

Jan. 6, 1953

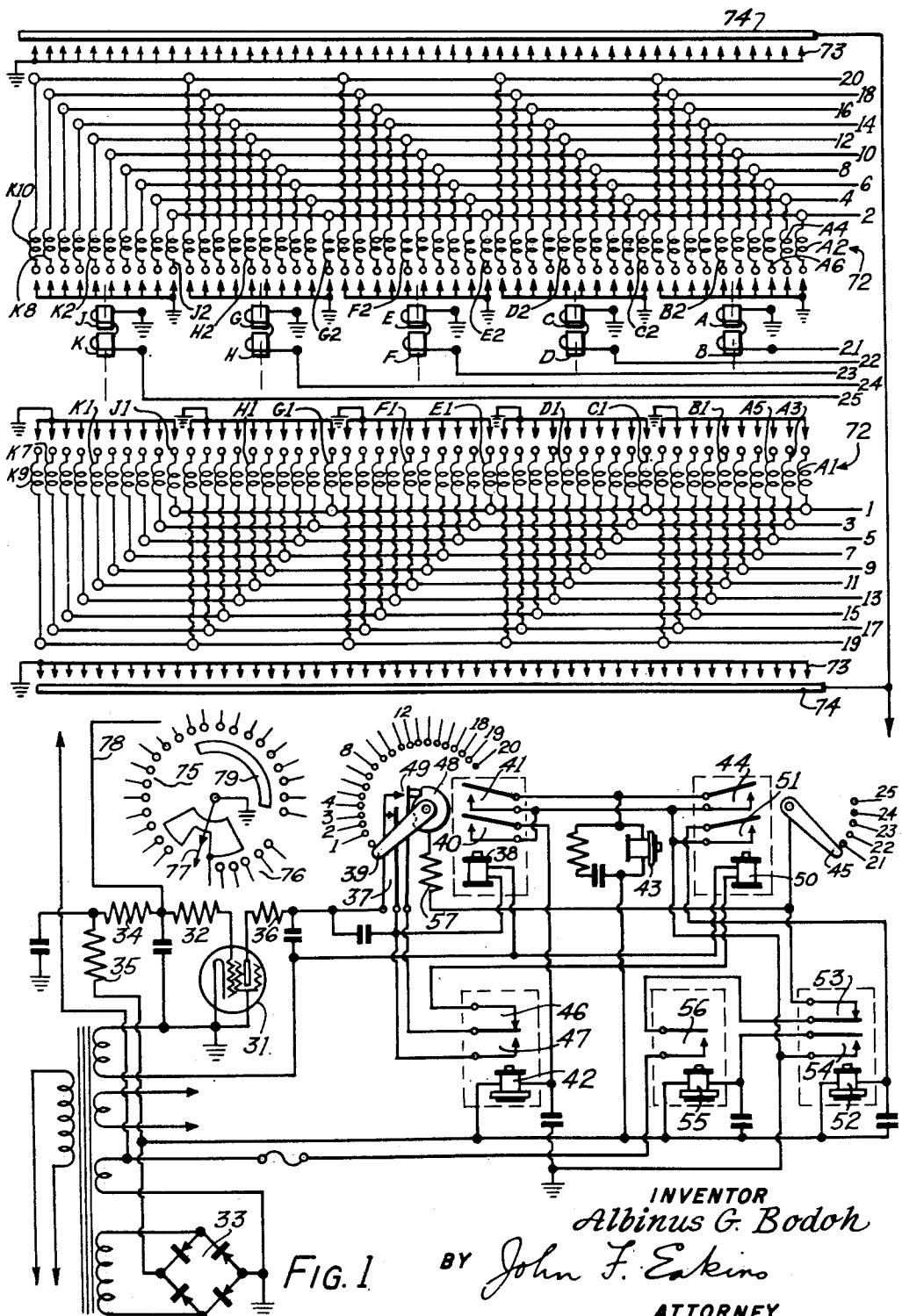
A. G. BODOH

2,624,795

SELECTOR FOR AUTOMATIC PHONOGRAHS

Filed Nov. 15, 1949

3 Sheets-Sheet 1



Jan. 6, 1953

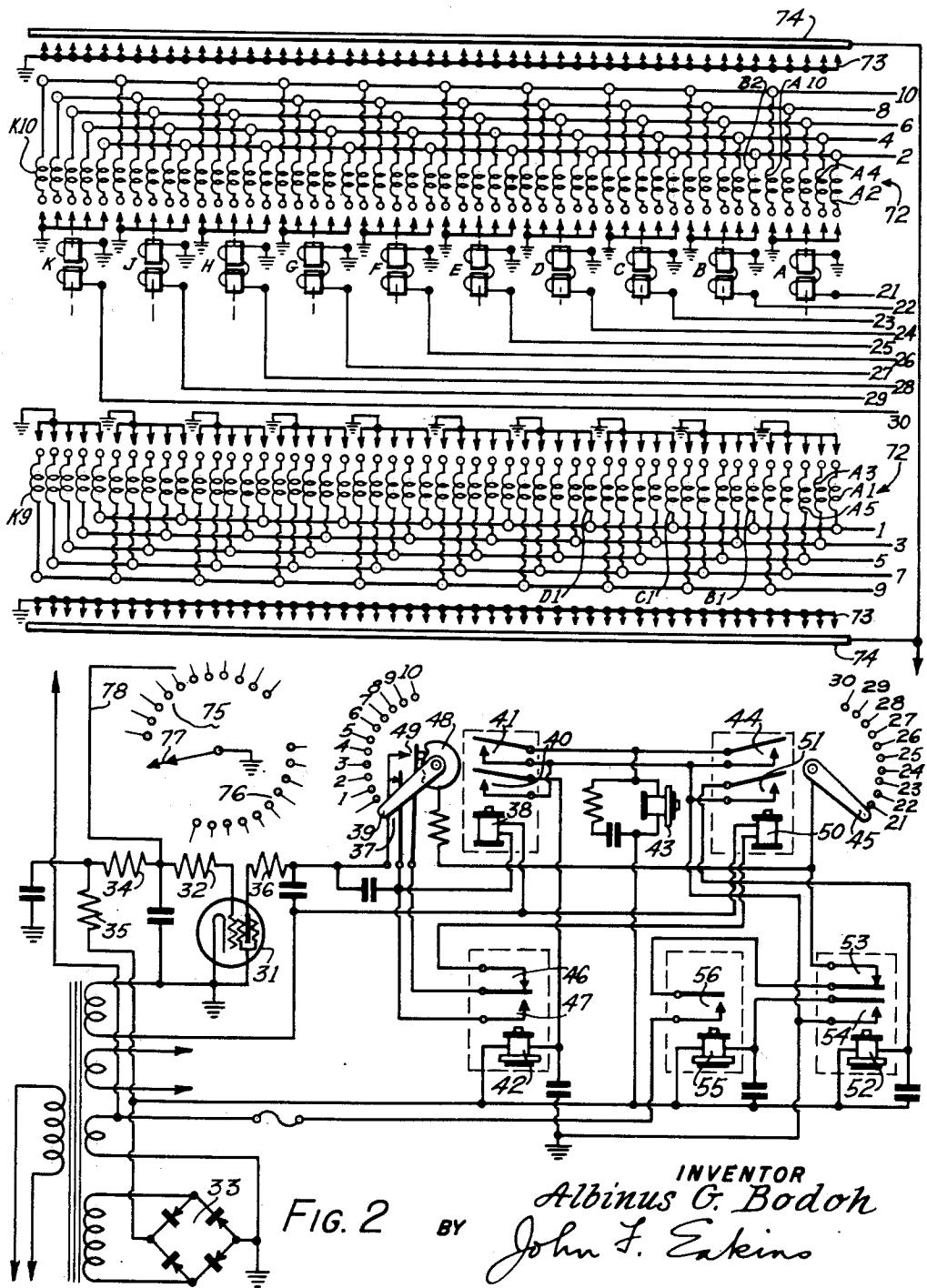
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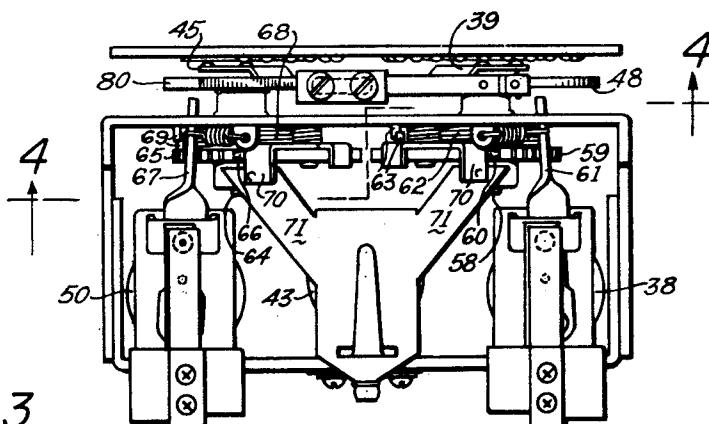


FIG. 3

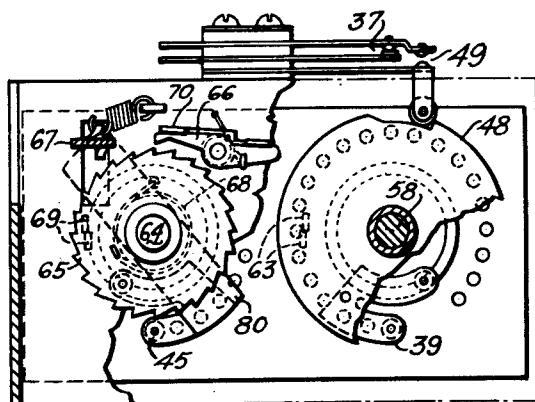


FIG. 4

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## UNITED STATES PATENT OFFICE

2,624,795

## SELECTOR FOR AUTOMATIC PHONOGRAPHS

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Application November 15, 1949, Serial No. 127,458

11 Claims. (Cl. 177—353)

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This invention relates to selectors for automatic phonographs and particularly to stepping mechanism which is adapted to receive any of a large number of two trains of impulses and in response thereto, to energize two circuits to effect selecting of a recording corresponding individually to the two trains.

