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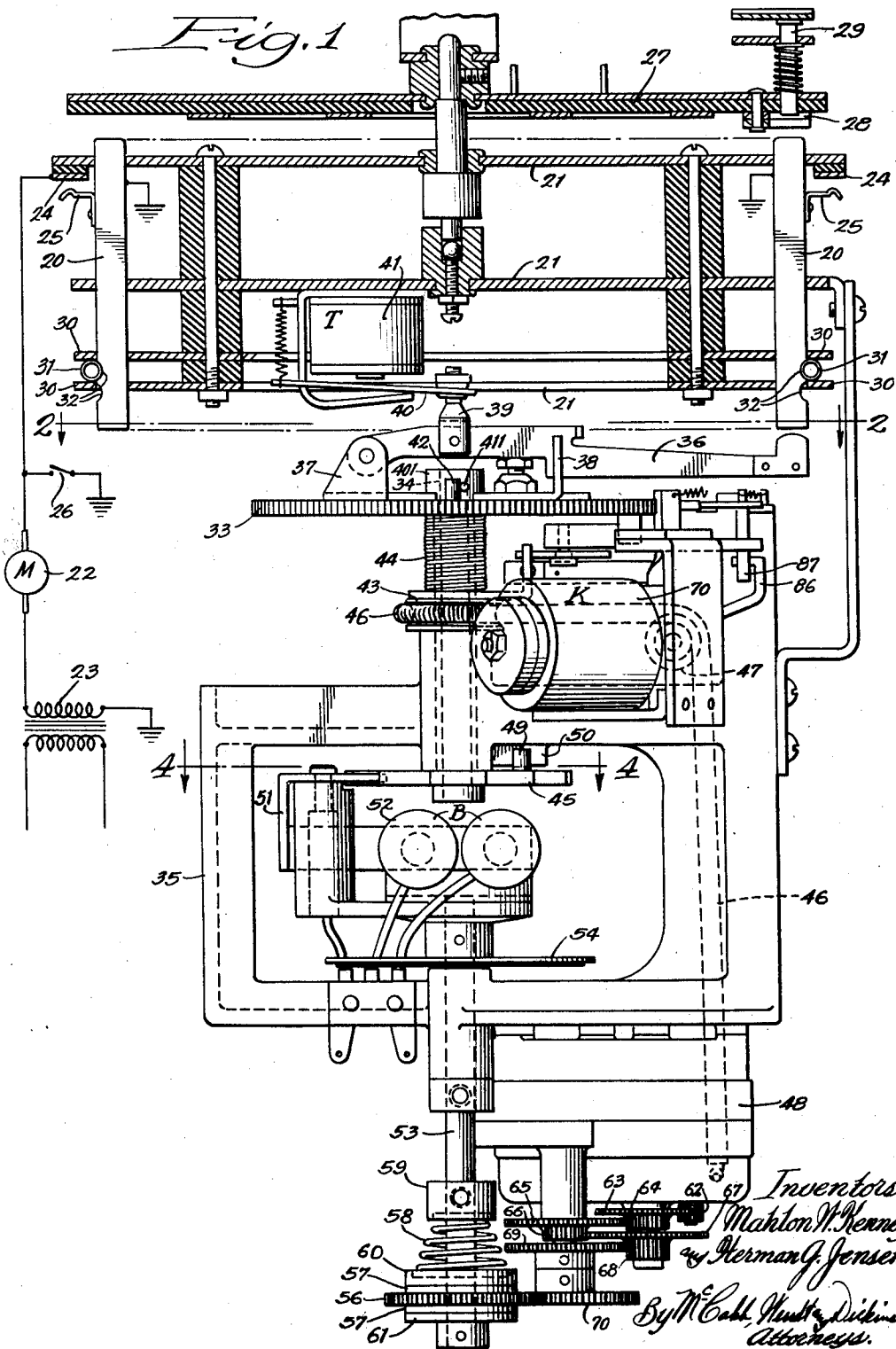
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2,382,487

