

E. M. TURNER.
PHONOGRAPH.

APPLICATION FILED DEC. 27, 1909.

Patented Jan. 31, 1911.

3 SHEETS—SHEET 1.

983,183.

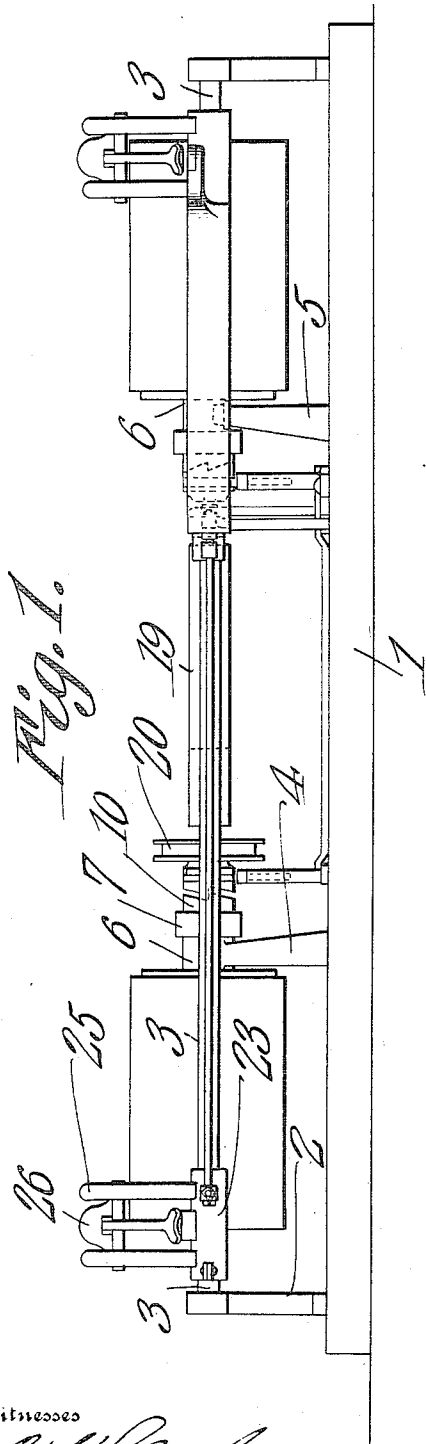


Fig. 1.

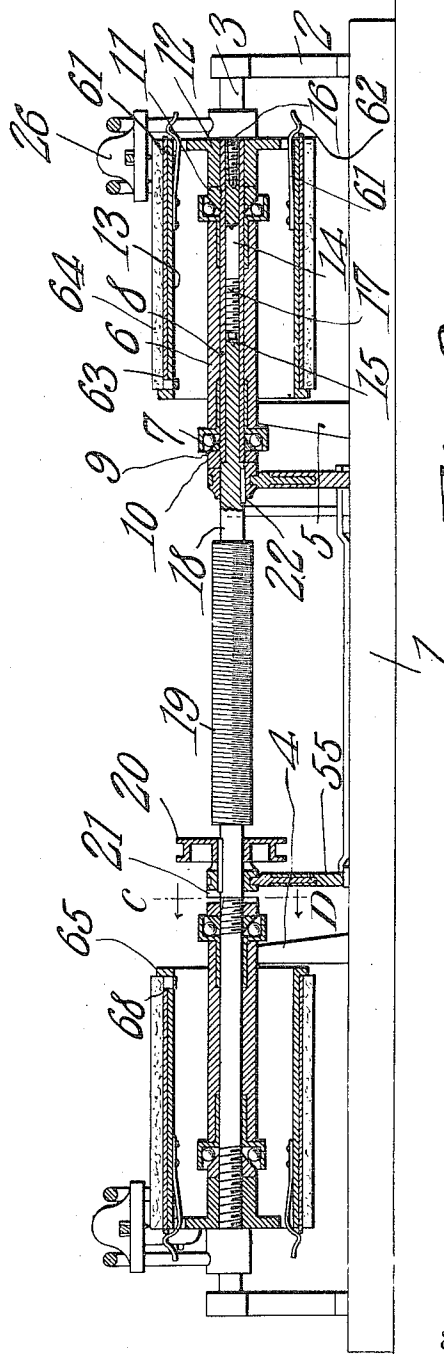


Fig. 2.