Patent No. 2,489,782, issued November 29, 1949 to Herman G. Jensen and co-pending application Serial No. 127,459, filed November 15, 1949, by Herman G. Jensen describe and claim mechanisms for supplying such trains of impulses and co-pending application Serial No. 117,389, filed September 23, 1949, by Herman G. Jensen describes and claims a two circuit selecting mechanism which may suitably be energized by the device of the present invention.

The principal object of the present invention is to provide an improved stepping mechanism of the type referred to.

The other objects, advantages and capabilities of the invention will appear from the following description thereof taken in conjunction with the accompanying drawings in which:

Figure 1 is a wiring diagram of an impulse actuated selecting mechanism embodying the present invention;

Fig. 2 is a similar view illustrating a modified form of the invention;

Fig. 3 is a plan view showing the mechanical structure of part of the device embodying the present invention; and

Fig. 4 is a vertical section of this mechanical structure, the section being taken on the line 4—4 of Fig. 3.

Referring more particularly to Fig. 1, it is to be noted that the essential parts of the impulse creating mechanism of the first mentioned application are shown as two sets of contacts 75 and 76 and an arm 77 which is arranged to pass over them for each selecting operation. The contacts of each set are regularly spaced and they are separated by a larger space which may be about three times the contact spacing. All the contacts are normally connected to the impulser line 78 which leads to the phonograph. The impulser circuit normally includes the impulser line 78, all the contacts 75 and 76 and the movable arm 77. Means including two sets of push buttons are provided to cut a desired number of contacts of each set out of the impulser circuit so as to create a large number of two train selecting signals. With two sets of ten buttons, 100 signals may be created. In this remote control, there are provided one set of 21 contacts and a second set of 5

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contacts. One set of buttons cuts out any number up to 9 of the first set of contacts and the other set of buttons cuts out any number up to 4 of the second set of contacts. Furthermore, the last 11 of the first set of contacts are subtended by a large contact 79 which can be connected and disconnected to the impulser circuit. Consequently, 100 double trains from 2-1 to 21-5 impulses can be transmitted. Where the first train transmits between 2 and 11 impulses, the large contact 79 is connected so that the last of these impulses is a long impulse. The reason why a minimum of two impulses is included in the first train will hereinafter appear.

Referring to Fig. 1, it will be understood that each impulse is created by the grounding of the line 78. This line is connected to the grid of a tetrode 31 through a relatively low resistor 32 and to the negative side of a rectifier 33 through a very high resistor 34 and a lesser resistor 35. Normally, the negative voltage applied to the grid of the tube 31 biasses the tube below cut-off so that no current flows. When, however, the line 78 is grounded to create an impulse, the negative bias of the grid of the tube 31 is removed and plate current flows through a small resistor 36, normally closed switch 37 and the first stepping relay 38. The tube 31 may suitably be a 2050 gas filled tetrode. This stepping relay moves the contact 39 one step and momentarily closes the two normally open switches 40 and 41. Closing of the switch 40 energizes the slow release relay 42 and closing of the switch 41 energizes the slow release relay 43. Slow release relay 42 is connected to the ungrounded side of the rectifier 33 and when the switch 40 closes, its other side is connected to ground. The relay 42 is slugged so that it remains energized for slightly longer than the period between successive impulses of the first train. The relay 43 is likewise connected to the ungrounded side of the rectifier 33 and when the switch 41, or the switch 44 is closed, its other side is grounded. It is required that the relay 43 remain energized not only between the successive impulses of each train, but also during the longer period between the two trains. Consequently, I provide a CR circuit in parallel with the relay 43 to give this much slower release. The relay 43, when energized, releases dogs which hold the two contacts 39 and 45 in the position into which they are stepped by two trains of impulses. It is to be noted that when the relay 42 is energized, the normally closed switch 46 is opened and the normally open switch 47 is closed. The second impulse of the first series brings the contact 39 into

engagement with a contact which is connected to a conductor 1. At the end of the second impulse, a cam 48 movable with the contact 39 closes the switch 49 and opens the switch 37. The third and succeeding impulses of the first train now pass through switch 49, switch 47, which is now closed, and through the first stepping relay 38 as before. Thus, the first train of impulses moves the contact 39 into an individual position which depends upon the number of impulses in that train. Thus, 11 impulses in the first train will move the contact 39 into contact with the contact connected to conductor 10. At the end of the first train of impulses, the relay 42 becomes deenergized, opening the switch 47 and closing the switch 46. The relay 43 remains energized until the second train of impulses is received.