SELECTOR FOR AUTOMATIC PHONOGRAPHS

Filed Oct. 11, 1943

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Fig. 2

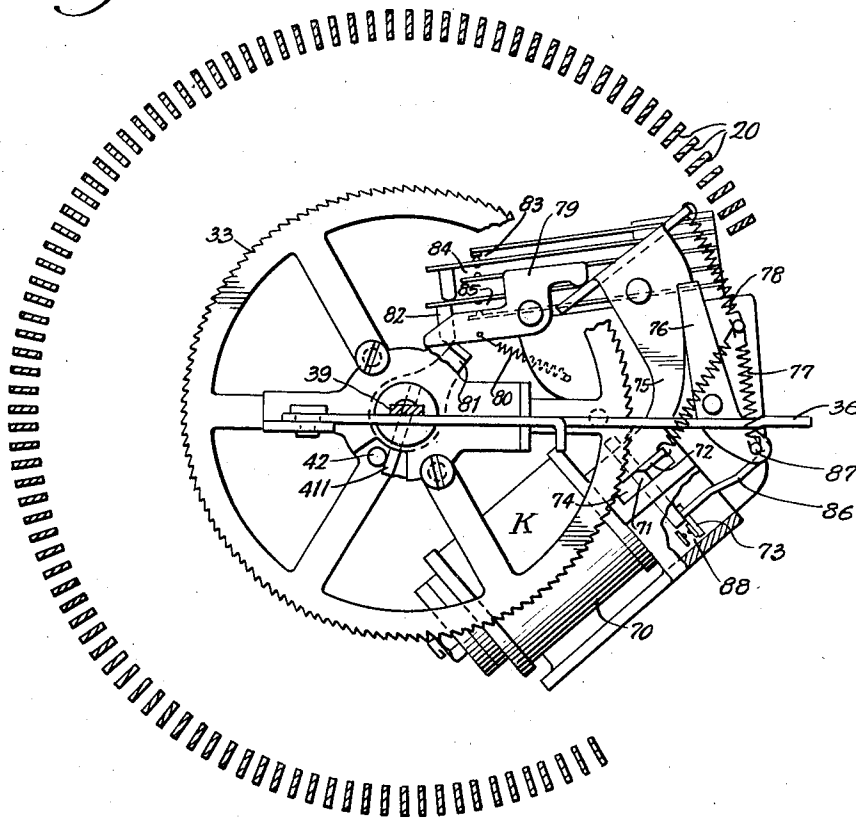


Fig. 3

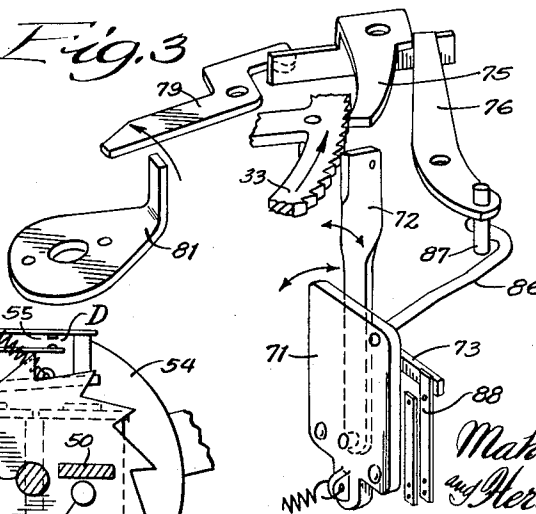
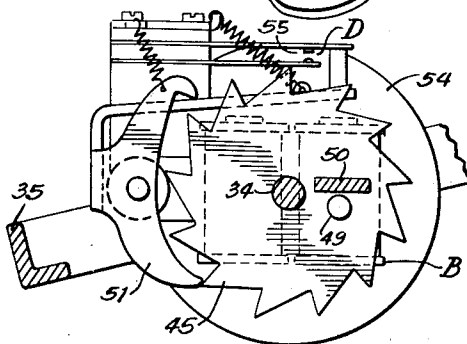


Fig. 4



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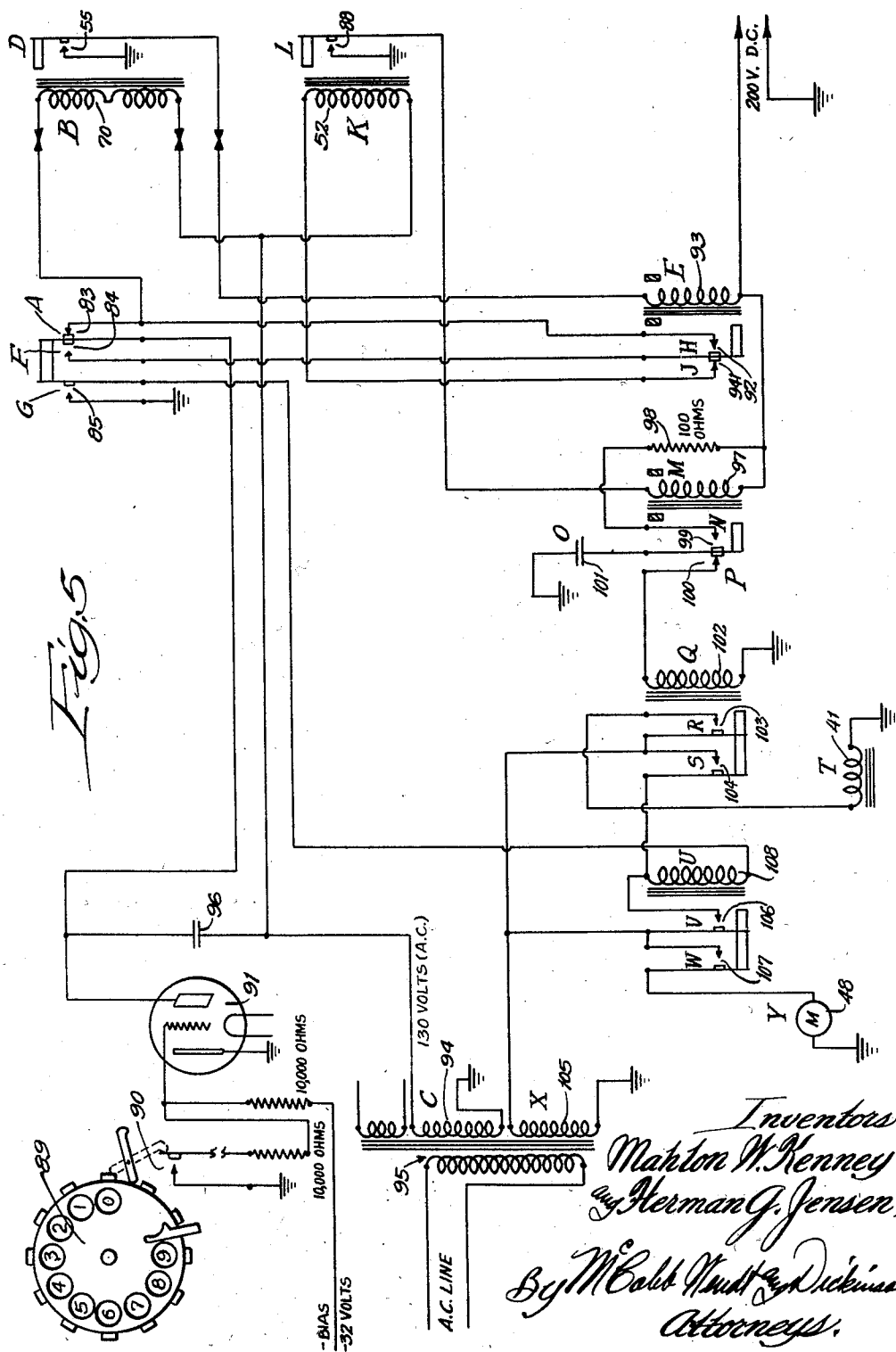
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SELECTOR FOR AUTOMATIC PHONOGRAPHS

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UNITED STATES PATENT OFFICE

2,382,487

SELECTOR FOR AUTOMATIC PHONOGRAPHS

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Application October 11, 1943, Serial No. 505,776

21 Claims. (Cl. 177—353)

This invention relates to selectors for automatic phonographs in which one or more recordings can be selected for playing seriatim.

One of the objects of the invention is to provide an improved selector which is adapted to control the selection of any of a large number of recordings.

A further object of the invention is to provide an improved phonograph selector arranged to be operated by a plurality of series of impulses, the numbers of the impulses in the two series determining the individual recording selected.

