

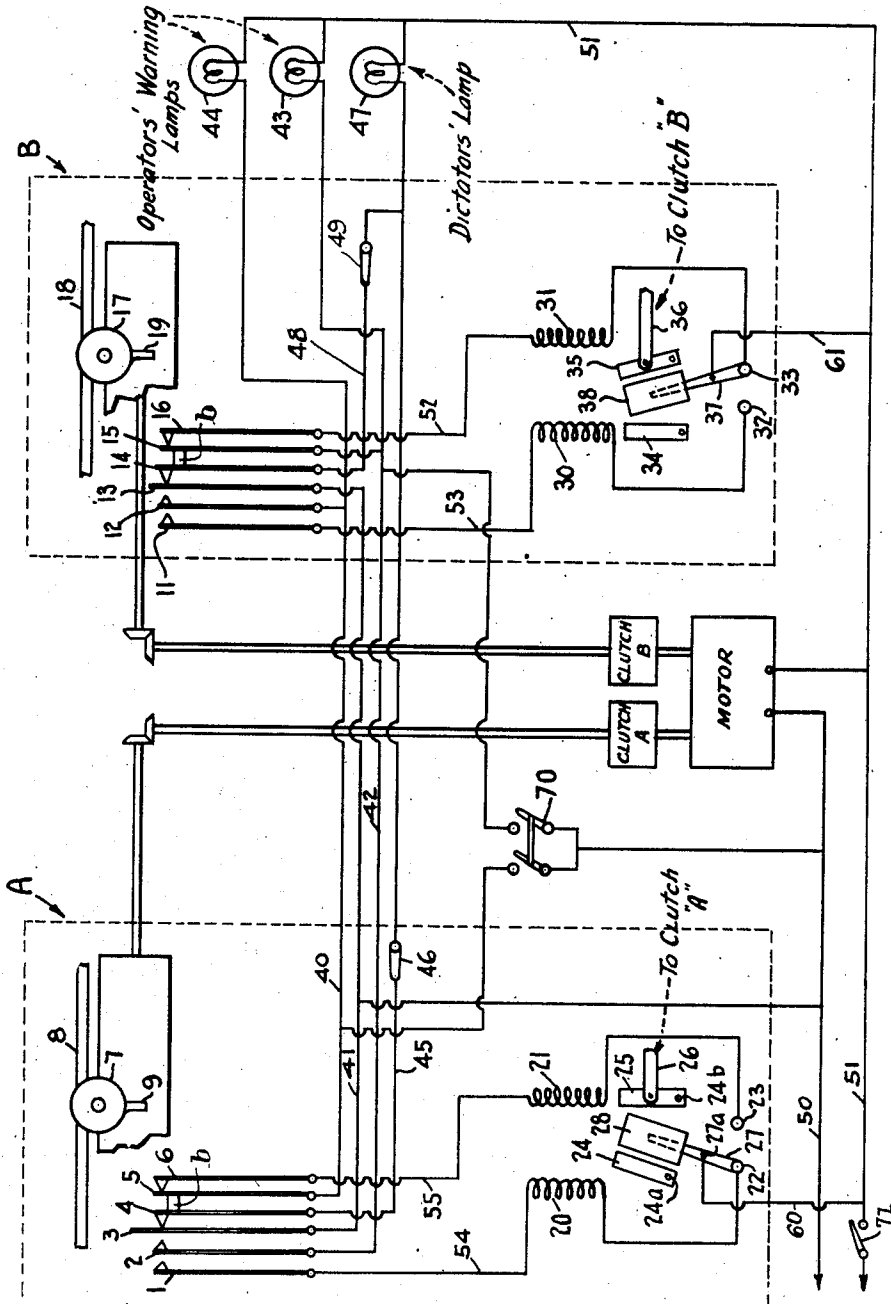
May 26, 1936.

C. HUENLICH

2,042,228

PHONOGRAPHIC APPARATUS

Original Filed Dec. 18, 1931



INVENTOR

Charles Huenlich

BY HIS ATTORNEY

Harry Lanahan

UNITED STATES PATENT OFFICE

2,042,228

PHONOGRAPHIC APPARATUS

Charles Huenlich, Bloomfield, N. J., assignor to
Thomas A. Edison, Incorporated, West Orange,
N. J., a corporation of New Jersey

Application December 18, 1931, Serial No. 581,870
Renewed April 4, 1935

21 Claims. (Cl. 274—10)

This invention relates to phonographic apparatus and more particularly to phonographic apparatus arranged to provide continuous recording for as long a period as may be desired.