Witnesses
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3 SHEETS-SHEET 2.

Fig. 3.

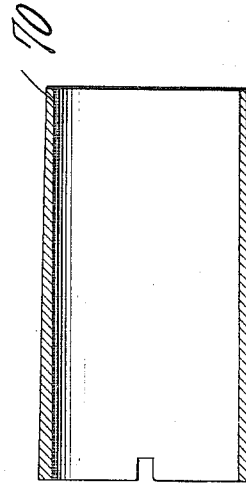
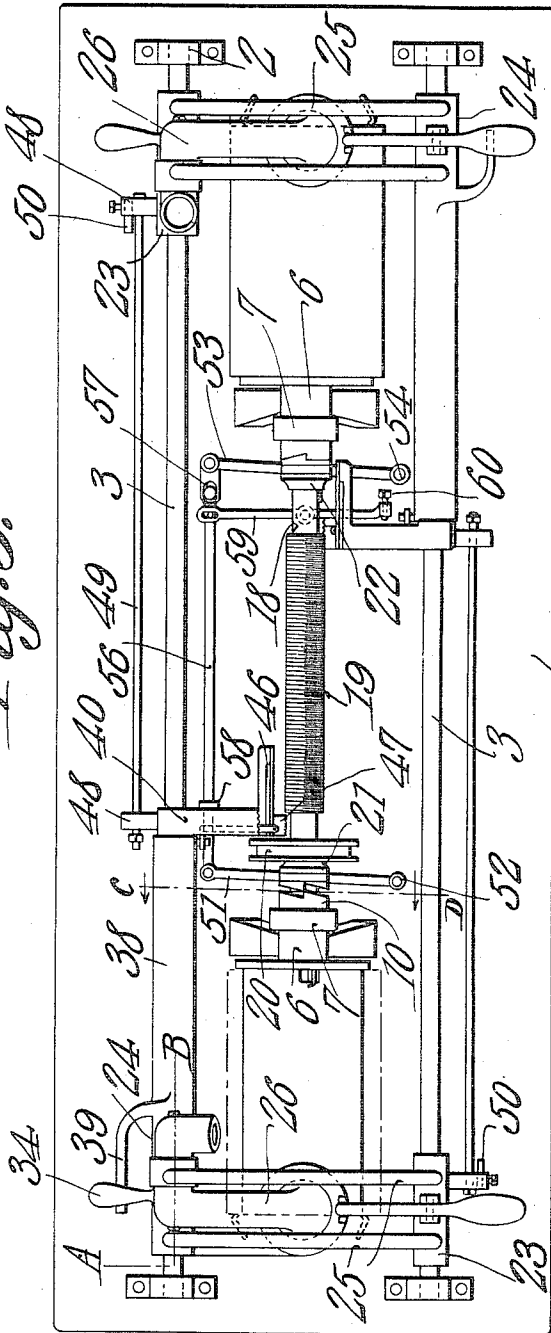


Fig. 5.

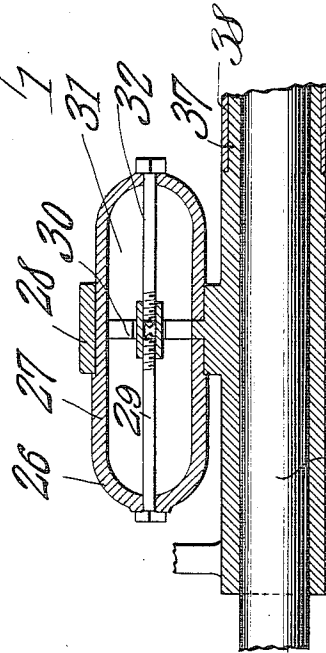


Fig. 4.

