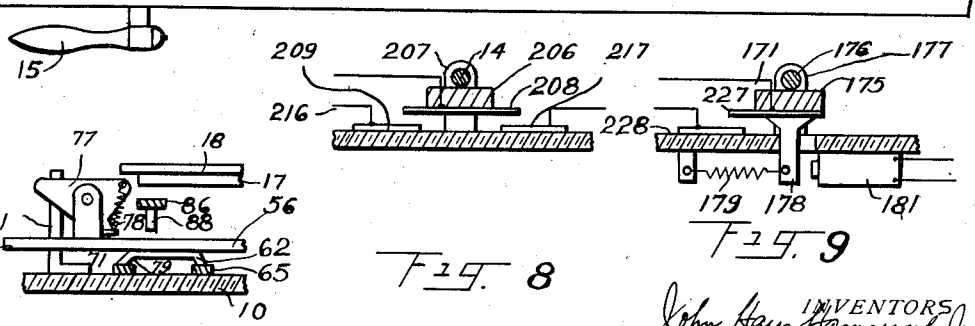


Fig. 5

Fig. 8

Fig. 9

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PHONOGRAPH CONTROL BY SOUND RECORD

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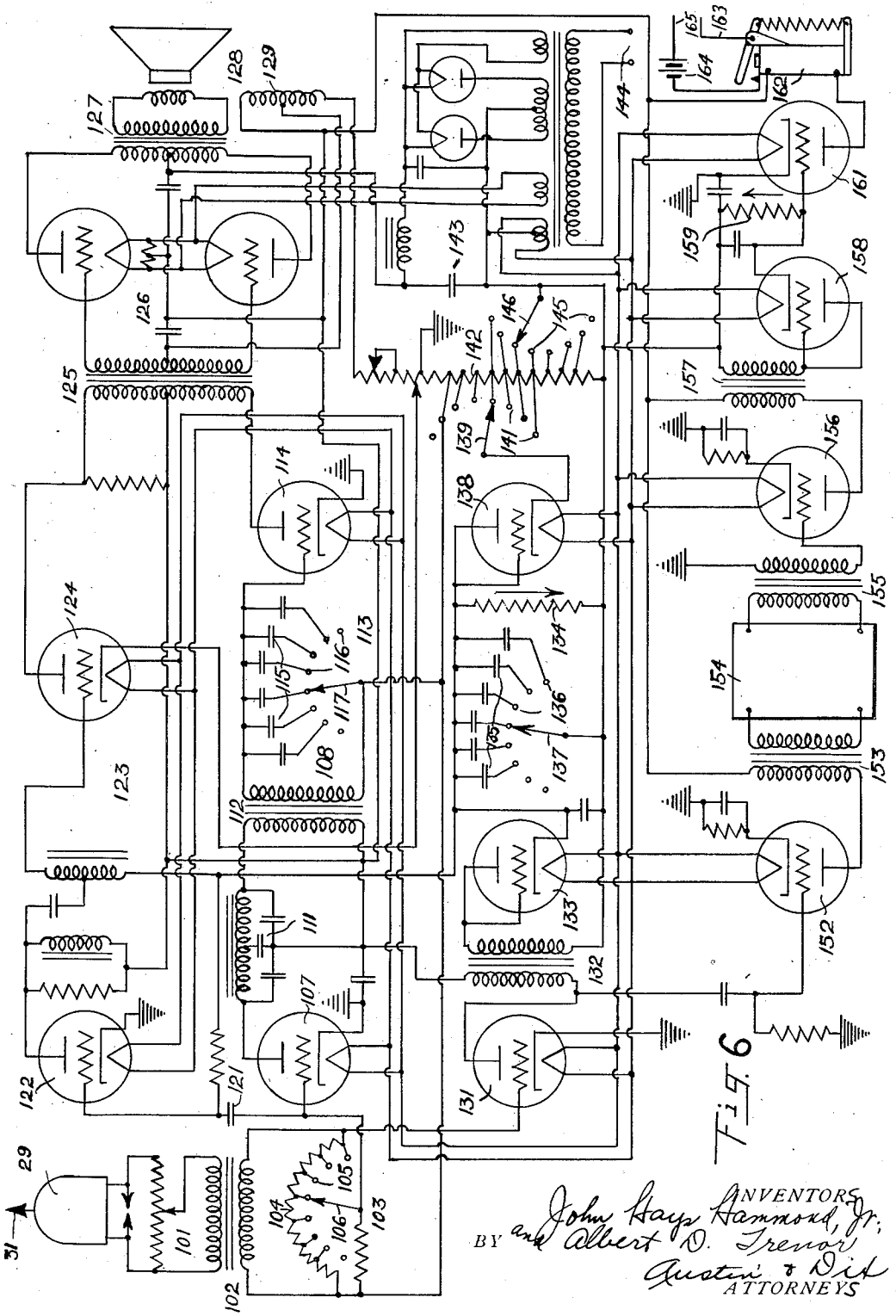

Fig. 6

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PHONOGRAPH CONTROL BY SOUND RECORD