The apparatus in accordance with this invention is particularly useful in connection with the recording of lectures, sermons, speeches and similar material which requires a greater length of time for its delivery than is available on the ordinary phonograph record and for which it is not possible to interrupt the delivery of the material while records are being changed.

It is an object of this invention to provide a system of the class described which may utilize a plurality of recording phonographs of any desired type, so arranged that each of the phonographs are set into operation alternately as the other phonograph approaches the end of the record thereon.

It is a further object of this invention to provide apparatus of the class described which may be easily and quickly assembled merely by the addition of a multiple contact switch and interconnecting wiring to each of a pair of commercial dictating machines.

It is a further object of this invention to provide apparatus of the class described in which start-stop chatter is prevented in case one machine reaches the end of its record while the other machine has not been provided with a fresh record.

Still other objects and advantages of my invention will be apparent from the specification.

The features of novelty which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, however, both as to its fundamental principles, and as to its particular embodiments, will best be understood by reference to the specification and accompanying drawing in which the single figure is a wiring diagram of a system in accordance with my invention.

Referring now more particularly to the drawing, the dotted rectangles A and B indicate diagrammatically a pair of phonographs. Since it is apparent that my invention is not concerned with the particular type of phonograph utilized but is applicable to any type not only for recording but also for reproducing, the details of the phonograph apparatus are not shown.

The particular embodiment of the system described comprises a pair of phonographs such as the usual dictating machine utilizing cylindrical records over which the recorder and reproducer travel. In the arrangement herein shown, the

sound box of phonograph A is diagrammatically indicated by numeral 7 and is arranged to travel across the record upon the guide 8. The sound box carries a projection 9 or is otherwise suitably arranged so that as it nears the end of its travel over the record it engages the arm 3 of the multiple contact switch and moves it to the left. The multiple contact switch comprises contact arms 1, 2, 3, 4, 5, 6 and is so arranged that contacts 3 and 4 are normally closed against each other, as are contacts 5 and 6, whereas contacts 1 and 2 and 2 and 3 are separated from each other. The phonograph B is similarly provided with a multiple contact switch comprising contact arms 11, 12, 13, 14, 15 and 16 arranged similarly to the corresponding contacts 1—6. Contacts 15 and 16 and 13 and 14 are normally closed whereas contacts 11 and 12 and 12 and 13 are normally open. Contact arm 13 is arranged to be engaged by projection 19 carried by sound box 17 in its travel along the guide 18. Contacts 3 and 4 and 13 and 14 are mechanically connected, as by an insulating block b, in the well known manner.

When the projection 9 engages contact arm 3 the said arm is moved to the left to open the contact between the contact members 3 and 4 and also to open the contact between contact members 5 and 6. Thereafter contact No. 3 closes the circuit between itself and contact No. 2 and upon further movement of the sound box to the left contact No. 2 is closed against contact No. 1. The multiple contacts on phonograph B are arranged to operate in a similar manner to contacts Nos. 1 to 6 inclusive, contacts 11 to 16 corresponding respectively to 1 to 6.

Each of the phonographs may comprise a driving motor which is preferably, although not necessarily, electrical, and is arranged to be thrown into connection with the mandrel or turn table by means of the levers 28 and 36 respectively, which operate any suitable form of clutch mechanism, shown diagrammatically. Alternatively, and in some instances, preferably, only one motor is employed, as shown in the drawing and two driving connections are utilized to the two mandrels, as shown diagrammatically.

For the purpose of controlling the operation of the clutch there may be provided stopping and starting magnet coils 28 and 21 cooperating with a pair of armatures and a switch. This mechanism may be of the type shown in U. S. Patent No. 1,380,486 to S. G. Langley, patented June 7, 1921, to which reference may be had for a more complete understanding of the details of such mechanism. In its essentials this mecha-

nism comprises a pair of armatures 24 and 25 pivoted at 24a and 24b respectively and an intermediate pivoted contact 27 pivoted at 27a and provided at its upper end with a surface adapted to be engaged by armatures 24 and 25 respectively, the upper ends of which may be connected together with a suitable spring, whereby, when magnet 20 is energized the armature 24 is attracted and rotates counter-clockwise, carrying with it the armature 25 which is caused to rotate in the same direction, and also rotating contact 27 counter-clockwise disengaging contact 27 from contact 22 and bringing it into engagement with contact 23.