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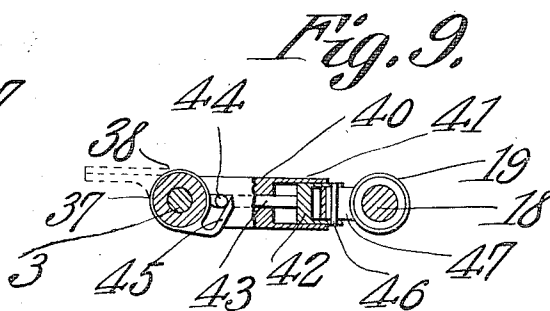
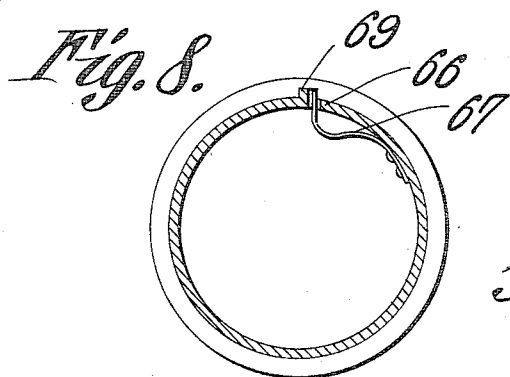
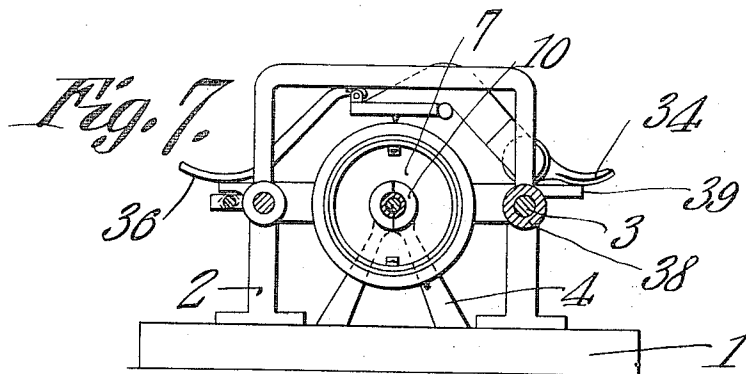
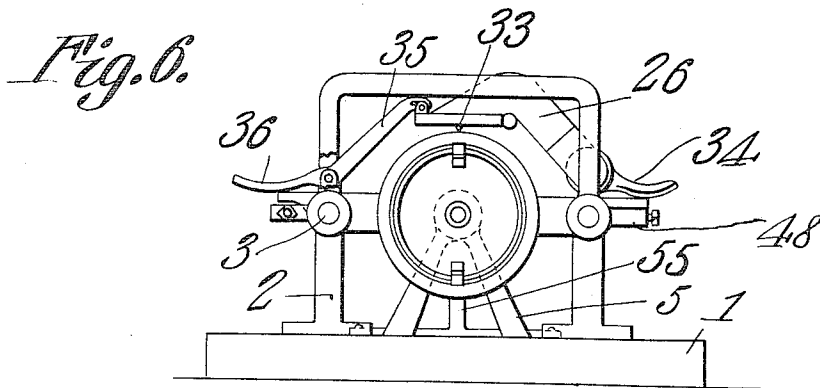
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3 SHEETS—SHEET 3.



Witnesses

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UNITED STATES PATENT OFFICE.

ESTEY MURRELL TURNER, OF PASADENA, CALIFORNIA.

PHONOGRAPH.

983,183.

Specification of Letters Patent.

Patented Jan. 31, 1911.

Application filed December 27, 1909. Serial No. 534,920.

To all whom it may concern:

Be it known that I, ESTEY M. TURNER, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented a new and useful Phonograph, of which the following is a specification.