Our improved selector is particularly adapted for use with a dial arranged to transmit a desired number of impulses. This dial may be of conventional type and it may be located at any desired position remote from the phonograph.

While the specific embodiment of the invention hereinafter described is arranged for selecting any of one hundred recordings, this is a matter of convenience only, because the number of impulses which the dial may be arranged to transmit can be varied at will. Thus, instead of employing a dial capable of transmitting ten different series of impulses, we may arrange a dial to transmit twenty-six or any other desired number of impulses, depending upon the number of selections which the phonograph is arranged to play.

It is to be noted that the invention is not intended to be limited to a dial. Any other selector control which can be operated to transmit two series of impulses can be used with the present selector.

In selectors operating with two series of impulses, it has not heretofore been possible to use these impulses to transfer a selector member to an individual position by movements in the same direction. Thus, if the selector is actuated to select recording No. 65, then in previous phonograph selectors of this general type a selector arm is located in the sixth row and at the fifth element of that row as a result of the first series of six impulses and the second series of five impulses.

One of the objects of the present invention is to provide an improved selector in which both series of impulses move the same element step by step in one direction.

In the specific embodiment hereinafter described, I provide means for moving a single selector means first in large steps and then in small steps to correspond to tens and units. For this purpose we employ two separate mechanisms for stepping the tens and units.

One of the objects of the present invention is

to provide a new relation of the stepping mechanisms whereby the mechanisms may be returned in convenient manner to zero positions.

Other objects and capabilities of the invention will appear from the following description of preferred embodiments and the accompanying drawings in which:

Figure 1 is an elevational view, partly in section, through a selector embodying my invention;

Fig. 2 is a sectional plane thereof, the section being taken on the line 2—2 of Fig. 1;

Fig. 3 is a diagrammatic perspective view of details involving the unit stepper;

Fig. 4 is a plan view of the tens stepper mechanism, this being a sectional view taken on the line 4—4 of Fig. 1;

Fig. 5 is a wiring diagram.

Referring to the drawings, and particularly Figs. 1 to 5 thereof, our improved selector comprises an arcuate series of selector elements 20 slidably mounted in a stationary frame 21. Each selector element 20 corresponds to an individual recording and the upward displacement of a selector element 20 starts the motor 22 of the phonograph, with the result that the record-changing mechanism is put into operation and that individual record is played.

The record-selecting mechanism effects the return of the displaced selector element 20 after a motor switch, in parallel with the switch elements associated with the selector elements 20, has been closed by the record-changing mechanism.

In copending application Serial No. 342,419, filed June 26, 1940, by Marion R. Winkler, there is shown a plurality of displaceable selector elements which operate and are controlled in the manner just described. In that application the selector elements were actuated from normal position by individual solenoids. In the present application a single element mechanically displaces the desired selector element 20.

Thus, the phonograph motor 22 may be energized from a secondary 23 of a transformer, one side of which is grounded and the other is connected to the motor 22. The other side of the motor 22 is connected to an insulated ring 24. Each selector element 20 carries a resilient switch arm 25 which is adapted to engage the ring 24 when the selector element is moved upwardly into selecting position. It will be apparent from Fig. 1 that when one or more selector elements 20 are thus moved upwardly, the circuit of the motor 22 is completed and the motor goes into operation.

A switch 26 is arranged in parallel relation to the switch elements 24 and 25, the switch 26 being arranged to be momentarily opened at the end of the playing of each record. Consequently, this switch closes immediately after the phonograph motor 22 starts to operate.

As fully described in the aforesaid patent application, the starting of the motor causes a disk 27 to be rotated one revolution with the result that an abutment 28 carried by the disk engages the upwardly displaced selector element 20 and the disk 27 is arrested. The disk 27 is, as fully described in the aforesaid patent application, operatively connected to the selector mechanism of the phonograph so that the corresponding record is moved out for playing. After the drive of the disk 27 terminates, a returning member 29 is moved downwardly so as to return the arresting selector element. The motor 22 continues to operate since the switch 26 is closed until the record is played and the switch 26 is opened by the record-changing mechanism.

In the mechanism illustrated, the disk 27 moves only in one direction, but our invention is not intended to be limited in this respect. Thus, the disk 27 may be arranged for oscillatory movements and it may be connected for example to the reciprocating carriage shown in application Serial No. 416,140, filed October 23, 1941, by Marion R. Winkler. The present invention is concerned primarily with means for displacing the selecting elements 20.

It will be understood that any desired number of the selector elements 20 may be projected upwardly, in which case the phonograph goes into operation to play the record corresponding to the first selector element 20 engaged by the abutment 28. After this record has been played, the disk 27 resumes its movement and engages the next projected selector element 20 and so forth until all the corresponding records have been played and all the projected selector elements have been returned to initial position.

Means are provided for resiliently holding the selector elements 20 in their normal and projected positions. Thus the frame 21 may include two spaced plates 30 through which the selector elements 20 extend. An annular coil spring 31 is arranged between the plates 30 as shown in Fig. 1. Each selector element 20 is provided with two recesses 32 within which the spring 31 nests, these recesses 32 being arranged so that the spring 31 holds the selector elements 20 in either their normal or upwardly projected positions.

As shown in Fig. 2, the selector elements 20 are arranged in an arc with uniform spacing, which spacing corresponds to the spacing of teeth on the ratchet wheel 33. The ratchet wheel 33 is mounted for free rotation on a shaft 34 which is rotatably mounted in a frame 35 below the frame 21 and in axial alignment with the arcuate series of selector elements 20.

A selector arm 36 is pivotally mounted on the upper side of the ratchet wheel 33. The arm 36 is pivotally mounted on a frame 37 which is secured to the upper side of the ratchet wheel 33 so that the arm 36 extends in a generally radial or diametrical relation to the ratchet wheel. The frame 37 may comprise a slotted guide member 38 so as to retain the selector arm 36 in radial or diametric relation to the wheel 33 while permitting the arm 36 to swing upwardly about its pivot.

In alignment with the shaft 34 the arm 36 is provided with an upwardly directed clevis member 39 which has a swivel connection to the armature 40 of a relay 41. The relay 41 is rigidly mounted on the frame 21 and since the clevis member 39 is arranged in alignment with the shaft 34, it will readily be understood that the ratchet wheel 33, together with the arm 36, may rotate freely with reference to the solenoid 41.