It may here be noted that the reason why a minimum of two impulses is included in the first train is to insure at least two closings of the switch 41 which is sufficient to charge the condenser of the CR circuit in parallel with the relay 43 to insure that this relay remains energized during the period between the two trains. The first impulse of the second train passes through the switch 49, switch 46, which is now closed, and the second stepping relay 50. The energization of the relay 50 steps the contact 45 into engagement with its first contact which is connected to a conductor 21, and also momentarily closes the switches 44 and 51. The closing of the switch 44 during the second train of impulses maintains the relay 43 energized and the similar closing of the switch 51 energizes the relay 52. One side of the relay 52 is connected to the ungrounded terminal of the rectifier 33 and its other side is connected through the switch 51 to ground. The relay 52 is slugged so that it remains energized between successive impulses of the second series. Consequently, while the second series of impulses is being received, the normally closed switch 53 is opened and the normally open switch 54 closes. A circuit is completed from ground, through switch 54 and relay 55 to the ungrounded side of the rectifier 33. Consequently, the switch 56 becomes closed, but it is to be noted that when this switch closes, the switch 53 has already been opened. One side of the switch 56 is connected to a 26 volt A. C. line. Its other side is connected to one side of the switch 53. The other side of switch 53 is connected to the contacts 39 and 45. The former connection includes a small resistor 57 since the electromagnetic devices to which the lines 21 to 25 are connected have a higher impedance than the electromagnetic devices to which the lines 1 to 21 are connected.

When the second series of impulses terminates, the relay 52 becomes deenergized, closing the switch 53 and opening the switch 54. The relay 55 thereafter becomes deenergized while the relay 43 remains energized owing to its slower release. After the relay 52 is thus deenergized and before the relay 55 becomes deenergized, a circuit is completed from the 26 volt A. C. source through switch 56, switch 53, the contacts 39 and 45 and through the electromagnetic devices to which they are connected owing to their stepped positions. After this impulse has passed through these electromagnetic devices, the relay 43 drops out and the contacts 39 and 45 are freed to resume their normal positions.

The contact 39 is carried by the cam 48 which is rigidly carried by a shaft 58 which also rigidly carries a ratchet wheel 59. A dog 60 is biased

towards the ratchet wheel 59 and when it is permitted to engage the ratchet wheel 59, it serves to hold this ratchet wheel and the contact 39 in any stepped position. The armature of the stepping relay 38 carries an arm 61 which is arranged to engage the teeth of the ratchet wheel 59 and step it one tooth and contact space each time the relay 38 is energized. The shaft 58 and the elements carried by it including the contact 39, are biased by a spring 62 towards normal position which is defined by stops 63. The contact 45 is mounted on a piece of insulation 80 carried by a shaft 64 which also rigidly carries a ratchet wheel 65. A dog 66 is biased towards the ratchet wheel 65 and when it is in operative position, it serves to hold the shaft 64 and contact 45 in any position into which they are stepped. The armature of the stepping relay 50 carries an arm 67 which is arranged to engage the ratchet wheel 65 and displace it one tooth and one contact space away from its normal position each time the relay 50 is energized. The shaft 64 and the elements carried thereby including the contact 45 are biased by a spring 68 towards normal position, which is defined by stops 69.

The dogs 60 and 66 carry projecting lugs 70, each of which is arranged to be engaged by a spring arm 71, carried by the armature of the relay 43. When the relay 43 is deenergized, the arms 71 lift the dogs 60 and 66 away from the ratchet wheels 59 and 65 so that the contacts 39 and 45 are freed to move to their normal zero positions. When the relay 43 is energized, the arms 71 are moved away from the lugs 70 so that the dogs 60 and 66 move into cooperative engagement with the ratchet wheels 59 and 65.

As has previously been described, the relay 43 becomes energized during the first impulse received and remains energized until after the last impulse has been received. Consequently, the dogs 60 and 66 hold the contacts 39 and 45 in stepped position. The first train of impulses steps the contact 39 into selected position depending upon the number impulses in the first train and the second train of impulses displaces the arm 45 into selected position depending upon the number of impulses in the second train. After the second train of impulses has been received, the relay 52 becomes deenergized and power is supplied through the closed switch 56 and the closed switch 53 to the contacts 39 and 45 so that an actuating surge of current is supplied to the two conductors with which the contacts 39 and 45 are connected. For example, if the first train included 17 impulses, and the second train included 3 impulses, an actuating surge of current would be supplied to conductors 16 and 23. This surge is terminated by deenergization of the relay 55 and thereafter the relay 43 releases so that the arms 71 lift the dogs 60 and 66 so that the contacts 39 and 45 are returned to their normal zero position by the associated springs 62 and 68.