Filed June 20, 1932 5 Sheets-Sheet 5

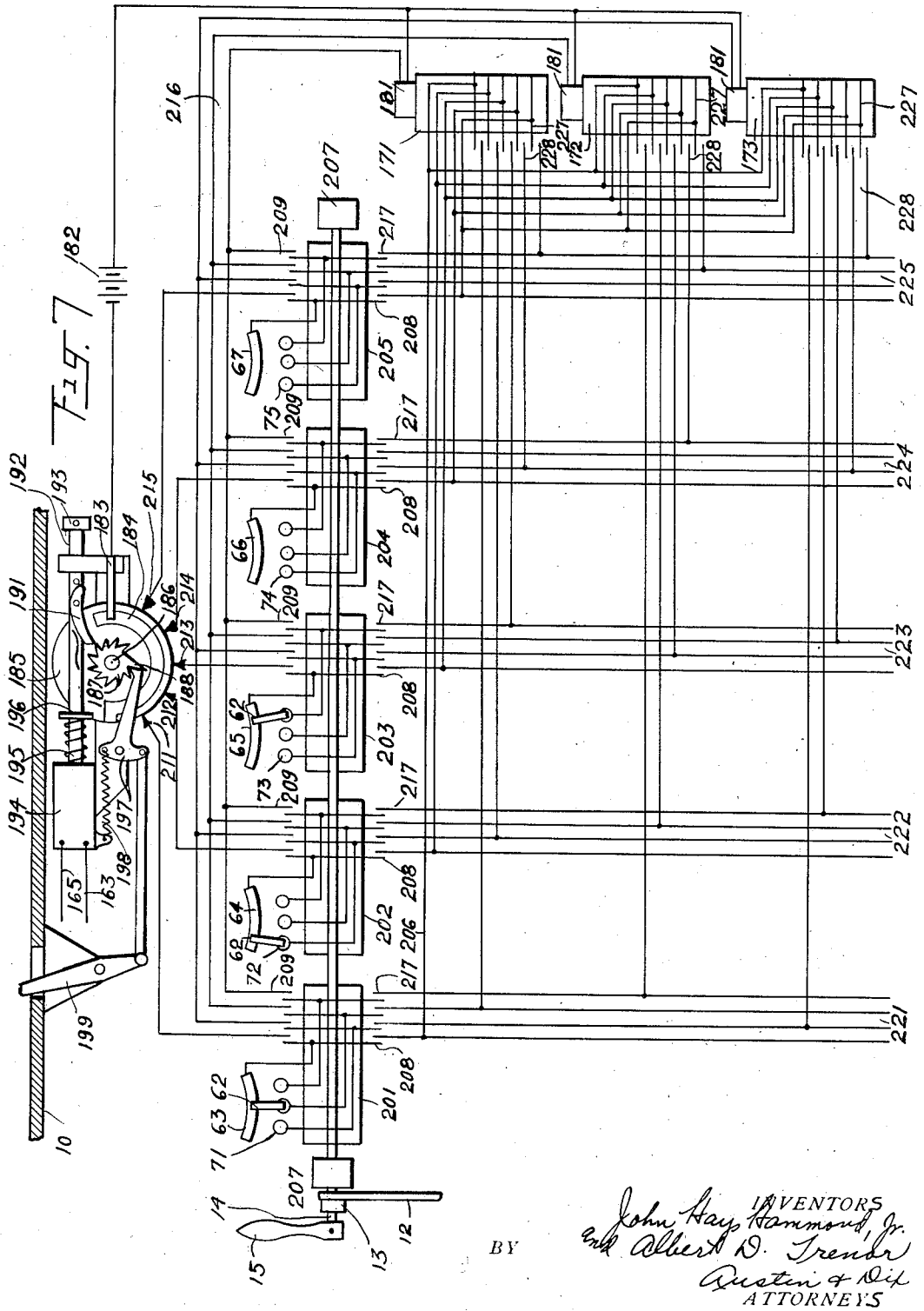

Fig. 7

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Patented Jan. 14, 1936 2,027,426

UNITED STATES PATENT OFFICE

2,027,426

PHONOGRAPH CONTROL BY SOUND RECORD

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Application June 20, 1932, Serial No. 618,118

31 Claims. (Cl. 179—100.4)

This invention relates to sound reproducing means and more particularly to a means for controlling the sound reproduction from a sound record tablet.

The invention relates more particularly to phonographs which are provided with an amplifier, the controls of which are adjusted by members which cooperate with notches cut on the edges of the record discs.

The invention further provides means for making these adjustments independently for the two sides of the record.

The invention also relates to phonographs with long duration records in which a plurality of selections are incorporated in one continuous record and provides means for independently setting the amplifier controls for each individual selection.

Means are also provided so that standard size and long duration records may be played on the same machine.

The invention also consists in certain new and original features of construction and combinations of parts hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, the mode of its operation and the manner of its organization may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof, in which

Fig. 1 is a top plan view of the invention as applied to a phonograph.

Fig. 2 is a top plan view of the mechanism shown in Fig. 1 with the record and turntable removed.

Fig. 3 is sectional elevation taken on line 3—3 of Fig. 2.

Fig. 4 is a top plan view similar to Fig. 1 with controls in operative positions.

Fig. 5 shows a detail of the mechanism in an operative position.

Fig. 6 illustrates diagrammatically one form of circuit which may be used in connection with this invention.

Fig. 7 illustrates diagrammatically a switching mechanism which is used when changing from standard to long duration records.

Fig. 8 is a detail of the switching mechanism taken on the line 8—8 of Fig. 7.

Fig. 9 is similar to Fig. 8 taken on the line 9—9 of Fig. 7.

Like reference characters denote like parts in the several figures of the drawings.