In each of its selecting positions the arm 36 is located beneath one of the selector elements 20 and consequently when the relay 41 is energized, the arm 36 moves upwardly and projects the aligned selector element 20 upwardly with the result that the phonograph is set in operation in the manner previously described.

Above the ratchet wheel 33 a collar 401 is rigidly secured to the shaft 34. The collar 401 carries a pin 411 which abuts against a pin 42 carried by the ratchet wheel 33. A grooved collar 43 is also rigidly mounted on the shaft 34. A coil spring 44 secured to the collar 43 and to the ratchet wheel 33 tends to keep the pin 42 in engagement with the pin 411 while permitting the ratchet wheel 33 to be moved in the clockwise direction, as viewed in Fig. 2, to carry the pin 42 away from the pin 411.

An escapement wheel 45 is rigidly secured to the lower end of the shaft 34. A long coil spring 46, anchored to the grooved collar 43, extends around a roller 47 mounted on the frame 35 and extends downwardly to a suitable point of anchorage, which is shown on the motor 48 carried at the lower end of the frame 35. This spring is arranged so as to bias the shaft 34 in the clockwise direction as viewed in Fig. 2.

As will hereinafter be described, the motor 48 is arranged to drive the shaft 34 to an initial or normal position in which an abutment 49 on the escapement wheel 45 engages an abutment 50 on the frame 35.

The escapement wheel 45 cooperates with an escapement 51 which is integral with the armature of a relay 52. The relay 52 is rigidly carried by a vertical shaft 53 mounted on the frame 35 in alignment with the shaft 34. Also rigidly mounted on the shaft 53 is a contact disk 54 which provides for the connections for the relay 52 and the switch 55 associated with that relay.

The shaft 53 freely carries a gear 56 which is located between two friction plates 57. A spring 58 abuts against a collar 59 rigidly mounted on the shaft 53 and against a pressure disk 60 located on the upper side of the upper friction plate 57. The lower friction plate 57 bears against a plate 61 rigidly mounted on the shaft 53. It will thus be seen that the gear 56 is operatively connected to the shaft 53 by means of an overload clutch which permits slippage of the gear 56 relative to the shaft 53 in the case of overload.

The gear 56 is connected by gear reduction means to the drive pinion 62 of the motor 48. The pinion 62 meshes with a gear 63 which is integral with a small gear 64. The gear 64 meshes with a large gear 65 which is integral with a small gear 66. The gear 66 meshes with a large gear 67 which is integral with a small gear 68. The gear 68 meshes with a large gear 69 which is rigidly connected to a gear 70 in mesh with the gear 56. The gears 63, 64 and 67, 68 are freely rotatable on a shaft depending from the frame of the motor 48. The gears 69 and 70 are rigidly secured to another shaft mounted for free rotation on the frame of the motor 48.

The gear assembly 55, 56 is freely rotatable on the last-mentioned shaft.

The gear drive is arranged so that the shaft 53 is positively driven by the motor 48 in the counterclockwise direction as viewed in Fig. 2. When the motor 48 is thus put into operation, the relay 52 is driven in the counterclockwise direction as viewed from above in Fig. 2 and the escapement 51 carries the escapement wheel 45 with it until the abutment 49 engages the abutment 50. As will hereinafter appear, the motor circuit is broken at about this time and any tendency of the motor to overrun is absorbed by the friction mounting of the gear 56.

The teeth on the escapement wheel 45 have a spacing corresponding to ten spacings of the selector elements 20 or ten tooth spacings on the ratchet wheel 33. It is to be noted that at the beginning of a selection operation, the relay 52 may have any of a plurality of positions with respect to the escapement wheel 45. One position is shown in Fig. 4 but the escapement 51 may be in engagement with any tooth on the escapement wheel 45. In other words, the escapement 51 may have at the beginning of a selection operation its position in Fig. 1 or any other position one or more tooth spaces from its position in Fig. 4.

The switch 55 mounted on the frame of the relay 52 is arranged to close momentarily each time the relay 52 is energized, that is, each time a tens impulse is received.

The unit-stepping relay 70 is mounted on the frame 35. The armature 71 of this relay has pivoted thereon an actuating arm or detent 72. The arm 72 is held close to the back of the armature 71 by means of a strap 73 carried in spaced relation to the armature 71. The arm 72 projects upwardly through an opening 74 in the relay frame to a position close to the teeth of the ratchet wheel 33.

Each time that the relay 70 is energized the arm or detent 72 moves into engagement with the ratchet wheel 33 and moves it one tooth space in the clockwise direction as viewed in Fig. 2. The pivotal mounting of the arm 72 on the armature 71 permits the detent to follow the arcuate movement of the ratchet wheel 33 during its engagement.

A holding dog 75, pivotally mounted on the frame of the relay 70, is arranged to engage the teeth of the ratchet wheel 33 so as to hold the ratchet wheel against counterclockwise movement during reception of the units impulses. Initially the holding dog 75 is latched out of engagement with the ratchet wheel 33 by means of a locking lever 76. The lever 76 is biased into latching position by a spring 77. The dog 75 is biased towards the ratchet wheel 33 by a spring 78.

The dog 75 is moved into latching position by a lever 79 biased out of engagement with the dog 75 by a spring 80. An arm 81, rigidly secured to the collar 43 and consequently to the shaft 34, is arranged to engage the lever 79 when the shaft 34 is in its normal position with the abutments 49 and 50 in engagement.

The arm 81, in the initial or normal position of the selector, as shown in Fig. 2, engages an insulation member 82 so as to effect the closing of a switch 83 and the opening of switches 84 and 85. These switches are constituted by levers mounted on the frame of the relay 70. Switch 83 is biased open and switches 84 and 85 are biased closed.

The armature 71 carries an arm 86 which extends from the rear side of the armature and is provided with a bent end which extends behind a pin 87 which projects downwardly from the latch 76. It will thus be seen that when the first units impulse is received, that is, the first impulse which energizes the relay 70, the arm 86 moves the latch 76 into unlatching position so that the dog 75 enters into cooperative engagement with the ratchet wheel 33 during the first units impulse.

Associated with the armature 71 is a switch 88 which closes momentarily during each units impulse.