The operation just described operates lever 26 and disengages the driving motor from the mandrel, at the same time preparing the circuit through coil 21 so that when coil 21 is energized later in a manner which will be described, the reverse operation takes place and lever 26 is thrown to the right to cause rotation of the mandrel. The construction and operation of the clutch control or phonograph B is the same as that already described, the stop and start coils 30 and 31 respectively controlling the position of armatures 34 and 35 and contact 37. In the position shown contact 37 has been removed from contact 32 and brought into engagement with contact 33, thus declutching the motor from the mandrel and preparing the start circuit for energization.

Thus I provide for controlling the relative movement of sound box and mandrel in each phonograph a two-position member—e. g. clutch R—responsive in position to the last energized of two associated magnets—e. g., starting and stopping magnets 31 and 30. These two magnets in each one phonograph are included respectively in a pair of distinct circuits, which may be respectively termed starting and stopping circuits for that phonograph, and each is energized when its respective circuit is closed. Momentary closing of either circuit (i. e., momentary energization of either magnet) is of course sufficient for response of the movement controlling member. The desirable limitation of the circuit closings (or magnet energizations) to momentary ones is effected by the described arrangement comprising contacts 33—32—37 (or 23—22—27) associated with each pair of circuits; this arrangement comprises a means for open-circuiting each circuit (or magnet) upon closing (or energizing) thereof until closing (or energizing) of the other circuit (or magnet) of the pair—the term “open-circuiting” being of course used to denote not only the initial opening, but also the maintenance in an open condition, of the circuit (or magnet).

Power is supplied through line switch 71 to conductors 50 and 51, line conductor 50 being connected to conductor 41, which in turn is connected to contacts 3 and 13.

With the apparatus in the position shown, the circuit extends from the source of power through line conductor 50 and conductor 41 to contact 3, to contact 4, through conductor 45, through signal switch 46, which will be described later, and through the dictator's signal lamp 47 thence through line conductor 51 to the source of power. The dictator's lamp 47 is arranged in a manner which will be more particularly described hereinafter so as to be energized when either phonograph is in position to record. Should both phonographs be out of recording position the

circuit through lamp 47 will be opened and consequently the said lamp will not be energized.

As the sound box 7 approaches the end of the record projection 9 engages contact 3 and, as already stated, separates contacts 3, 4, 5 and 6, and brings contact 3 into engagement with contact 2, thereby applying power to contact 2 and energizing the start magnet 31 of phonograph B through conductor 42, contact 15, contact 16 and conductor 52, through coil 31, thence to contact 33, to contact 37, through conductor 61 to line conductor 51 (or in other words closing the starting circuit of phonograph B); this throws lever 36 to the right to start the mandrel of phonograph B in rotation and simultaneously rotates contact 37 into engagement with contact 32. Also, when contact 3 is brought into engagement with contact 2 the operator's warning lamp 43 is energized, indicating to the operator that the sound box of phonograph A has reached or nearly reached the end of its travel and that the record on phonograph A is filled or nearly filled. Further movement of the sound box 7 causes closure of contacts 1 and 2, thereby applying power to stop coil 20 through conductor 54, contact 22, contact 27, conductor 60, to line conductor 51 (or in other words closing the stopping circuit of phonograph A); this automatically opens that stopping circuit, prepares the starting circuit through magnet 21, and moves lever 26 to the left to declutch the mandrel of phonograph A from the driving motor. The mandrel of phonograph B is now rotating and the sound box 17 is travelling over the record, whereas the mandrel of phonograph A has stopped with the sound box at the end of the completed record. The operator then replaces the completed record on phonograph A with a fresh record and returns the sound box 7 to starting position. When this is done, contact 3 returns to normal position, opening contacts 1—2 and 2—3. The opening of contacts 1—2 produces no effect because the phonograph A stopping circuit through stop magnet 20 has already been opened by movement of contact 27. The opening of contacts 2—3 produces no effect on start magnet 31 of phonograph B because the phonograph B starting circuit through coil 31 has already been opened at contact 37, but the opening of contacts 2 and 3 de-energizes the operator's warning lamp 43.