In the following description and in the claims, parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

Referring to the accompanying drawings and more particularly to Figures 1 to 3, a base 10 is provided, to the lower side of which is attached a phonograph driving mechanism contained in a casing 11. This mechanism is provided with a standard type of change speed device for use with long duration records, which is operated by means of a shaft 12, which is attached to an arm 13, secured to a shaft 14, on the end of which is mounted a handle 15.

The mechanism in the casing 11 drives a shaft 16, on the upper end of which is mounted the usual turntable 17. Resting on this turntable is a record 18, which is provided with a plurality of notches 21, 22, 23, 24, 25, and 26, cut in the edge thereof.

The usual tone arm 27 is mounted on the support 28. Secured to the end of this tone arm is a standard electro-magnetic pick-up 29, which is provided with the usual needle 31.

A support 32 is provided for the tone arm which is so constructed that the needle 31 will be held above the top of the record until the pick-up 29 has been moved sufficiently to the left to cause the needle 31 to be in a position above the outer edge 33 of the record groove. The right-hand side of the tone arm 27 will then be at the left-hand edge of the support 32, so that the needle 31 may then be lowered into the record groove. In this way, it is impossible for the needle 31 to drop into any of the notches 21, 22, etc. while being placed in position.

The standard type of shut-off mechanism is provided consisting of the slotted arm 34, to the end of which is attached the pawl 35. This cooperates with the ratchet teeth 36 on the arm 37, the other end of which is provided with a hook 38. The trip 39 is provided with a pin 40, and is rotated in a clock-wise direction by means of a spring 41. The usual motor switch is shown at 42, which comprises a fixed contact 43, and a movable contact 44, carried by a spring 45. A spring operated detent 46 is carried on a plate 47, which is provided with a cam face 48. The plate 47 is mounted for rotation on a pin 49. A spring 49-A tends to rotate this plate in a counter-clockwise direction. At suitable times, the detent 46 engages the slot 26 in the record 18.

Surrounding the shaft 16 and secured to the base 10 is a sleeve 50. Rotatably mounted on this sleeve are five members, 51 to 55. Secured to the ends of these members are five arms of insulating material 56 to 60. Secured to the under sides of these arms are contact springs 62, which engage contact segments 63 to 67 and groups of contact buttons, 71 to 75.

Mounted to the tops of the arms 56 to 60 are blocks 76, to which are pivoted trip members 77. Springs 78 are connected between these members and the blocks 76 and tend to rotate them in a clock-wise direction, as seen in the left-hand of Fig. 3. The trip members 77 are provided with pins 79. Secured to the base 10 are five cams 81 to 85, which at suitable times are engaged by the trip members 77 to hold them in the inoperative positions shown in Fig. 3.

Rotatably mounted on the sleeve 50 is a segment 86 to which is attached a handle 87. The segment 86 is provided with two sets of pins 88 and 89, the former being short and engaging the pins 79, and the latter being long and engaging the arms 56 to 60. A pin 91 is also carried by the segment 86 and at suitable times engages the cam face 48 of the detent mechanism 46.

In the operation of the mechanism, shown in Figures 1 to 3, the record 18 is placed on the turntable 17 so that the notch 26 is engaged by the detent 46. The handle 87 is then moved to the right, this giving the segment 86 a motion of rotation in a counter clock-wise direction.

As this segment moves, the pins 88 will engage the pins 79 of the trip members 77, thus causing these members together with the arms 56 to 60, to be rotated in a counter clock-wise direction.

As soon as the trip members 77 have been moved, a short distance, they will move out of engagement with the corresponding cams 81 to 85, thus allowing the upper ends of the trip members 77 to rest on the edge of the record 18. These trip members will slide around the edge of the record until the first member comes opposite the notch 21. As soon as this occurs, this trip member will drop through this notch into the position shown in Figure 5, under the action of the spring 78. In this position, the pin 79 will have moved out of engagement with the pin 88, so that as the segment 86 continues its motion, it will leave the trip member 77, together with the arm 56, in the position shown in Fig. 4.

As the segment 86 continues to move, one after another of the trip members 77 will drop into the corresponding notches, thus leaving the arms 57, 58, 59, and 60 in the positions shown in Fig. 4. In moving to these positions, the arms 56 to 60 will carry with them the corresponding contact fingers 62, so that these will then make contact with the corresponding contact buttons of the groups 71 to 75. As the segment 86 continues to move, the pin 91 will engage the cam 48, thus rotating the plate 47, together with the detent 46, in a clock-wise direction, so as to cause this detent to move out of engagement with the notch 26, as shown in Fig. 4. A further movement of the segment 86 causes it to engage the pin 40, thus rotating the member 39 in a counter clock-wise direction. As the left-hand end of this member moves out of engagement with the arm 37, this arm will be rotated in a clock-wise direction by means of the spring 45, until the hook 38 engages the projection of the member 39, thus locking the member 39 and the arm 37 together. In this position, the contact 44 will engage the contact 43, thus causing the driving motor in the casing 11 to start rotating, which causes the turntable 17, together with the record 18 to start rotating.