In order to facilitate understanding of the invention, a brief description of the operation of the mechanical parts thereof is now given: The first series of impulses are switched so that they energize the relay 52. On each energization of the relay 52 the escapement 51 is actuated and consequently the shaft 34 is moved in the clockwise direction as viewed in Fig. 2 a number of tens steps corresponding to the number of impulses received. In the specific embodiment disclosed in Figs. 1 to 5, the arm 36 is located twenty-two steps away from the first of the series of selector elements 20 regarded in the clockwise direction in Fig. 2. Incidentally, for this embodiment the dialling of the number "0" provides two impulses, the dialling of the number "1" provides three impulses, and so forth.

Supposing the number "3" is dialled first, then the relay 52 receives five impulses and the arm 36 is brought to a position below the twenty-ninth of the series of selector elements 20 regarded in the clockwise direction on Fig. 2. This displacement of the arm 36 results from the displacement of the shaft 34 under the influence of the spring 46, the escapement 51 being energized five times. The elements 79, 75 and 76 were initially in their positions shown in Fig. 2. On the first impulse the arm 81 moved away from the lever 79 and from the insulating member 82. Consequently, the switches 83, 84 and 85 moved to the reverse positions from that shown in Fig. 2 on the first impulse. The holding dog 75 remains latched out by its engagement with the latch member 76.

The second series of impulses is arranged to energize the relay 70, once for each impulse. The first units impulse moves the latch 76 to unlatching position so that the dog 75 engages the teeth to the ratchet wheel 33. Each energization of the relay 70, moves the ratchet wheel 33 one tooth in the clockwise direction as viewed in Fig. 2. During the reception of the units impulses the shaft 34 remains stationary and the ratchet wheel 33 is moved against the tension of the spring 44 carrying the pin 42 away from pin 41.

If the second impulse is caused by moving the dial to the "5" position, seven impulses are transmitted and the arm 36 is moved from the twenty-ninth to the thirty-sixth selector element 20. Since the first selector element corresponds to the dialled number 00, the thirty-sixth selector element corresponds to No. 35, the number dialled by the two successive actuations of the dial. Thereupon the relay 41 is energized and the arm 36 is moved upwardly, projecting the thirty-sixth selector element 20 (corresponding to No. 35) upwardly. Thereafter the motor 48 is put into operation and it moves the shaft 34 back to initial position with the stops 49 and 50 in engagement.

At the time this engagement occurs, the arm 81 engages the piece of insulation 82 and opens the switch 85, whereupon the motor ceases to be energized. At the same time, the arm 81 swings the lever 79 into engagement with the dog 75 so that this dog is operatively disengaged from the ratchet wheel 33 and is latched out automatically by the latch 76. The disengagement of the dog 75 from the ratchet wheel 33 enables the spring 44 to turn the ratchet wheel 33 back to initial position which is defined by the engagement of the pin 42 with the pin 411.

It is to be noted that when the motor 48 thus operates, it carries the escapement 51 in the counter-clockwise direction five steps from its original position shown in Fig. 4. During successive selections the ratchet 51 is moved in counterclockwise direction a certain number of tens steps corresponding to the number of the tens impulses in the selection last made.

Referring now to Fig. 5, the manually operable dial 89 cooperates with the switch 90 so that on the manual action of the dial the switch 90 remains open and when the dial is released to resume normal position, the switch 90 is closed a number of times, depending upon the displacement of the dial. One side of the dial 90 is grounded, the other being connected through a limiting resistor (suitably 10,000 ohms) to the grid of a gas tube 91. This tube may suitably be a 2051 tube, the grid of which is connected through a limiting resistor (suitably 10,000 ohms) to a source of thirty-two volts negative voltage.

The plate of the tube is connected to one side of the normally closed switch 83 and one side of the normally open switch 84. This may be conveniently done by employing a common pole for these two switches. The other side of the switch 83 is connected to the relay 70 and to one side of the switch 92 which is associated with the relay 93. The relay 93 also controls a normally closed switch 941. One side of the switch 941 is connected to one side of the relay 52. The other sides of the relays 52 and 70 are connected to the high side of the secondary 94 of the power transformer 95. The other side of the secondary 94 is grounded. The high side of the transformer 95 is connected to the plate of the tube 91 by a by-pass condenser 96. The other side of the switch 84 is connected to the common pole of the two switches 941 and 92. One side of the switch 85 is grounded, the other being connected to one side of the relay 93. The other side of the relay is connected to a source of 200 volts D. C. This source is also connected to one side of the relay 97 and through a limiting resistor 98 (suitably 100 ohms) to one side of a normally open switch 99 controlled by the relay 97. Also associated with the relay 97 is a normally closed switch 100. The common pole of the two switches 99 and 100 is connected through a condenser 101 to ground. The other side of the switch 100 is connected to a relay 102 which controls the normally open switches 103 and 104.

Two sides of the switches 103 and 104 are connected together to the high side of the secondary 105 of the transformer 95 and to normally open switches 106 and 107 controlled by relay 108. The other side of the switch 107 is connected to the motor 48, the other side of this motor being grounded. The other side of the switch 106 is connected to the other side of the relay 108 and to the other side of the switch 104. The other side of the switch 103 is connected

to the relay 41, the other side of which is grounded. Relays 93 and 97 are slow-release relays so that they may remain energized during the reception of decades impulses and units impulses, respectively.

The operation will now be amplified with reference to Fig. 5 and with reference to the previous description of the mechanical parts of the selector. Actuation of the dial 89 results in the closing of the switch 90 five times. Each time the switch 90 is closed, the voltage of the grid of the tube 91 becomes substantially zero and the tube flashes. The first flash of the tube supplies plate current from secondary 94, relay 70, and normally closed switch 83. After the first impulse switch 83 is opened and switches 84 and 85 are closed, the first energization of the relay 70 closes the switch 85 and completes the circuit of the relay 93 so that switch 92 closes and switch 941 opens. Relay 93, being a slow-opening relay, maintains these switches in the conditions mentioned during the reception of the tens impulses. The second and subsequent tens impulses pass plate current from secondary 94 through relay 70, closed switch 92 and closed switch 84. The relay 70 thus receives five impulses and the arm 36 is moved to a position beneath the twenty-ninth selector element 29 (No. 28). On the termination of the tens impulses the relay 93 becomes deenergized, the switch 92 opens and the switch 941 closes, switch 83 remains open and switches 84 and 85 remain closed.