As the sound box 17 of phonograph B approaches the end of its travel contacts 13—14, and 15—16 are opened. The opening of contacts 15—16 produces no effect because the phonograph B starting circuit through coil 31 is already opened at contact 37, likewise the opening of contacts 13—14 produces no effect except to open the circuit from contact 14 through conductor 48, signal switch 49 and dictator's lamp 47 which, however, is still energized through another circuit from contact 3, contact 4, conductor 45, signal switch 46, through lamp 47. When contact 13 is closed against contact 12, power is applied to contact 12 thereby energizing operator's warning lamp 44 through conductor 40 and also applying power through contact 5 to contact 6, conductor 55 through coil 21 (or in other words closing the phonograph A starting circuit), thereby operating the clutch control to set the mandrel on phonograph A in rotation again. Further rotation of the mandrel on phonograph B closes contact 12 against contact 11, thereby applying power through con-

ductor 53, stop coil 30, contact 32 and contact 37 and conductor 31 (or in other words closing the phonograph B stopping circuit) to stop the rotation of the mandrel of phonograph B. The operator, observing that the lamp 44 is now lighted, changes the record on phonograph B and returns the sound box 17 to initial position over the fresh record whereupon contacts 12-13 are opened as are contacts 11-12 and contacts 13-14, and 15-16 are closed.

The opening of contacts 11-12 produces no effect because the phonograph B stopping circuit through stop coil 30 is already open at contact 37. The opening of contacts 12-13 de-energizes the operator's warning lamp 44 but produces no further effect because the phonograph A starting circuit through start magnet 21 is already open at contact 27. Closure of contact 13 against contact 14 supplies power through conductor 43 and signal switch 49 through dictator's lamp 47 which, however, is already energized as previously described. Closure of contacts 15 and 16 produces no effect because contact 15 is now dead and will remain so until power is applied to it by the engagement of contacts 2 and 3 on phonograph A.

Thus, it will be seen that the system has described a complete cycle involving the starting of phonograph A, the starting of phonograph B when the record on phonograph A is nearly filled, the stopping of phonograph A shortly thereafter, the starting of phonograph A for the second time, with a new record when the record on phonograph B is nearly filled and shortly thereafter the stopping of phonograph B. It will be noted that each phonograph is placed in operation shortly before the completion of the record on the other phonograph, whereby during a short interval the matter to be recorded is recorded simultaneously upon the end of one record and the beginning of the other and the sequence of records may be determined.

It should be noted that by the provision of contacts 5-6 and 15-16 it is impossible for either phonograph A or B to be started if the operator has neglected to change the record. Each of these pairs of contacts forms a switch, included in the starting circuit of the respective phonograph in series with the main switch for that circuit (2-3 or 12-13, carried by the opposite phonograph), and normally closed, but opened when the sound box of that phonograph is at or adjacent the end of its travel and at least as soon as the respective contacts 3-2-1 or 13-12-11 are closed; each pair when open obviously forms a means for blocking actuation of the starting means of the respective phonograph. Together the contact pairs 5-6 and 15-16 form means interlocking the circuits of the two phonographs. If such interlocking means were not provided, that is to say, if the start coil 31 were connected directly to contact 2, the closure of either contacts 2 and 3 or 12 and 13 under such conditions would continuously maintain power on contacts 1, 11, 2 and 12 and would result in a continuous start-stop chatter of the clutch controls of both phonographs, or start-stop oscillation of both phonographs.

It will be noted that the dictator's lamp 47 is energized through either of two circuits in parallel already described, so that when either phonograph is in position to record, the dictator's lamp 47 is lighted.

It will be noted that each of the two parallel circuits for energizing the dictator's lamp 47

comprises two switches in series, one switch being formed by the contacts 3-4 or 13-14 of the respective multiple contact switch and the other being formed by the signal switch 49 or 48. The precise form of the signal switch forms per se no part of this invention and is therefore not described in detail. It will be understood, however, that the signal switches 48 and 49 may be of any desired form or construction and are suitably arranged so as to be closed only when the sound box or recorder is over the record in position to record.

While I have described my invention as applied to a pair of recording phonographs of the mandrel type, it will be apparent that they may be applied to other types of phonographs whether used for recording or reproducing.

In case the recording is carried on electrically by means of a microphone either with or without the use of an amplifier, an additional signal switch may be provided if desired in series with lamp 47 which is arranged to be closed only when the microphone or amplifier or both are energized.

The amount of overlap, that is to say, the amount of material which is recorded on both records simultaneously, depends upon the spacing between contacts 1 and 2, and 11 and 12, it being understood that the greater the distance between these contacts, the greater will be the time interval intervening between the start of the machine, which is operating upon a fresh record, and the stopping of a machine which is just completing a record.

In order to start the system, starting switch 70 may be provided in the form of a double pole, single throw non-locking key, one contact being connected to conductor 41, and the other to conductor 42, while the other side of the switch is connected to line conductor 50. A series line switch 71 may also be provided, if desired.