The pick-up 29 is then moved to the left and the needle 31 is placed in the record groove 33 in the usual manner. By the time the record has finished playing, the tone arm 27 will have moved sufficiently far to the left so that the pawl 35 will have engaged the ratchet teeth 36. As soon as the needle 31 enters the eccentric groove 95, the tone arm will be moved back and forth, thus causing the arm 34 to be oscillated, which by means of the ratch 36 causes the arm 37 to be rotated in a counter clock-wise direction, thus releasing the hook 38 from the member 39. This member will be rotated in a clock-wise direction by means of the spring 41, thus rotating the arm 37 in a counter clock-wise direction into the position shown in Fig. 2, which will cause the contact 44 to move away from the contact 43, thus stopping the driving motor, and therefore, the rotation of the turntable 17, and the record 18.

The record is then removed from the turntable, and the handle 87 is moved to its full extent to the left, thus causing the segment 86 to be rotated in a clock-wise direction. As it does so, the pins 89 will engage the corresponding arms 56 to 60, thus causing them to be rotated in a clock-wise direction. This will continue until the trip members 77 engage the corresponding cams 81 to 85. When this occurs, these trip members will be rotated to the positions shown in Figures 2 and 3.

The mechanism is now in its initial position, and is ready to have a new record placed on the turn-table 17, and the cycle of operations repeated.

It is thus seen that by properly positioning the slots in the record 18, it is possible to place the contact fingers 62 on any desired contact button, by merely moving the handle 87 to the right, and at the end of this motion, the record is automatically freed from the detent 46, and is started in rotation.

For reproducing the program picked up by the pickup device 29, any suitable form of amplifier may be used, as for example, that shown in Figure 6 of the drawings. In this system the pick-up 29 is connected through a potentiometer 101, and a transformer 102, to a volume control 103. This comprises a tapped resistance 104, the taps of which are connected to contact buttons 105, which are engaged by a movable contact arm 106. This arm is connected in the input circuit of a space discharge device 107, which forms the first stage of a low pass amplifier circuit 108. This circuit includes a fixed scratch filter 111, a transformer 112, a tone control 113, and a second space discharge device 114. The tone control 113 comprises a plurality of condensers 115, which are connected to a set of contact buttons 116, which are engaged by a movable contact arm 117.

The volume control 103 is connected through a condenser 121 to the input circuit of a space discharge device 122, which forms the first stage of a high pass amplifier circuit 123, which also includes a second space discharge device 124. The output circuits of the space discharge devices 114 and 124, include the primary of a transformer 125, the secondary of which is in the input circuit of a push-pull amplifier 126. The output of this amplifier passes through a transformer 127 to a loud speaker 128, which is provided with the usual field winding 129.

The volume control 103 is also connected to the input circuit of a space discharge device 131, the output circuit of which is connected through a transformer 132 to a rectifier 133. The cathode of this rectifier is connected to the grid return of the space discharge devices 122 and 124, and is also connected to a resistance 134. Connected across this resistance is a plurality of condensers 135, which are connected to a set of contact buttons 136. These contact buttons are engaged by a movable contact arm 137. Also connected across the resistance 134 is a rectifier 138, the cathode of which is connected to a movable contact 139, which engages a set of contact buttons 141. These contact buttons are connected to taps on a resistor assembly 142 which is provided with current from a power pack 143. This power pack 143 is supplied with current from a suitable A. C. source 144. This power pack provides filament current and plate potential for the various space discharge devices used in this system. The resistor assembly 142 is also connected to a plurality of contact buttons 145, which are engaged by a movable contact 146.

The output circuit of the space discharge device 131 is also connected to the input circuit of a space discharge device 152. The output circuit of this device is connected through a transformer 153, a selector 154, and a second transformer 155, to the input circuit of a second space discharge device 156. The selector 154 may be of any desired construction, but is preferably a tuned circuit for allowing the passage of inaudible frequencies only. The output circuit of the device 156 is connected though a transformer 157 to a rectifier 158, the output of which includes a resistance 159. Shunted across this resistance is a space discharge device 161 in the output circuit of which is a relay 162. The armature of this relay is connected to a conductor 163, and the contact is connected through a battery 164, to a conductor 165. These conductors will be described later in connection with Figure 7.

In the operation of the amplifying system shown in Figure 6, the energy from the pick-up mechanism 29 passes through the potentiometer 101, and transformer 102 to the volume control 103. By means of the adjustable contact 106, any amount of this energy may be fed to the amplifying system, the high frequency energy passing through the condenser 121 to the space discharge device 122, where it is amplified and fed to the space discharge device 124. Here it is further amplified and fed to part of the primary of the transformer 125.

The lower frequencies are amplified by the space discharge device 107, and passed through the transformer 112 to the space discharge device 114. The amplified energy from this device passes through the other part of the primary of the transformer 125. Energies from the two amplifying circuits 123 and 108 are then amplified by the push-pull amplifier 126, the output from which passes through the transformer 127 to the loud speaker 128 where the program is reproduced as speech or music in the usual manner. Control of tone may be obtained by manipulating the movable contact arm 117, thus connecting different capacities across the secondary of the transformer 112.

Some of the energy from the volume control 103 passes to the space discharge device 131, where it is amplified and passes through the transformer 132 of the rectifier 133. Here, the energy is rectified and passes through the resistance 134 in the direction of the arrow, thus causing a potential difference to be built up across this resistance. The positive potential built up at the upper end of this resistance is impressed upon the input circuits of the devices 122 and 124, thereby decreasing the negative bias on these devices which causes an increase of the amplification factors of these circuits. In this way, as the amount of energy received increases, the gain ratio of the circuit 123 is increased so that the amplification for loud signals will be greater than for weak signals. In this manner, the high frequency notes are accentuated when they are strong and suppressed when they are weak.