This invention has reference to improvements in phonographs and is designed to produce a machine of this character with which the sound may be recorded or reproduced to as great an extent as desired even though far exceeding the limits of the record tablet, the structure being such that when the record on one tablet is about exhausted or the limits of the tablet are about reached, a second tablet will come into action automatically so that during the recording or reproducing of the sounds with the second tablet a third tablet may be placed on the machine after the removal of the first tablet and on the completion of the second tablet the third tablet will be automatically introduced into action, and this operation may be repeated indefinitely so long as the operator desires.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,

Figure 1 is a side elevation of the machine. Fig. 2 is a central vertical section longitudinal of the machine. Fig. 3 is a plan view of the machine. Fig. 4 is a section on the line A—B of Fig. 3. Fig. 5 is a sectional view of a sleeve or adapter. Fig. 6 is an end elevation of the machine. Fig. 7 is a section on the line C—D of Fig. 3. Fig. 8 is an end view of one of the record mandrels illustrating the lock for the record tablet. Fig. 9 is a detail view of the mechanism for operating the feed nut.

Referring to the drawings there is shown a base 1, at the opposite ends of which are spaced standards 2 near opposite sides of the base and these standards carry rods 3 elevated at an appropriate distance above the base and extending from one end to the other at opposite sides of and at equal distances from the center line of the base. In the middle line of the base are two standards 4, 5, each having formed as part thereof or fixed thereto a sleeve 6 extending toward

the end of the base 1. These sleeves terminate at the ends or have secured to their ends ball cups 7. Mounted within the sleeves 6 are other sleeves 8 extending at each end through the ball cups. At one end, that is the end toward the middle of the base each sleeve 8 carries a ball cone 9 which may be attached to or form part of a clutch member 10 also mounted on the sleeve in fixed relation thereto. The other end of the sleeve 8 carries another ball cone 11 attached to or forming part of a hub 12 carrying at the end remote from the ball cup one end of a cylindrical mandrel 13 projecting over the sleeve 6 in concentric relation thereto and toward the middle of the base 1.

Entering the end of the sleeve 8 carrying the mandrel 13 is a screw pin 14 terminating at the inner end in a point 15 while at the outer end this pin is entered by a tapered screw 16 forcing it into firm engagement with the corresponding end of sleeves 8 thus uniting the pin 14 to the sleeve 8 in such manner that the pin may be adjusted longitudinally of the sleeve and then locked by the screw 16. The pin 14 is shown as provided with a portion 17 having screw threads formed thereon and this portion is designed to enter a correspondingly threaded portion of the interior of the sleeve 8.

Extending between the facing ends of the sleeves 8 is a shaft 18 having its intermediate portions provided with screw threads as shown at 19, this intermediate portion being preferably of greater diameter than the rest of the shaft and the screw threads are of a pitch such as is usually employed in sound recording and reproducing machines. The ends of the shaft 18 are reduced in diameter and enter the corresponding ends of the sleeves 8 and the extreme ends of the shaft are engaged by the pointed ends 15 of the pins 14 entering center cups in the ends of the shaft, these pointed ends 15 of the pins 14 serving as centering bearings for the shaft. Fast to the shaft 18 at one end of the threaded portion 19 is a pulley 20 by means of which rotative movement may be imparted to the shaft from any appropriate motor. This pulley 20 is to be taken as indicative of any manner of causing the rotation of the shaft 18 either by belt or otherwise.

At the portions of the shaft 18 adjacent

to the clutch members 10 are other clutch members 21 constrained to rotate with the shaft each by a spline 22 but which clutch members may be moved longitudinally of the shaft into and out of engagement with the respective clutch members 10 so that either one of the mandrels 13 may have rotative motion imparted thereto as may be desired.

Mounted on the rods 3 at each end of the machine is a carriage composed of two sleeves 23, 24. The sleeve 23 is mounted on one rod 3, while the sleeve 24 is mounted on the other rod 3 at the same end of the machine as is the sleeve 23, the two sleeves 23 and 24 at the same end of the machine being connected by yokes 25 so that the sleeves will move together.

The carriages are capable of moving along the rods 3 for a distance about equal to the length of the corresponding mandrel 13 and the length of the screw section 19 of the shaft 18 is such as to impart the appropriate motion to the two carriages as will herein-after appear.