In order to start the system for continuous operation, one sound box is left at the end of its travel, and one is placed at the beginning of its travel, for instance, the sound box of phonograph A. If key 70 is depressed, phonograph A will be started and when its record is full, phonograph B will be started and so on, as long as the records are changed and the sound boxes restored to initial position.

It may sometimes be desired to make duplicate records, and if this is desired, it is only necessary to set both sound boxes at the beginning of their records. Closure of switch 70 then applies line voltage to both starting coils 21 and 31, causing both phonographs to operate simultaneously. Of course, both phonographs will be stopped when they reach the end of their records.

It will be understood that although I have shown only two phonographs associated for sequential or simultaneous operation, my invention is not limited thereto, and it will be understood that three, four or even more phonographs may be operated in accordance with the teachings of this invention, contacts being provided on each machine whereby as the first machine reaches the end of its record, the next machine is set into operation, and the first one stopped, and so on, until all of the machines have operated.

As the last machine of the series approaches the end of its record, the first machine is set into operation again.

While I have shown and described certain preferred embodiments of my invention, it will be

understood that modifications and changes may be made without departing from the spirit and scope of my invention as will be understood by those skilled in the art.

5 What I claim is:

1. In a phonograph system, in combination, a pair of phonographs comprising a stylus movable transversely of a record, means for automatically initiating operation of the other phonograph 10 when either phonograph approaches the end of its record, a dictator's ready signal, and a pair of parallel circuits for causing energization of said signal, each circuit comprising a pair of contacts closed when the stylus is engaged with the 15 record, and a second pair of contacts in series with said first pair and arranged to be opened when the stylus has approached the end of its travel on the record.

2. In a phonographic system, in combination, 20 a pair of phonographs, motive means for driving said phonographs, clutches for operatively connecting said phonographs to said motive means, and circuits for operating said clutches electrically, said circuits comprising a switch having at 25 least two positions in one of which the said clutches are automatically operated sequentially and in the other of which the clutches are automatically operated simultaneously.

3. In a phonographic system, in combination, 30 a plurality of phonographs each having a sound box carriage movable relative to a record, motive means for driving said phonographs, clutches interposed between said motive means and said phonographs, electrical means for controlling the 35 operation of said clutches, said means comprising electrical contacts on each phonograph, said contacts being operable by the carriage of each phonograph to sequentially actuate the clutches of at least two of said phonographs.

4. In a phonographic system, in combination, 40 a plurality of phonographs each having a sound box carriage movable relative to a record, a motor for driving said phonographs, clutches interposed between said motor and said phonographs, 45 electrical means for controlling the operation of said clutches, said means comprising contacts on each phonograph for controlling the operation of the clutch of another phonograph, and contacts on each machine for controlling the operation 50 of its own clutch, all of said contacts of each phonograph being actuated by the respective carriage in its movement.

5. In a phonographic system, in combination, 55 a pair of phonographs each including a sound box element adapted for progressive movement relative to a record element between initial and terminal limits; and means for automatically starting said movement in either phonograph and 60 stopping said movement in the other, while permitting subsequent restoration of said elements in the latter to their initial limit without interfering with the so-started movement, comprising, in association with each phonograph, switches 65 operatively responsive to approach of said elements to their terminal limit, starting and stopping magnets adapted to be energized respectively by operation of a first said switch on the opposite phonograph and by operation of the second said switch on the respective phonograph, and a 70 two-position member controlling said movement and responsive to the magnet last energized.

6. The combination claimed in claim 5, further 75 including in association with each phonograph means operative upon energization of each mag-

net thereof for open-circuiting the same until the other magnet thereof is energized.

7. In a phonographic system, in combination, a plurality of phonographs each including a sound box element adapted for progressive movement 5 relative to a record element; an individual system associated with each phonograph comprising starting and stopping magnets, and a two-position member controlling said movement and responsive to the magnet last energized; and magnet energizing means, comprising switches in each 10 one phonograph, responsive to approach of said elements therein to a relative movement limit, for energizing the starting magnet of another of said phonographs and the stopping magnet of 15 the one phonograph.

8. The combination claimed in claim 7, further including in each of said systems means operative upon energization of each magnet therein for open-circuiting the same until the other magnet 20 therein is energized.

9. In a phonographic system, in combination, a plurality of phonographs each including a sound box element adapted for progressive movement 25 relative to a record element; an individual pair of magnets associated with each phonograph; magnet energizing means, comprising an individual group of contacts associated with each phonograph and responsive to approach of said elements therein to a relative movement limit, each 30 said group controlling the energization of at least one said magnet of each of a plurality of said phonographs; and a two-position member for each phonograph controlling said movement therein and responsive to the last energized of 35 said magnets thereof.