The time constant of the output circuit of the device 133 may be varied by manipulating the movable contact 137, thus connecting various capacities across the resistance 134. The space discharge device 138 acts as a limiter so that when the potential across the resistance 134 has been built up to a predetermined value, controlled by the setting of the movable contact 139, current will flow through the rectifier 138, thus limiting the potential across the resistance 134. The point of low potential on the resistor assembly 142 is determined by the setting of the movable contact 146.

Some of the energy from the output circuit of the device 131 is fed to the space discharge device 152 where it is amplified and passes through the transformer 153, selector 154, and transformer 155, to the input circuit of the space discharge device 156. Here, the energy is further amplified and passes through the transformer 157 to the rectifier 158, where it is rectified. This rectified current then passes through the resistance 159 in the direction of the arrow, thereby causing a potential difference to be built up across this resistance, which causes a decrease of bias on the grid of the space discharge device 161. This decrease of bias allows current to pass through this device, thus energizing the relay 162. This relay controls the operation of mechanism shown in Figure 7, which will be described hereafter.

It is thus seen that when energy of the proper frequency passes through the selector 154, which is preferably in the inaudible range, it will cause the energization of the relay 162. When this energy is not present the relay 162 will remain de-energized.

The movable contact arms 106, 117, 137, 139, and 146 correspond to the contact fingers 62, secured to the under-surface of the arms 56 to 60, shown in Figures 2 and 3, and the sets of contact buttons 105, 116, 136, 141, and 145 correspond to the sets of contact buttons 71, 72, 73, 74, and 75, respectively. It is evident, therefore, that the controls of the amplifier, shown in Figure 6, are automatically set by moving the handle 87, as already described in connection with Figures 1 to 3, so that by merely putting the record in place and moving this handle, the amplifier will be automatically set for the proper reproduction of the program on each individual record.

The notches for setting the amplifier for the program on one side of the record are cut on the one semicircular edge, and the notches for controlling the setting of the amplifier for the program on the opposite side of the record are cut on the other semicircular edge of this record, the holding notch 26 being common for both sets of notches. The notch 26 may be differentiated from the other notches, either by means of its shape, or by marking it with a suitable color,

so that it can be readily located when the record is put in place.

For locating the positions of the notches, when making the records, the program is first recorded on a record and the notch **26** cut in its proper place. The springs **78** on the trip members **77** are disengaged so that these members are inoperative. The record is then placed on the turntable and the selection is then played. The arms **56** to **60** are manually adjusted until the best reproduction for this selection is provided. After the record has been stopped, it is turned so that the notch **26** engages the detent **46**, and the positions of the trip members **77** are marked on the edge of the record. The notches are then cut at these positions so that when the record is played in the manner described in connection with Figures 1 to 3, the arms **56** to **60** will be moved to the proper positions. This work, is of course, done at the factory where the records are made, so that after the notches have been located on the master record, a templet is made so that the notches in all the production records can be cut from this templet.

In order to make it possible to use the long-playing records which are engraved with a succession of programs, the mechanism and circuits shown in Figure 7, are provided as each individual program on the record will require a different arrangement of settings of the amplifier controls, so therefore, a plurality of switches, **171**, **172**, **173**, etc. are provided for each required combination of settings of these controls. Only three of these switches are shown in the diagram, but as many as seven may be used in connection with the mechanism shown in Figure 2. These switches consist of a plate of insulating material **175** (see Figure 9), which is secured to a shaft **176**, mounted for rotation in brackets **177**. Secured to the plate **175** is an arm **178**, made of magnetic material. This arm is held in the position shown by means of a spring **179**. Located adjacent to the arm **178** is an electro-magnet **181**.

One side of the windings of the magnets **181** are connected through a battery **182**, to a contact **183**, which engages a segment of conducting material **184**, mounted on a disc of insulating material **185**. This disc is secured to a shaft **186**, to which is also secured a ratchet **187**, which is provided with a large tooth **188**. Secured to the shaft is a spiral spring **189** (not shown) which tends to rotate this shaft together with the ratchet **187**, and the disc **185** in a clockwise direction as seen in Fig. 7. Cooperating with the ratchet **187** is a spring pressed pawl **191**, which is mounted on a reciprocating rod **192**, to the end of which is secured a collar **193** for limiting the motion thereof. The rod **192**, which is made of magnetic material forms the core of a solenoid **194**, the winding of which is connected to the conductors **163** and **165**, described in connection with Figure 6. A spring **195** surrounding the rod **192**, and engaging a collar **196**, secured to this rod tends to move the rod **192**, together with the pawl **191** to the right, normally holding them in position shown in Fig. 7. Engaging the ratchet **187** is a detent **197** which is held in engagement with the ratchet by means of a spring **198**. This detent may be moved out of engagement with the ratchet by means of a lever **199**, which is mounted for rotation on the base **10**, shown in Figures 2 and 3. The upper end of this lever normally rests against the segment **86**.

Secured to the shaft **14**, are five switches, **201** to **205**. These switches comprise plates of insulating material **206**, which are secured to the shaft **14**, (see Figure 8) which is mounted for rotation in brackets **207**. Secured to the plates **206** is a plurality of contact fingers **208**, which are connected to the groups of contact buttons **71** to **75**, and to the contact segments **63** to **67**. In the diagram shown in Figure 7, only three contact buttons of each group are shown, for simplicity, it being understood, however, that in practice the seven buttons of each group, shown in Figure 2, will be used.