The embodiment of the invention just described is suitable for use with the automatic phonograph selector described and claimed in co-pending application Serial No. 117,389, filed September 23, 1949, by Herman G. Jensen. This selector includes two rows of electromagnets 72 and since the described device is intended for 100 selections, 100 such magnets 72 are provided, each corresponding to one selection. The lower row of electromagnets 72 in Fig. 1, corresponds, reading from right to left, to selections A1, A3, A5, A7, A9, B1, B3, B7, B9, C1, C3 and so forth up to K9. It may be noted that this nomenclature is derived

from the last mentioned application and has its origin in the fact that one set of selector buttons is numbered and the other set is lettered. The letter I is omitted to avoid confusion with the No. 1. The upper row of electromagnets 72 in Fig. 1, corresponds, reading from right to left, to selections A<sub>2</sub>, A<sub>4</sub>, A<sub>6</sub>, A<sub>8</sub>, A<sub>10</sub>, B<sub>2</sub>, B<sub>4</sub>, B<sub>6</sub>, B<sub>10</sub>, C<sub>2</sub>, C<sub>4</sub> and so forth up to K<sub>10</sub>. The conductor 1 is connected to one side of electromagnets A<sub>1</sub>, C<sub>1</sub>, E<sub>1</sub>, G<sub>1</sub> and J<sub>1</sub>. Conductor 2 is connected to one side of electromagnets A<sub>2</sub>, C<sub>2</sub>, E<sub>2</sub>, G<sub>2</sub> and J<sub>2</sub> and so forth. Conductor 11 is connected to one side of electromagnets B<sub>1</sub>, D<sub>1</sub>, F<sub>1</sub>, H<sub>1</sub> and K<sub>1</sub>. Conductor 12 is connected to one side of electromagnets B<sub>2</sub>, D<sub>2</sub>, F<sub>2</sub>, H<sub>2</sub> and K<sub>2</sub> and so forth, conductor 20 being connected to one side of electromagnets B<sub>10</sub>, D<sub>10</sub>, F<sub>10</sub>, H<sub>10</sub> and K<sub>10</sub>.

The other sides or terminals of the electromagnets are normally disconnected, but are arranged to be engaged by the grounded armatures of 5 electromagnets which are designated A—B, C—D, E—F, G—H, and J—K. One side of each of these electromagnets is grounded. The other sides of electromagnets A—B, C—D, E—F, G—H and J—K are connected to conductors 21, 22, 23, 24 and 25 respectively. The armatures of the electromagnets A—B, C—D, E—F, G—H and J—K individually ground the normally unconnected terminals of the group of electromagnets A<sub>1</sub> to B<sub>10</sub>, C<sub>1</sub> to D<sub>10</sub>, E<sub>1</sub> to F<sub>10</sub>, G<sub>1</sub> to H<sub>10</sub>, and J<sub>1</sub> to K<sub>10</sub> respectively. It will thus be seen that when an actuating surge of current is supplied to any one of the conductors 1 to 20 and any one of the conductors 21 to 25, only one of the electromagnets 72 will be energized. Thus, returning to the previously mentioned example, where the first train included 17 impulses and the second train included 3 impulses, an actuating surge of current is supplied to conductors 16 and 23. The surge passing over conductor 23 energizes electromagnet E—F and the surge of current passing over conductor 16 energizes electromagnet F<sub>6</sub> whose normally unconnected terminal is grounded by the armature of the electromagnet E—F. While the conductor 16 is also connected to electromagnets B<sub>6</sub>, D<sub>6</sub>, H<sub>6</sub> and K<sub>6</sub>, these last mentioned electromagnets are not energized because their normally unconnected terminals remain unconnected since electromagnet E—F is the only one of the electromagnets A—B to J—K which is energized.

As is more fully described in the last mentioned co-pending application, the energization of any one of the electromagnets 72 causes the physical displacement of its individual armature 73 into selecting position and the engagement of this arm with a bar 74 which puts the phonograph motor into operation to effect the playing of the corresponding record.

The modification of Fig. 2 is also intended for use in the selection of any of 100 records, but is arranged to respond to 100 two train signals including from 2-1 to 11-10 impulse trains. Such trains may be supplied by one of the embodiments of the invention described and claimed in Patent No. 2,489,782, issued November 29, 1949, to Herman G. Jensen. In that application two sets of 12 contacts were provided to transmit 100 signals of 2-2 to 12-12 impulses. In the present embodiment only one "extra" contact is provided in the first train, the remote control unit being provided with two sets of 11 and 10 contacts respectively. The large contact of the previously described modification is omitted. The 75