Each rod 3 carries a sleeve 23 near one end and the sleeve 24 of the other carriage near the other end. Mounted on the sleeve 23 at one end of the machine is a tubular arm 26 having an angle neck 27 seated in an annular bearing 28 carried by the corresponding sleeve and the arm 26 is held to the sleeve by a screw pivot 29 extending axially of the neck and entering an appropriate threaded socket 30 carried by the bearings 28. The free end of the neck 26 within the bearing 28 is in communication with another neck 31 similarly mounted in the bearing 28 by means of a screw 32 similar to the screw 29 and the other end of the neck 31 may receive any appropriate sound conveying conduit whether of the amplifying character or not.

The end of the tubular arm 26 remote from that formed into the neck 27 carries a sound box 33 either formed thereon or attached thereto and this sound box may be of any appropriate character, the construction of the sound box not entering into the present invention. In order that the sound box may be manipulated as desired, the arm 26 is formed with a manipulating handle or extension 34. Attached to the sound box 33 or to the corresponding end of the arm 26 there is one end of a lever 35 hinged to the opposite member 23 or 24 of the corresponding carriage and also provided with a manipulating extension 36 similar to the manipulating extension 34 of the arms 26.

The member 24 of the carriage is longer than the mandrel 13 and for a portion of its length is reduced in external diameter as indicated at 37 in Fig. 4, this reduced portion constituting a seat for a sleeve 38 capa-

ble of turning on the sleeve 24 and this sleeve 38 at the end toward the sound box is provided with an off-set arm 39 having its free end parallel with the axis of rotation of the sleeve and under-riding the handle or extension 34 so that when the latter is depressed the arm 39 will be engaged by said handle and the sleeve 38 will be given a short rotative movement about the axis of the member 24.

The end of the sleeve 24 remote from that carrying the hollow arm 26 in one case and the lever 34 in the other case has a lateral extension or arm 40 adjacent to the screw portion 19 of the shaft 18. This arm 40 is formed at the outer end with a recess housing a block 42 provided with a stem projecting into the arm toward the rod 3 and having its end adjacent to the rod 3 bent at an angle to project beyond the corresponding face of the arm 40 as shown at 44. The sleeve 38 adjacent to the arm 40 is provided with a finger 45 shaped to engage the end 44 of the rod or stem 43 in such manner as to cause the longitudinal movement of the block 42 in the recess 41 when the sleeve 38 is rotated in the proper direction. Outside the recess 41 the block 42 is engaged by a spring 46 tending to move the block 42 outward. The block 42 carries a nut section 47 adapted to the threaded portion 19 of the shaft 18.

The sleeves 23 and arms 40 are provided with meeting lugs 48 and through the corresponding lugs on the same side of the machine extends a rod 49 headed at each end beyond the lugs and capable of moving through said lugs. The lug 48 upon each sleeve 23 also carries an adjustable pin 50 so positioned as to make contact with the other lug 48 on the same side of the machine under conditions which will presently appear.

Mounted on the base 1 beneath the clutch member 21 is a lever 51, this lever being pivoted at one end to the base as indicated at 52.

Beneath the clutch member 20 is another lever 53 pivoted at one end of the base as indicated at 54. Rising from each lever is an arm 55 connected to the corresponding clutch member 21 or 22 as the case may be so that when the lever is moved on its pivot the clutch member will be moved longitudinally on the shaft 18 into or out of engagement with the meeting clutch member coupled to the corresponding mandrel. The two levers 51 and 53 have their pivot connections at one side of the center line of the machine and extend toward the other side of the machine where the free ends of the levers are connected by a link 56 so that these two levers are constrained to move together. The link 56 near the lever 53 carries an upwardly projecting pin 57 of sufficient height to be engaged by a lug or block 58 carried by

the arm 40 of the sleeve 24 on the corresponding side of the machine.