For the second or units impulses, the dial is operated with the aid of the opening corresponding to "5," and consequently the switch 90 is closed seven times. The plate circuit is completed through closed switch 84, closed switch 941, relay 52 and secondary 94. On the first units impulse, the relay 97 closes switch 99 and opens switch 100. This condition persists during the reception of the units impulses and the condenser 101 is charged at 200 volts D. C. Each unit impulse energizing the relay 70 moves the ratchet wheel one tooth in the clockwise direction as viewed in Fig. 2, that is, a total of seven teeth, so that the arm 36 is brought beneath the twenty-sixth selector element 26 (No. 35). At the end of the second series of impulses, relay 97 becomes deenergized, switch 99 opens, and switch 100 closes. The condenser 101 then discharges through the relay 102, energizing this relay and closing switches 103, 104. The closing of the switch 103 completes a circuit from secondary 105 through relay 41 so that the arm 36 is moved upwardly to project selector element 20 (No. 35) upward to selecting position.

The momentary closing of the switch 105 energizes relay 108 through the closed switch 85. The energization of the relay 108 closes switches 106 and 107. The closing of the switch 107 completes the circuit of the motor 48 so that the same starts to operate to return the shaft 34 towards its initial position where the abutments 49 and 50 engage. The closing of the switch 106 maintains the relay 108 energized through the circuit 105, 106, 108 and closed switch 85.

When the motor 48 has driven the shaft 34 almost back of its normal position, the arm 81 engages the piece of insulation 82 and opens the switch 85. At the same time the arm 81 turns the lever 79 in clockwise direction as viewed in Fig. 2, moving the dog 75 clear of the ratchet wheel 33. This ratchet wheel is now rotated in counterclockwise direction as viewed in Fig. 2

by the spring 44 until the pin 42 hits against the pin 411.

The movement of the dog 75 by the pivoted lever 79 results in the automatic latching out of the dog 75 as shown in Fig. 2 and the dog 75 remains in this latched-out position until the first units energization of the next selection operation again energizes the relay 70.

It will be understood that any desired selector elements 20 and any desired plurality thereof can be projected upwardly by a sequence of double actuations of the dial 89.

It may here be remarked that if the No. "0" is dialled twice, the arm 36 is advanced twenty-two steps, so that the first of the selector elements 20 (No. 00) is projected upwardly. It is preferred to have at least two impulses to prevent the selector from responding to accidental impulses on the line. Accidental impulses will ordinarily not have the time relation necessary for maintaining the relay 93 or relay 97 energized. No selection can be made by two accidental impulses. It requires two pairs of at least two impulses with the proper time relation to effect actuation of any selector element 20. It will of course be understood that we may use a greater number of "dead" impulses. Thus we may arrange the mechanism so that the dialling of 00 gives two series of three, four or more impulses to bring the arm 36 into alignment with the first selector element 20 (No. 00).

It will of course be understood that the dial 89 may be located at any suitable position remote from the rest of the mechanism herein described. The line connecting the switch 90 to the limiting resistor may be of any desired length and this line is consequently shown broken in the drawings.

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

We claim:

1. A selector for automatic phonographs comprising a member arranged to be moved by two series of impulses into a desired selecting position, a rotatable member carrying said selecting member, means biasing said rotatable member away from normal position, escapement means on said rotatable member, complementary escapement means, a rotatable member carrying last said escapement means, electromagnetic means whereby a series of impulses results in a corresponding number of actuations of said last escapement means, and a corresponding number of relative movements of said selector member, and electromagnetic means for moving first said rotatable member by a plurality of small steps corresponding in number to a second series of impulses received by last said electromagnetic means.

2. A selector for automatic phonographs comprising a member arranged to be moved by two series of impulses into a desired selecting position, a rotatable member carrying said selecting member, means biasing said rotatable member away from normal position, escapement means on said rotatable member, complementary escapement means, a rotatable member carrying last said escapement means, electromagnetic means whereby a series of impulses results in a corresponding number of actuations of said last escapement means, and a corresponding

number of relative movements of said selector member, electromagnetic means for moving first said rotatable member by a plurality of small steps corresponding in number to a second series of impulses received by last said electromagnetic means, and means for moving last said escapement means to carry first said escapement means back to normal position.

3. A selector for automatic phonographs comprising a member arranged to be moved by two series of impulses into a desired selecting position, a rotatable member carrying said selecting member, means biasing said rotatable member away from normal position, escapement means on said rotatable member, complementary escapement means, a rotatable member carrying last said escapement means, electromagnetic means whereby a series of impulses results in a corresponding number of actuations of said last escapement means, and a corresponding number of relative movements of said selector member, electromagnetic means for moving first said rotatable member by a plurality of small steps corresponding in number to a second series of impulses received by last said electromagnetic means, and an electric motor for moving last said escapement means to carry first said escapement means back to normal position.

4. A selector for automatic phonographs comprising a member adapted to be moved in a plane into desired selecting position, a ratchet wheel supporting said selector member, a rotatable structure carrying said ratchet wheel, means biasing said ratchet wheel to a normal position on said structure, a units stepper arranged to cooperate with said ratchet wheel to move the same a definite number of steps relative to said structure, means biasing said structure away from normal position, an escapement wheel on said structure, an escapement arranged to cooperate therewith, electromagnetic means controlling said escapement whereby a series of impulses received by said electromagnetic means effects movement of said structure a corresponding number of tens steps from normal position, a second rotatable structure carrying said escapement and last said electromagnetic means for rotatable movement of said escapement and last said electromagnetic means in planetary relation to said escapement wheel, and an electric motor for rotating last said rotatable structure to carry first said rotatable structure back to initial position.

5. A selector for automatic phonographs comprising a member adapted to be moved in a plane into desired selecting position, a ratchet wheel supporting said selector member, a rotatable structure carrying said ratchet wheel, means biasing said ratchet wheel to a normal position on said structure, a units stepper arranged to cooperate with said ratchet wheel to move the same a definite number of steps relative to said structure, a holding dog adapted to hold said ratchet wheel against return movement, means biasing said structure away from normal position, an escapement wheel on said structure, an escapement arranged to cooperate therewith, electromagnetic means controlling said escapement whereby a series of impulses received by said electromagnetic means effects movement of said structure a corresponding number of tens steps from normal position, means for returning said structure to normal position, and means controlled by said structure for disengaging said dog from said ratchet wheel.