remote control unit is provided with means cutting out up to 9 contacts of each set of contacts to provide the range of double trains just mentioned. In this modification, ten conductors bearing the numbers 1 to 10 are associated with the contact 39 and ten conductors bearing the numbers 21 to 30 are associated with the contact 45. The first two impulses of the first train bring the contact 39 into engagement with conductor 1. The next impulse of the first train brings the contact 39 into engagement with conductor 3 and so forth. The first impulse of the second train brings the contact 45 into engagement with conductor 21. The next impulse brings the contact 45 into engagement with conductor 22 and so forth. In this modification, 10 electromagnets A, B, C . . . J, K are provided instead of the 5 electromagnets A—B, etc., of the previously described embodiment. The conductors 21, 22, 23, 24, 25, 26, 27, 28, 29 and 30 are connected to electromagnets A, B, C, D, E, F, G, H, J and K, respectively. Conductor 1 is connected to electromagnets 72—A<sub>1</sub>, B<sub>1</sub>, C<sub>1</sub> . . . K<sub>1</sub>. Conductor 2 is connected to electromagnets A<sub>2</sub>, B<sub>2</sub>, C<sub>2</sub> . . . K<sub>2</sub> and so forth, the conductor 10 being connected to electromagnets A<sub>10</sub>, B<sub>10</sub>, C<sub>10</sub> . . . J<sub>10</sub> and K<sub>10</sub>. When electromagnet A is energized, it grounds the normally unconnected terminals of electromagnets A<sub>1</sub> to A<sub>10</sub>. When electromagnet B is energized, it grounds the normally unconnected terminals of the electromagnets B<sub>1</sub> to B<sub>10</sub> and so forth. When the electromagnet K is energized, it grounds the normally unconnected terminals of the electromagnets K<sub>1</sub> to K<sub>10</sub>.

Here again, when an actuating surge is supplied to the contacts 39 and 45, only one of the electromagnets 72 is energized. Thus, a double train of 7 and 5 impulses step the contact 39 into circuit with conductor 6 and the contact 45 into circuit with the conductor 25. The actuating surge through the conductor 25 energizes electromagnet E, grounding the normally unconnected ends of the electromagnets E<sub>1</sub> to E<sub>10</sub>. The actuating surge through conductor 6 energizes the electromagnet E<sub>6</sub> so that the corresponding recording is played. While electromagnets A<sub>6</sub>, B<sub>6</sub>, C<sub>6</sub>, D<sub>6</sub>, F<sub>6</sub>, G<sub>6</sub>, H<sub>6</sub>, J<sub>6</sub> and K<sub>6</sub> are also connected to conductor 6, none of these is energized because only electromagnet E of the series of electromagnets A to K is energized.

Although the invention has been described in connection with the specific details of a preferred embodiment thereof, it must be understood that such details are not intended to be limitative of my invention except insofar as set forth in the accompanying claims.

Having thus described my invention, I declare that what I claim is:

1. In a selector for automatic phonographs, in combination, a stepping switch, a plurality of circuits each of which is contacted by said switch as a result of an individual number of stepping impulses, a second stepping switch, a second plurality of circuits each of which is contacted by said second stepping switch as a result of an individual number of impulses, means for maintaining the stepping switches in stepped condition, a slow release relay arranged, when energized, to render said maintaining means operative, switch means associated with said stepping switches for supplying energy to said relay to maintain it energized during both series of impulses, means normally connected to the first stepping switch for supplying impulses thereto, electromagnetic means associated with the first

stepping switch for supplying said impulses to the second stepping switch at the end of the first train of impulses, electromagnetic means for supplying power to the two stepping switches and the two circuits to which they are connected to effect selection of a corresponding recording and means associated with the second stepping switch for maintaining said electromagnetic means inoperative until after the termination of its stepping operation.

2. In a selector for automatic phonographs, in combination, a stepping switch, a plurality of circuits each of which is contacted by said switch as a result of an individual number of stepping impulses, a second stepping switch, a second plurality of circuits each of which is contacted by said second stepping switch as a result of an individual number of impulses, means for maintaining the stepping switches in stepped condition, a slow release relay arranged, when energized, to render said maintaining means operative, switch means associated with said stepping switches for supplying energy to said relay to maintain it energized during both series of impulses, a CR circuit in parallel with said relay to increase its slow release quality, means normally connected to the first stepping switch for supplying impulses thereto, electromagnetic means associated with the first stepping switch for supplying said impulses to the second stepping switch at the end of the first train of impulses, electromagnetic means for supplying power to the two stepping switches and the two circuits to which they are connected to effect selection of a corresponding recording, and means associated with the second stepping switch for maintaining said electromagnetic means inoperative until after the termination of its stepping operation.

3. In a selector for automatic phonographs, in combination, a stepping switch, a plurality of circuits each of which is contacted by said switch as a result of an individual number of stepping impulses, a second stepping switch, a second plurality of circuits each of which is contacted by said second stepping switch as a result of an individual number of impulses, means for maintaining the stepping switches in stepped condition during both series of impulses, an impulser line, a first switch normally connecting said impulser line to the first stepping switch, a second switch normally open and arranged to connect the impulser line to a third normally closed switch connected to the second stepping switch and a fourth normally open switch connected to the first stepping switch, cam means arranged to open the first switch and close the second switch after the first stepping switch is stepped into circuit contacting position, a slow release relay associated with the first stepping switch for closing said fourth switch and opening the third switch during the first series of impulses, whereby the second series of impulses is supplied to the second stepping switch through the second and third switches, means for supplying power to the two stepping switches and the two circuits with which they contact to effect selection of a corresponding recording, and means associated with the second stepping switch for maintaining said power supplying means inoperative until after the termination of its stepping operation.