When the shaft **14** is rotated in a counter clockwise direction, as seen in Figure 8, by means of the handle **15**, the contact fingers **208** will engage contact segments **209**. One of these segments of each switch is connected to contacts **211** to **215**, which engage the circular plate **185**. The other contact segments **209** of the switches are connected by a group of conductors **216** to the electro-magnets **181** of the switches **171**, **172**, **173**, etc.

When the rod **14** is rotated in a clockwise direction, as seen in Figure 8, the contact fingers engage contact segments **217**. These segments are connected to groups of conductors **221** to **225**, the left-hand conductors of which are connected to the movable arms **106**, **117**, **137**, **139**, and **141**, respectively. The other conductors of each group are connected to the tapped resistance **104**, the condensers **115**, the condensers **135**, and the tapped resistor assembly **142**, so that when the switches **201** to **205** are in this position the circuits will be identical with those shown in Figure 6.

Secured to the plates **175** of the switches **171**, **172**, **173**, etc. are contact fingers **227**, which cooperate with contact segments **228**. The corresponding contact fingers **227** are connected together, as shown in Figure 7, each set being connected to the left-hand conductor of the groups **221** to **225**, and therefore, to the movable arms **106**, **117**, **137**, **139**, and **141**. The contact segments **228** are connected to various other conductors of these groups, depending upon the desired combination of amplifier controls for each of the various selections which are recorded on the record.

In the operation of the mechanism, shown in Figure 7, when it is desired to play the standard type of record, the handle **15**, and therefore, the shaft **14**, are rotated in a clockwise direction, as seen in Figure 8. The circuits will be identical to those shown in Figure 6, and the operation of the mechanism will be similar to that already described. If, however, it is desired to use a long-playing record, the handle **15** is moved in the opposite direction, thus connecting the contact segments **63** to **67**, to the contacts **211** to **215**, and connecting the corresponding contact buttons of the groups **71** to **75**, to the electro-magnets **181** of the switches **171**, **172**, and **173**, etc. This operation also actuates the change speed mechanism of the driving motor **11**, by means of the shaft **12**, so that when the motor is started, it will rotate the turntable **17** at a reduced rate of speed. The record is then placed on the turntable so that the notch **26** is engaged by the detent **46**.

The handle **87** is then operated in a manner similar to that already described, thus causing the contact springs **62**, to be moved into engagement with various contact buttons of the groups **71** to **75**, the particular buttons selected being dependent upon the position of the notches

in the edge of the record, as already described in connection with Figures 1 to 3. The driving motor 11 is then automatically started, which causes the rotation of the record at a slow rate of speed.

The first recording on this record is that of the inaudible frequency which is passed by the selector 154. Some of the energy from the pick-up 29 passes through the volume control 103, to the space discharge means 131. Part of the output of this device passes through the amplifier 152 and selector 154, which as already described, causes the energization of the relay 162, which in turn energizes the solenoid 194. This causes the rod 192 to be moved to the left which by means of the pawl 191 causes the rotation of the ratchet 187, and therefore the disc 185, through a fraction of a revolution so that the contact 211 is brought into engagement with the end of the segment 184. This closes a circuit from the battery 182 through contact 183, segment 184 contact 211, contact segment 209, contact finger 208, contact segment 63, contact spring 62, contact button 71, conductor 216, electro-magnet 181 of switch 172, and back to the battery 182. This energizes the electro-magnet 181 and causes the contact fingers 227 to engage the contact strips 228, as already described, thus setting the amplifier controls in a manner dependent upon the way in which the conductors from the contact strips 228 to the conductors in the groups 221 to 225 have been wired up, this having been previously arranged for this type of program.

When the needle 31 of the pick-up 29 passes on to the first program part of the record the inaudible frequency will cease, thus deenergizing the relay 162, which in turn de-energizes the solenoid 194, thus allowing the rod 192, together with the pawl 191 to be moved to the right, under the action of the spring 195, into the position shown in Figure 7. The ratchet 187, together with the disc 185, will be held, however, by means of the detent 197, so that the switch 172 will remain closed during the playing of this section of the program.

At the end of this section of the program, and before the next section starts, the inaudible frequency is again recorded on the record. This, again causes the energization of the solenoid 194, which causes the disc 185 to be rotated an additional amount, so that the contact 212 engages the end of the segment 184, thus closing the circuit through the electro-magnet 181 of the switch 171. This causes this switch to be operated, thus setting the amplifier controls in a manner determined by the wiring of the conductors to this switch, this arrangement being that found preferable for the second selection on the record.

In a similar manner, the amplifier controls will be set by the switches 173, etc., for each of the selections on the record. The record is then removed from the turntable and the handle 87 moved to the left so as to return the segment 86 to its initial position, as shown in Figure 2. This causes the left-hand end of this segment to engage the lever 199, rotating it in a clockwise direction, as seen in Figure 7, which causes the detent 197, to move out of engagement with the teeth of the ratchet 187. This ratchet, together with the disc 185 is then rotated in a clock-wise direction under the action of the spring 189, until the large tooth 188 engages the detent, thus stopping the disc 185 in its initial position, as shown in Figure 7. The mechanism is then ready for a new record to be placed on the turntable, and the operation repeated.