Pivotaly connected to the link 56 near the pin 57 is one end of a lever 59 pivoted to the base about the center line thereof, that is, beneath the shaft 18, and this lever extends to the other side of this center line and into the path of the arm 40 of the carriage member 24 on the corresponding side of the machine. The free end of this lever carries a set screw 60 so that the relative time of contact of the arm 40 with the lever may be adjusted.

The accessible end of each mandrel 13 is provided with elastic fingers 61 preferably at diametric points within the mandrel and the free ends of the spring fingers project beyond the free end of the mandrel and are there bent as indicated at 62 to normally project beyond the periphery of the mandrel in the path of a record tablet to be placed thereon. In the particular structure shown in the drawings the record tablets each consist of a metallic sleeve 63, or this sleeve may be formed of any other suitable material, and exterior thereto there is a coating 64 of record receiving material of any suitable character. Such a tablet may be readily pushed on the mandrel 13, the spring fingers 61 yielding to such movement and when the tablet is on the mandrel to the full extent then the ends 62 of the spring fingers snap in the path of the tablet thus holding it on the mandrel.

The end of the mandrel remote from that onto which the tablet is first placed is provided with a radial circumferential flange 65 and adjacent to this flange the mandrel is provided with a perforation 66 through which extends the free end of a spring 67 fast to the interior of the mandrel. The sleeve 63 is provided with an end notch 68 entered by a radial lug 69 on the mandrel adjacent to the spring 67 and this spring is designed to have its free end enter the notch in the mandrel so as to take up any looseness of fit between the notch of the mandrel and the lug 69. The parts just described are designed to cause the tablet to rotate with the mandrel, without interference however with the ready removal of the tablet from the mandrel.

The mandrel 13 is cylindrical, but such mandrel may be made tapering, after the ordinary practice of cylinder record machines, or the mandrel 13 may be adapted to tablets with internal tapers by the employment of a taper bushing 70 shown in Fig. 5.

Let it be assumed that it is desirable to make a sound record much longer than is possible on a single tablet. Also let it be assumed that a suitable record tablet has been placed upon the mandrel at the right hand end of the machine and that the sound

is being recorded in the usual manner. In the position shown in Fig. 3 the sound box has reached about the limit of its travel toward the right and the arm 40 of the sleeve 24 of the carriage for the said sound box is brought into engagement with the screw 60 of the lever 59 and the actuation of this lever by the continued movement of the carriage causes a movement of the lever 53 in a direction to move the clutch member 22 out of engagement with the clutch member 10 and thus uncoupling the mandrel at the right hand end of the machine, as viewed in Fig. 3, from the shaft 18 which is assumed to be continuously rotating under the action of a suitable power applied thereto through the pulley 20 or by means of other driving devices.

As the clutch member 22 is being moved out of engagement with the clutch member 10, the clutch member 21 is being moved into engagement with the clutch member 10 of the other mandrel, that is the one at the left hand end of the machine, through the link connection 56 between the levers 53 and 51. The parts may be so adjusted that the coupling of the mandrel at the left hand end of the machine to the power shaft will take place just prior to the uncoupling of the mandrel at the right hand end of the machine from the power shaft.

The parts are so adjusted that just prior to the uncoupling of the mandrel at the right hand end of the machine from the power shaft the rods 49 are so moved by the progressive travel of the carriage at the right hand end of the machine as to have their other ends move the carriage at the left hand end of the machine a sufficient distance toward the right to bring the nut 47 of said carriage into engagement with the threaded portion 19 of the shaft 18 so that as the recording at the right hand end of the machine ceases it will begin at the left hand end of the machine. It is preferable that the recording should begin on the left hand end of the machine just prior to ceasing at the right hand end of the machine so that there is a slight overlapping, but with the machine properly adjusted this will not interfere with the reproduction of the sound. The recording proceeds continuously, and the operator by a suitable manipulation of the extensions 34 and 36 lifts the sound box 33 out of engagement with the record tablet, and this manipulation of the extensions 34 and 36 causes a rocking of the sleeve 38 by engagement of the extension 34 with the arm 39 to a sufficient extent to cause the finger 45 to operate on the pin end 43 and withdraw the nut 47 from engagement with the threaded portion 19 of the shaft 18. The carriage at the right hand end of the machine may now be pushed toward the other end of the