4. In a selector for automatic phonographs, in combination, a stepping switch, a plurality of circuits each of which is contacted by said switch as a result of an individual number of stepping impulses, a second stepping switch, a second plurality of circuits each of which is

contacted by said second stepping switch as a result of an individual number of impulses, means for maintaining the stepping switches in stepped condition, a slow release relay arranged, 5 when energized, to render said maintaining means operative, switch means associated with said stepping switches for supplying energy to said relay to maintain it energized during both series of impulses, an impulser line, a first switch 10 normally connecting said impulser line to the first stepping switch, a second switch normally open and arranged to connect the impulser line to a third normally closed switch connected to the second stepping switch and a fourth normally open switch, cam means arranged to open the first switch and close the second switch after the first stepping switch is stepped into a circuit connecting position, a slow release relay associated with the first stepping switch for closing said fourth switch and opening the third switch during the first series of impulses, 15 said fourth switch and opening the third switch during the first series of impulses, whereby the second series of impulses is supplied to the second stepping switch through the second and third switches, electromagnetic means for supplying power to the two stepping switches and the two circuits to which they are connected to effect selection of a corresponding recording, and means associated with the second stepping switch for maintaining said electromagnetic means inoperative until after the termination of its stepping operation.

5. In a selector for automatic phonographs, in combination, a stepping switch, a plurality of circuits each of which is contacted by said switch as a result of an individual number of stepping impulses, a second stepping switch, a second plurality of circuits each of which is contacted by said second stepping switch as a result of an individual number of impulses, means for maintaining the stepping switches in stepped condition, a slow release relay arranged, when energized, to render said maintaining means operative, switch means associated with said stepping switches for supplying energy to said relay to maintain it energized during both series of impulses, a CR circuit in parallel with said relay to increase its slow release quality, an impulser line, a first switch normally connecting said impulser line to the first stepping switch, a second switch normally open and arranged to connect the impulser line to a third normally closed switch connected to the second stepping switch and a fourth normally open switch, cam means arranged to open the first switch and close the second switch after the first stepping switch is stepped into a circuit connecting position, a slow release relay associated with the first stepping switch for closing said fourth switch and opening the third switch during the first series of impulses, whereby the second series of impulses is supplied to the second stepping switch through the second and third switches, electromagnetic means for supplying power to the two stepping switches and the two circuits to which they are connected to effect selection of a corresponding recording, and means associated with the second stepping switch for maintaining said electromagnetic means inoperative until after the termination of its stepping operation.

6. In a selector for automatic phonographs, in combination, a stepping switch, a plurality of circuits each of which is contacted by said switch as a result of an individual number of stepping impulses, a second stepping switch, a second plurality of circuits each of which is contacted

by said second stepping switch as a result of an individual number of impulses, means for maintaining the stepping switches in stepped condition during both sets of impulses, means for normally supplying impulses to the first stepping switch, means controlled by the first stepping switch for connecting said supplying means to the second stepping switch, a slow release relay associated with the second stepping switch and arranged to be energized thereby while it is receiving impulses, a second relay arranged to be energized by said relay, and a power circuit connected to both stepping switches and including a normally closed switch on the first relay and a normally open switch on the second relay, whereby a power impulse is supplied to both stepping switches and the two circuits contacted thereby, to effect selection of a corresponding recording.

7. In a selector for automatic phonographs, in combination, a stepping switch, a plurality of circuits each of which is contacted by said switch as a result of an individual number of stepping impulses, a second stepping switch, a second plurality of circuits each of which is contacted by said second stepping switch as a result of an individual number of impulses, means for maintaining the stepping switches in stepped condition, a slow release relay arranged, when energized, to render said maintaining means operative, switch means associated with said stepping switches for supplying energy to said relay to maintain it energized during both series of impulses, means normally connected to the first stepping switch for supplying impulses thereto, a second slow release relay associated with the second stepping switch and arranged to be energized thereby while it is receiving impulses, a third relay arranged to be energized by said relay, and a power circuit connected to both stepping switches and including a normally closed switch on the second relay and a normally open switch on the third relay, whereby a power impulse is supplied to both stepping switches and the two circuits contacted thereby, to effect selection of a corresponding recording.

8. In a selector for automatic phonographs, in combination, a stepping switch, a plurality of circuits each of which is contacted by said switch as a result of an individual number of stepping impulses, a second stepping switch, a second plurality of circuits each of which is contacted by said second stepping switch as a result of an individual number of impulses, means for maintaining the stepping switches in stepped condition, a slow release relay arranged, when energized, to render said maintaining means operative, switch means associated with said stepping switches for supplying energy to said relay to maintain it energized during both series of impulses, a CR circuit in parallel with said relay to increase its slow release quality, means normally connected to the first stepping switch for supplying impulses thereto, electromagnetic means associated with the first stepping switch for supplying said impulses to the second stepping switch at the end of the first train of impulses, a second slow release relay associated with the second stepping switch and arranged to be energized thereby while it is receiving impulses, a third relay arranged to be energized by said relay, and a power circuit connected to both stepping switches and including a normally closed switch on the second relay and a normally open

switch on the third relay, whereby a power impulse is supplied to both stepping switches and the two circuits contacted thereby, to effect selection of a corresponding recording.