If so desired, the portions of the record between the selections may be left blank instead of recording thereon the inaudible frequency previously referred to. If these sections between the selections are left blank, the selector 154 may be eliminated, and the output circuit of the device 152 connected to the primary of the transformer 155. As soon as the pick-up device 29 picks up the first program, energy will pass through the device 152, thereby energizing the relay 162, as already described, which in turn energizes the solenoid 194, thus causing the disc 185 to be rotated so that the contact 211 engages the segment 184. This will cause the operation of the switch 172, thus properly setting the amplifier controls for this program. During the playing of this program the relay 162 will remain energized, thus causing the solenoid 194 to remain energized and holding the rod 192 and pawl 191 to the left. When this selection of the program is finished, the needle 31 will enter the section of the groove between the selections where no energy has been recorded. Relay 162 will then become de-energized, thus deenergizing the solenoid 194 which allows the rod 192 and the pawl 191 to be moved to the right, into position shown in Figure 7.

When the needle 31 enters the next selection energy will be again fed to the device 152, thus energizing the relay 162 and rotating the disc 185, in the next position. It is thus seen that the sequence of operation, similar to that described when the selector 154 was used, is repeated, thus setting the amplifier controls for each individual selection.

The wiring connections for the switches 171, 172, etc., are determined for different types of selections, thus for example, for an orchestral selection, the wiring would be arranged so that the amplifier would be properly set for this type of selection. For a vocal selection, the amplifier controls would have different settings which would be determined in advance, thus each switch would have a given designation, such for example, orchestral, vocal, talking, etc. When a long-playing record is made, it would be determined in which group each one of the selections would come, and the notch for each selection would be so located that the contact 62 would be moved to the proper button to operate the correct switch for this type of selection.

Although only a few of the various forms in which this invention may be embodied have been shown herein, it is to be understood that the invention is not limited to any specific construction, but might be embodied in various forms without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. In a phonograph or the like, a sound record tablet of substantially circular form provided with notches on the periphery thereof and means cooperating with said notches for setting the controls of said phonograph.

2. In a phonograph or the like, a pick-up device, an amplifier for amplifying the energy from said pick-up, a sound reproducer for converting the amplified energy into sound waves, a sound record tablet provided with marginal indentations and means co-operating with said indentations to preset the controls of said amplifier before said record is played.

3. In a phonograph or the like, a pick-up device, an amplifier for amplifying the energy from said pick-up, a sound reproducer for converting the amplified energy into sound waves, a sound record disc provided with notches along its edge, movable fingers co-acting with the edge of said disc and means controlled by said fingers for setting the controls of said amplifier.

4. In a phonograph or the like, a sound record tablet having an irregularly shaped margin, tactile elements adapted to contact with the margin of said tablet and means controlled by said tactile elements for setting the controls of said phonograph before said record is played.

5. In a system for the production of sound from a sound record tablet, notches cut in said sound record tablet, a pick-up device, an amplifier and a sound reproducer and means co-acting with said notches for setting the controls of said amplifier before said record is played.

6. In a system for the production of sound from a sound record tablet provided with notches along its edge, a pick-up device, an amplifier, a sound reproducer, manually operated means co-acting with said notches for presetting the controls of said amplifier.

7. A system for producing sound from a sound record tablet comprising means for translating the sound record into compressional waves, control elements for controlling the intensity and tone qualities of said compressional waves and means formed on the edge of said record tablet for automatically operating said control elements whereby the sound translated from each tablet is automatically adjusted in a predetermined manner before said record is played.

8. A system for producing sound from a sound record tablet comprising means for translating said record into compressional waves, control elements for varying the tone qualities thereof, said tablet having a plurality of notches formed on the edge thereof and cooperating with said control elements to automatically set said elements to a predetermined position before said record is played.

9. A system for producing sound from a sound record tablet comprising means for translating said record into compressional waves, control elements for varying the tone qualities thereof, said record tablet having a plurality of notches formed on the edge thereof and cooperating with said control elements to automatically set said elements to a predetermined position, said notches being so arranged that different predetermined settings may be obtained when each side of said tablet is being reproduced.

10. A sound reproducing system comprising a sound record tablet, a table for receiving and rotating said tablet, said tablet being provided with a plurality of notches on its periphery at predetermined positions, means for translating said record into compressional waves, control elements for controlling the tonal quality of said waves and means whereby said control elements are positioned in accordance with the positions of said peripheral notches whereby said elements are automatically adjusted in a predetermined manner.

11. In a phonograph or the like, a pick-up device, an amplifier for amplifying the energy from said pick-up, a sound reproducer for converting the amplified energy into sound waves, a sound record tablet having engraved thereon a plurality of program selections arranged in succession, said tablet being provided with marginal indentations and means cooperating with said indentations for adjusting said amplifier for each individual selection.

12. In a phonograph or the like, a pick-up device, an amplifier for amplifying the energy from said pick-up, a sound reproducer for converting the amplified energy into sound waves, a sound record tablet having engraved thereon a plurality of program selections arranged in succession, said tablet being provided with marginal indentations, a plurality of movable fingers co-acting with the edge of said tablet and means controlled by each individual finger for adjusting said amplifier for each individual selection.

13. In a phonograph or the like, having a sound reproducing system, a sound record tablet having engraved thereon a succession of programs, said tablet having an irregularly shaped margin, tactile elements adapted to contact with the margin of said tablet and means controlled by said tactile elements for adjusting said sound reproducing system in the proper manner for each of said programs.