6. A selector for automatic phonographs comprising a member adapted to be moved in a plane into desired selecting position, a ratchet wheel supporting said selector member, a rotatable structure carrying said ratchet wheel, means biasing said ratchet wheel to a normal position on said structure, a units stepper arranged to cooperate with said ratchet wheel to move the same a definite number of steps relative to said structure, a holding dog adapted to hold said ratchet wheel against return movement, means biasing said structure away from normal position, an escapement wheel on said structure, an escapement arranged to cooperate therewith, electromagnetic means controlling said escapement whereby a series of impulses received by said electromagnetic means effects movement of said structure a corresponding number of tens steps from normal position, means for returning said structure to normal position, means controlled by said structure for disengaging said dog from said ratchet wheel, and means controlled by said structure in its normal position for latching said dog in inoperative position.

7. A selector for automatic phonographs comprising a member adapted to be moved in a plane into desired selecting position, a ratchet wheel supporting said selector member, a rotatable structure carrying said ratchet wheel, means biasing said ratchet wheel to a normal position on said structure, a units stepper arranged to cooperate with said ratchet wheel to move the same a definite number of steps relative to said structure, a holding dog adapted to hold said ratchet wheel against return movement, means biasing said structure away from normal position, an escapement wheel on said structure, an escapement arranged to cooperate therewith, electromagnetic means controlling said escapement whereby a series of impulses received by said electromagnetic means effects movement of said structure a corresponding number of tens steps from normal position, means for returning said structure to normal position, means controlled by said structure for disengaging said dog from said ratchet wheel, means controlled by said structure in its normal position for latching said dog in inoperative position, and means actuated by said units stepper for unlatching said dog after said structure has moved from normal position.

8. A selector for automatic phonographs comprising a member adapted to be moved in a plane into desired selecting position, a ratchet wheel supporting said selector member, a rotatable structure carrying said ratchet wheel, means biasing said ratchet wheel to a normal position on said structure, a units stepper arranged to cooperate with said ratchet wheel to move the same a definite number of steps relative to said structure, a holding dog adapted to hold said ratchet wheel against return movement, means biasing said structure away from normal position, an escapement wheel on said structure, an escapement arranged to cooperate therewith, electromagnetic means controlling said escapement whereby a series of impulses received by said electromagnetic means effects movement of said structure a corresponding number of tens steps from normal position, means for returning said structure to normal position, means controlled by said structure for disengaging said dog from said ratchet wheel, means controlled

by said structure in its normal position for latching said dog in inoperative position, a second rotatable structure carrying said escapement and last said electromagnetic means for rotatable movement for said escapement, last said electromagnetic means being in planetary relation to said escapement, and an electric motor for rotating last said rotatable structure to carry first said rotatable structure back to initial position.

9. A selector for automatic phonographs comprising a member adapted to be moved in a plane into desired selecting position, a ratchet wheel supporting said selector member, a rotatable structure carrying said ratchet wheel, means biasing said ratchet wheel to a normal position on said structure, a units stepper arranged to cooperate with said ratchet wheel to move the same a definite number of steps relative to said structure, a holding dog adapted to hold said ratchet wheel against return movement, means biasing said structure away from normal position, an escapement wheel on said structure, an escapement arranged to cooperate therewith, electromagnetic means controlling said escapement whereby a series of impulses received by said electromagnetic means effects movement of said structure a corresponding number of tens steps from normal position, means for returning said structure to normal position, means controlled by said structure for disengaging said dog from said ratchet wheel, means controlled by said structure in its normal position for latching said dog in inoperative position, means actuated by said units stepper for unlatching said dog after said structure has moved from normal position, a second rotatable structure carrying said escapement and last electromagnetic means for rotatable movement for said escapement, last said electromagnetic means being in planetary relation to said escapement, and an electric motor for rotating last said rotatable structure to carry first said rotatable structure back to initial position.

10. A selector for automatic phonographs comprising a selecting member arranged to be moved into a plurality of selecting positions in response to two series of impulses, ratchet means arranged to move with said member, stepping means responsive to a first series of impulses for controlling the movement of said selecting member through a corresponding number of large steps, an impulser responsive to a second series of impulses to actuate said ratchet means a corresponding number of small steps, a holding dog adapted to engage said ratchet means during said second series of impulses, and means controlled by said impulser for causing said dog to engage said ratchet means.

11. A selector for automatic phonographs comprising a selecting member arranged to be moved into a plurality of selecting positions in response to two series of impulses, ratchet means arranged to move with said member, stepping means responsive to first series of impulses for controlling the movement of said selecting member through a corresponding number of large steps, an impulser responsive to a second series of impulses to actuate said ratchet means a corresponding number of small steps, a holding dog adapted to engage said ratchet means during said second series of impulses, a latch arranged to hold said dog away from the ratchet means, and means on said impulser for releasing said latch.

12. A selector for automatic phonographs comprising a selecting member arranged to be moved

into a plurality of selecting positions in response to two series of impulses, a ratchet wheel arranged to move with said member, a movable structure, spring and stop means connecting said structure to said wheel whereby said wheel moves with said structure but said wheel may move independently of structure towards selecting positions, a stepper responsive to a series of impulses for controlling movement of said structure, ratchet wheel and selecting member through a corresponding number of large steps, a stepper responsive to a second series of impulses for moving said ratchet wheel and said selecting member a corresponding number of small steps relative to said structure, a dog adapted to engage said ratchet wheel during said second series of impulses, a latch adapted normally to hold said dog away from said ratchet wheel, and means controlled by second said impulser for releasing said dog when second said impulses begins to operate.

13. A selector for automatic phonographs comprising a selecting member arranged to be moved into a plurality of selecting positions in response to two series of impulses, a ratchet wheel arranged to move with said member, a movable structure, spring and stop means connecting said structure to said wheel whereby said wheel moves with said structure but said wheel may move independently of structure toward selecting positions, a stepper responsive to a series of impulses for controlling movement of said structure, ratchet wheel and selecting member through a corresponding number of large steps, a stepper responsive to a second series of impulses for moving said ratchet wheel and said selecting member a corresponding number of small steps relative to said structure, a dog adapted to engage said ratchet wheel during said second series of impulses, a latch adapted normally to hold said dog away from said ratchet wheel, means controlled by second said impulser for releasing said dog when second said impulser begins to operate, and means on said structure adapted to move said dog away from the ratchet wheel.