5 9. In a selector for automatic phonographs, in  
combination, a stepping switch, a plurality of  
circuits each of which is contacted by said switch  
as a result of an individual number of stepping  
impulses, a second stepping switch, a second plu-  
10 rality of circuits each of which is contacted by  
said second stepping switch as a result of an in-  
dividual number of impulses, means for main-  
taining the stepping switches in stepped con-  
15 dition during both series of impulses, an im-  
pulser line, a first switch normally connecting  
said impulser line to the first stepping switch, a  
second switch normally open and arranged to  
connect the impulser line to a third normally  
20 closed switch connected to the second stepping  
switch and a fourth normally open switch con-  
nected to the first stepping switch, cam means  
arranged to open the first switch and close the  
second switch after the first stepping switch is  
25 stepped into circuit contacting position, a slow  
release relay associated with the first stepping  
switch for closing said fourth switch and open-  
ing the third switch during the first series of  
impulses, whereby the second series of impulses  
30 is supplied to the second stepping relay through  
the second and third switches, a second slow re-  
lease relay associated with the second stepping  
switch and arranged to be energized thereby  
while it is receiving impulses, a third relay ar-  
ranged to be energized by said relay, and a power  
35 circuit connected to both stepping switches and  
including a normally closed switch on the second  
relay and a normally open switch on the third  
relay, whereby a power impulse is supplied to  
both stepping switches and the two circuits con-  
40 tacted thereby, to effect selection of a corre-  
sponding recording.

45 10. In a selector for automatic phonographs, in combination, a stepping switch, a plurality of circuits each of which is contacted by said switch as a result of an individual number of stepping impulses, a second stepping switch, a second plurality of circuits each of which is contacted by said second stepping switch as a result of an individual number of impulses, means for maintaining the stepping switches in stepped condition, a slow release relay arranged, when energized, to render said maintaining means operative, switch means associated with said stepping switches for supplying energy to said relay to maintain it energized during both series of impulses, an impulser line, a first switch normally connecting said impulser line to the first stepping switch, a second switch normally open and arranged to connect the impulser line to a third normally closed switch connected to the second stepping switch and a fourth normally open switch, cam means arranged to open the first switch and close the second switch after the first stepping switch is stepped into a circuit connecting position, a second slow release relay associated with the first stepping switch for closing said fourth switch and opening the third switch during the first series of impulses, whereby the second series of impulses is supplied to the second stepping switch through the second and third switches, a third slow release relay associated with the second stepping switch and arranged to be energized thereby while it is receiving impulses, a fourth relay arranged to be energized by said third slow release relay and

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a power circuit connected to both stepping switches and including a normally closed switch on the third slow release relay and a normally open switch on the fourth relay, whereby a power impulse is supplied to both stepping switches and the two circuits contracted thereby, to effect selection of a corresponding recording.

11. In a selector for automatic phonographs, in combination, a stepping switch, a plurality of circuits each of which is contacted by said switch as a result of an individual number of stepping impulses, a second stepping switch, a second plurality of circuits each of which is contacted by said second stepping switch as a result of an individual number of impulses, means for maintaining the stepping switches in stepped condition, a slow release relay arranged, when energized, to render said maintaining means operative, switch means associated with said stepping switches for supplying energy to said relay to maintain it energized during both series of impulses, a CR circuit in parallel with said relay to increase its slow release quality, an impulser line, a first switch normally connecting said impulser line to the first stepping switch, a second switch normally open and arranged to connect the impulser line to a third normally closed switch connected to the second stepping switch and a fourth normally open switch, cam means arranged to open the first switch and close the second switch after the first stepping switch is stepped into a circuit connecting position, a second slow release

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relay associated with the first stepping switch for closing said fourth switch and opening the third switch during the first series of impulses, whereby the second series of impulses is supplied to the second stepping switch through the second and third switches, a third slow release relay associated with the second stepping switch and arranged to be energized thereby while it is receiving impulses, a fourth relay arranged to be energized by said third slow release relay, and a power circuit connected to both stepping switches and including a normally closed switch on the third slow release relay and a normally open switch on the fourth relay, whereby a power impulse is supplied to both stepping switches and the two circuits contacted thereby, to effect selection of a corresponding recording.

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relay associated with the first stepping switch for closing said fourth switch and opening the third switch during the first series of impulses, whereby the second series of impulses is supplied to the second stepping switch through the second and third switches, a third slow release relay associated with the second stepping switch and arranged to be energized thereby while it is receiving impulses, a fourth relay arranged to be energized by said third slow release relay, and a power circuit connected to both stepping switches and including a normally closed switch on the third slow release relay and a normally open switch on the fourth relay, whereby a power impulse is supplied to both stepping switches and the two circuits contacted thereby, to effect selection of a corresponding recording.

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