10. The combination claimed in claim 9, further including in association with each phonograph means operative upon energization of each magnet thereof for open-circuiting the same until the other magnet thereof is energized. 40

11. In a phonographic system, in combination, a plurality of phonographs each including a sound box element adapted for progressive movement relative to a record element; an individual 45 pair of magnets associated with each phonograph; magnet energizing means, comprising contacts associated with each phonograph and responsive to approach of said elements therein to a relative movement limit, the energization of at 50 least one said magnet of each one phonograph being controlled by said contacts of a plurality of the phonographs; and a two-position member for each phonograph controlling said movement therein and responsive to the last energized of 55 said magnets thereof.

12. The combination claimed in claim 11, further including in association with each phonograph means operative upon energization of each magnet thereof for open-circuiting the same until the other magnet thereof is energized. 60

13. The combination claimed in claim 7, further including in each one phonograph means, responsive to adjacency of said elements to said limit therein and operative at least as soon as 65 both said switches therein, for open-circuiting the starting magnet thereof.

14. In combination, a plurality of phonographs each having a sound box element adapted for progressive movement relative to a record element; an individual system associated with each 70 phonograph comprising means responsive to momentary actuation for starting said movement, and means operative as a limit of said movement 75

is approached for stopping said movement; and means associated with each one phonograph, operative when said elements therein are adjacent said limit and at least as soon as said stopping means, for blocking actuation of the starting means of the one phonograph and actuating the starting means of another of said phonographs.

15. In a phonograph system, in combination, a sound box element and means for producing progressive movement thereof relative to a record element; means responsive to momentary actuation for starting said movement; means operative as a limit of said movement is approached for stopping said movement; and means, responsive to adjacency of said elements to said limit and operative at least as soon as said stopping means, for blocking actuation of said starting means.

16. In combination, a plurality of phonographs each having a sound box element adapted for progressive movement relative to a record element; an individual movement control system associated with each phonograph comprising an electrical circuit adapted upon momentary closing to start said movement, and means operative as a limit of said movement is approached for stopping said movement; and contacts associated with each one phonograph, responsive to adjacency of said elements therein to said limit and operative at least as soon as said stopping means, for open-circuiting the starting circuit of the one phonograph and closing the starting circuit of another of said phonographs.

17. In a phonograph system, in combination, a sound box element and means for producing progressive movement thereof relative to a record element; a movement control system comprising an electrical circuit adapted upon momentary closing to start said movement, and means operative as a limit of said movement is approached for stopping said movement; and contacts, responsive to adjacency of said elements to said limit and operative at least as soon as said stopping means, for open-circuiting said starting circuit.

18. In combination, a plurality of phonographs each having a sound box element adapted for progressive movement relative to a record element; an individual movement control system associated with each phonograph comprising two electrical circuits respectively adapted upon momentary closing to start and to stop said movement therein; and contacts associated with each one phonograph and responsive to adjacency of said elements therein to a limit of their said movement, for closing the starting circuit of another of said phonographs and the stopping circuit of the one phonograph, while open-circuiting the starting circuit of the one phonograph.

19. In a phonograph system, in combination, a sound box element and means for producing progressive movement thereof relative to a record element; a movement control system comprising two electrical circuits respectively adapted upon momentary closing to start and to stop said movement; and contacts responsive to approach of said elements to a limit of said movement, for closing said stopping circuit while open-circuiting said starting circuit.

20. The combination claimed in claim 19, further including in each control system means operative upon closing of each circuit therein for open-circuiting the same until the other circuit therein is closed.

21. In combination, a plurality of phonographs each having a sound box element adapted for progressive movement relative to a record element; an individual movement control system associated with each phonograph comprising two electrical circuits respectively adapted upon momentary closing to start and to stop said movement therein; contacts associated with each one phonograph and operative as a limit of said movement therein is approached, for closing the starting circuit of another of said phonographs and the stopping circuit of the one phonograph; and means, interlocking the circuits of a plurality of said phonographs, for preventing start-stop oscillation.

CHARLES HUENLICH.

CERTIFICATE OF CORRECTION.

Patent No. 2,042,228.

May 26, 1936.

CHARLES HUENLICH.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, second column, line 25, claim 20, for "19" read 18; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of September, A. D. 1936.

(Seal)

Henry Van Arsdale
Acting Commissioner of Patents.