14. A selector for automatic phonographs comprising a selecting member arranged to be moved into a plurality of selecting positions in response to two series of impulses, a ratchet wheel arranged to move with said member, a movable structure, spring and stop means connecting said structure to said wheel whereby said wheel moves with said structure but said wheel may move independently of structure towards selecting positions, a stepper responsive to a series of impulses for controlling movement of said structure, ratchet wheel and selecting member through a corresponding number of large steps, a stepper responsive to a second series of impulses for moving said ratchet wheel and said selecting member a corresponding number of small steps relative to said structure, a dog adapted to engage said ratchet wheel during said second series of impulses, a latch adapted normally to hold said dog away from said ratchet wheel, means controlled by second said impulser for releasing said dog when second said impulser begins to operate, means on said structure adapted to move said dog away from the ratchet wheel into latched condition when said structure moves back its initial position, and motor means for returning said structure to its initial position.

15. A selector for automatic phonographs comprising a selecting member arranged to be moved into a plurality of selecting positions in response to two series of impulses, a ratchet wheel ar-

ranged to move with said member, a movable structure, spring and stop means connecting said structure to said wheel whereby said wheel moves with said structure but said wheel may move independently of structure towards selecting positions, means biasing said structure away from its initial position, a second structure arranged to move with the first structure, an escapement stepper on second said structure arranged to release first said structure for a number of large steps corresponding in number to a series of impulses received by said stepper, a second stepper responsive to a second series of impulse for moving said ratchet wheel and said selecting member a corresponding number of small steps relative to first said structure, a dog adapted to engage said ratchet wheel during said second series of impulses, a latch adapted normally to hold said dog away from said ratchet wheel, means controlled by second said impulser for releasing said dog when second said impulser begins to operate, means on first said structure adapted to move said dog away from the ratchet wheel into latched condition when first said structure moves back to its normal position, and an electric motor adapted to drive second said structure and the first said structure through the escapement stepper, to move the second said structure back to normal position whereupon the dog is moved into latched position and the ratchet wheel is returned to its initial position by said biasing means.

16. A selector for automatic phonographs comprising a member arranged to be moved in the same direction from initial to desired selecting position by two series of impulses comprising an electromagnetic stepping device adapted to move said member through a number of steps, means for supplying the first series of impulses to said electromagnetic stepping device, a second electromagnetic device adapted to move said member through steps of different size, means controlled by the first electromagnetic stepping device for supplying the second series of impulses to the second electromagnetic stepping device, means for displacing said member out of its normal plane in its selecting position and means controlled by the second electromagnetic stepping device for operating said displacing means after the second electromagnetic stepping device has received the second series of impulses.

17. A selector for automatic phonographs comprising a member arranged to be moved in the same direction from initial to desired selecting position by two series of impulses comprising an electromagnetic stepping device adapted to move said member through a number of steps, means for supplying the first series of impulses to said electromagnetic stepping device, a second electromagnetic device adapted to move said member through steps of different size, means controlled by the first electromagnetic stepping device for supplying the second series of impulses to the second electromagnetic stepping device, means for displacing said member out of its normal plane in its selecting position, means controlled by the second electromagnetic stepping device for operating said displacing means after the second electromagnetic stepping device has received the second series of impulses, and means controlled by the second electromagnetic stepping device for conditioning the first electromagnetic stepping device for the reception of impulses in a subsequent selecting operation.

18. A selector for automatic phonographs comprising a member arranged to be moved in the

same direction from initial to desired selecting position by two series of impulses comprising an electromagnetic stepping device adapted to move said member through a number of steps, means for supplying the first series of impulses to said electromagnetic stepping device, a second electromagnetic device adapted to move said member through steps of different size, means controlled by the first electromagnetic stepping device for supplying the second series of impulses to the second electromagnetic stepping device, means for displacing said member out of its normal plane in its selecting position, means controlled by the second electromagnetic stepping device for operating said displacing means after the second electromagnetic stepping device has received the second series of impulses, and means controlled by the second electromagnetic means for effecting return of said member to its initial position.

19. A selector for automatic phonographs comprising a member arranged to be moved in the same direction from initial to desired selecting position by two series of impulses comprising an electromagnetic stepping device adapted to move said member through a number of steps, means for supplying the first series of impulses to said electromagnetic stepping device, a second electromagnetic device adapted to move said member through steps of different size, means controlled by the first electromagnetic stepping device for supplying the second series of impulses to the second electromagnetic stepping device, means for displacing said member out of its normal plane in its selecting position, means controlled by the second electromagnetic stepping device for operating said displacing means after the second electromagnetic stepping device has received the second series of impulses, means controlled by the second electromagnetic stepping device for conditioning the first electromagnetic stepping device for the reception of impulses in a subsequent selecting operation, and means controlled by the second electro-

magnetic means for effecting return of said member to its initial position.

20. A selector for automatic phonographs comprising a series of displaceable members each corresponding to an individual recording, a selector member movable past said series of displaceable members, an electromagnetic stepper arranged to step said selector member past said displaceable members by steps of definite size, a second electromagnetic stepper arranged to step said selector member past said displaceable members with steps of a different size, means for supplying a series of impulses to the first stepper, means controlled by the first stepper whereby a second series of impulses is supplied to the second stepper, means for displacing said selector member to displace a registering displaceable member, and means controlled by the second stepper for effecting the operation of said displacing means.

21. A selector for automatic phonographs comprising a series of displaceable members each corresponding to an individual recording, a selector member movable past said series of displaceable members, an electromagnetic stepper arranged to step said selector member past said displaceable members by steps of definite size, a second electromagnetic stepper arranged to step said selector member past said displaceable members with steps of a different size, means for supplying a series of impulses to the first stepper, means controlled by the first stepper whereby a second series of impulses is supplied to the second stepper, means for displacing said selector member to displace a registering displaceable member, means controlled by the second stepper for effecting the operation of said displacing means, and means controlled by the second stepper for returning said selector member to its initial position.

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