14. In a system for producing sound from a sound record tablet having engraved thereon a succession of programs, means for translating the sound record into compressional waves, control elements for controlling the intensity and tone qualities of said compressional waves and means formed on the edge of said record tablet for automatically operating said control elements whereby the sound translated from each individual program is automatically controlled in a predetermined manner best suited for that particular program.

15. In a system for producing sound from a sound record tablet having engraved thereon a succession of programs, means for translating the sound record into compressional waves, control elements for controlling the intensity and tone qualities of said compressional waves and notches cut on the edge of said record tablet for automatically operating said control elements whereby the sound translated from each individual program is automatically controlled in a predetermined manner, best suited for that particular program.

16. In a system for producing sound from a sound record tablet having engraved thereon a succession of programs separated by short records of inaudible frequencies, means for translating the sound record into compressional waves, control elements for controlling the intensity and tone qualities of said compressional waves and means formed on the edge of said record tablet for automatically setting said control elements in a predetermined manner whenever said inaudible frequencies are picked up from said record, thus properly adjusting the translating means for each individual selection.

17. In a system for producing sound from a sound record tablet having engraved thereon a succession of programs separated by short intervals when no energy is recorded, means for translating the sound record into compressional waves, control elements for controlling the intensity and tone qualities of said compressional waves and means formed on the edge of said record tablet for automatically setting said control elements in a predetermined manner whenever no energy is picked up from said record, thus properly adjusting the translating means for each individual selection.

18. In a system for producing sound from a

sound record tablet having engraved thereon a succession of programs separated by short records of different characteristics from said program records, means for translating the sound records into compressional waves, a plurality of switches for adjusting said translating means in a predetermined manner, control elements for operating said switches, means formed on the edge of said record tablet for automatically setting said control elements in a predetermined manner and selector means operated by the short records between the program records for actuating each of said switches in succession thus adjusting said translating means in a different manner for each individual selection on said record tablet.

19. As an article of manufacture, a phonograph record disc having a selection recorded thereon and having notches irregularly distributed along its outer edge, said notches being located in positions determined by the characteristics of said selection and being adapted to guide the manner of reproduction of said selection.

20. As an article of manufacture, a phonograph record having a plurality of different selections recorded thereon and having inaudible recordings between said selections.

21. In a phonograph or the like, a pick-up device, an amplifier for amplifying the energy from said pick-up device, a sound reproducer for converting the amplified energy into sound waves, a sound record tablet having engraved thereon a plurality of program selections arranged in succession, means for adjusting said amplifier and means on said record for actuating said adjusting means for each individual selection.

22. In a phonograph or the like, a disc record tablet and a pick-up device adapted to cooperate therewith, an amplifier fed by said pick-up device, a reproducer fed by said amplifier, notches in the edge of said tablet and means cooperating therewith to present said amplifier.

23. In a phonograph or the like, a record tablet having a sound record and control elements thereon, means coacting with said record tablet to pick-up, amplify and reproduce sound from said sound record, devices coacting with some of said control elements to preset said amplifying means before said record is played and means coacting with other of said control elements to change the setting of said amplifying means during the playing of said record.

24. A system for reproducing sound from a sound record tablet comprising means for translating the sound record into compressional waves, control elements for controlling the intensity and tone qualities of said compressional waves and means formed on said record tablet for automatically pre-setting said control elements prior to translation of each tablet.

25. A system for reproducing sound from a sound record tablet comprising means for translating said record into compressional waves, control elements for varying the tone qualities thereof, said record having a plurality of slots formed therein and cooperating with said control elements to automatically pre-set said elements to a predetermined position prior to translation of said tablet.

26. A system for reproducing sound from a sound record tablet comprising means for translating said record into compressional waves, control elements for varying the tone qualities thereof, said record having a plurality of slots formed therein and cooperating with said control elements to automatically set said elements to a predetermined position, said slots being so arranged that different predetermined settings may be obtained when each side of said tablet is being reproduced.

27. A sound reproducing system comprising a sound record tablet, a magnetic pick-up adapted to translate said record into electrical variations, an electrical amplifier associated with said pick-up, control elements for controlling the tone quality of the amplified current and means associated with said tablet and operated when said tablet is placed in position for reproduction for automatically pre-setting said control elements into predetermined position, responsive to the individual characteristics of said tablet.

28. In a sound reproducing system, a sound record tablet having a plurality of radial slots therein, a sound reproducing mechanism, control elements therefor, said control elements being positioned to cooperate with certain of said slots when one side of said record is being reproduced and the others of said slots when said record is reversed.

29. In a sound reproducing system, a sound record having a sound selection recorded thereon, reproducing devices for translating the sound selection into audible sounds, said reproducing devices having a control element for determining the nature of the reproduction, and means controlled by the sound record for pre-setting said control element for the reproduction of the selection prior to said reproduction.

30. In a system for reproducing sound, a sound record having a sound selection recorded thereon, reproducing devices comprising a dynamic amplifier for expanding the volume ratio of the recorded selection and a sound propagating device fed by said amplifier, and means controlled by said sound record for pre-setting the constants of the dynamic amplifier for the said selection prior to the reproduction of the selection.

31. A system for reproducing sound from a mechanical sound record tablet comprising means for translating the sound record into compressional waves, control elements for controlling the intensity and tone qualities of said compressional waves and means formed on said record tablet for automatically operating said control elements whereby the sound translated from each tablet is automatically adjusted in a predetermined manner.

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