machine to a sufficient distance to bring the sound box into operative relation to the initial end of the record tablet, the full tablet having been previously removed and a new table substituted, or this may be done after the carriage has been returned to its initial position. In the meantime the record is being produced upon the tablet at the left hand end of the machine and the carriage there located is moving toward the right. Ultimately this carriage approaches the right hand limit of its travel when the lug 58 will be brought into engagement with the pin 57 and move the link 56 in a direction opposite to that in which it was moved by the carriage at the right hand end of the machine at the termination of its travel, and the clutch member 21 will be moved out of engagement with the other clutch member of the mandrel at the left hand end of the machine and the clutch member 22 will be moved into engagement with the corresponding clutch member of the mandrel at the right hand end of the machine thus starting the mandrel at the right hand end of the machine into rotation. The pins 50 are at the same time brought into engagement with the respective lugs 48 and the carriage at the right hand end of the machine, previously moved to its initial position, will be caused to travel a short distance with the carriage at the left hand end of the machine, this distance being sufficient to bring the nut 47 of the carriage at the right hand end of the machine into operative engagement with the threaded portion 19 of the shaft 18. As soon as the second cylinder has received its record and the mandrel carrying it has ceased to move, it may be removed from its place ready for an additional record, the carriage and sound box individual to such end of the machine having been moved to its initial position so that when the preceding record is finished the new record may continue as before. By this means the recording may continue uninterruptedly as long as necessary or desirable.

The machine thus provides means for the continuous recording of sound without interruption and the reproduction of such records may be caused on the same or a like machine even though the composition recorded covers many tablets of a size convenient to handle.

While the sound conduit for either receiving or amplifying recorded sounds is not shown in the drawing it will be understood that the two necks 31 will have a common connection to the receiving or the delivery end of a suitable sound conduit as the case may be.

There need be no interruption whatsoever in the continuity of the record as a whole

even though it cover many sound record tablets.

What is claimed is:—

1. In a phonograph, a central feed screw, record tablet holders at opposite ends of the screw, clutches between the screw and respective tablet holders, operating means for the clutches acting to alternately move the clutches into position, sound boxes one for each tablet holder, elongated supports for the sound boxes parallel with the longitudinal axis of the screw, a feed nut for each sound box movable therewith and pivotally mounted on the respective sound box support, and means under the control of each sound box support for moving the feed nut of the other sound box into engagement with the feed screw.

2. In a phonograph, a central feed screw, record tablet holders at opposite ends of the screw, clutches between the screw and respective tablet holders, operating means for the clutches acting to alternately move the clutches into operative position, sound boxes one for each tablet holder, elongated supports for the sound boxes movable parallel with the longitudinal axis of the screw, a feed nut for each sound box support movable therewith and pivotally mounted on the respective sound box support, means under the control of each sound box support for moving the feed nut of the other sound box support into engagement with the feed screw, and manually operable means for returning either sound box support and its feed nut to initial position without interference with the other.

3. In a phonograph, a shaft provided with an intermediate screw, record tablet carriers at each end of the shaft, clutches between the shaft and respective tablet carriers, rods on each side of and parallel with the shaft, a carriage on and movable along the rods adjacent each tablet carrier, a sound box on each carriage, a feed nut on each carriage for engaging with the feed screw, a connection from each carriage to the other active to cause movement of the inoperative carriage to engagement with the feed screw as the active carriage approaches the limit of its active movement, and clutch-operating means controlled in turn by each carriage to cause one clutch to engage and the other to disengage.

4. In a phonograph, two parallel spaced carriers, and a carriage adapted to travel thereon and composed of two rigidly joined supporting members in separated parallel relation mounted on and capable of movement together along the carriers, a sound-box intermediate of said two carriage members, a sound conveying tube carried by the sound box and pivotally supported on one of the carriage members at the end remote

from the sound box, and a manipulating member for the sound box pivotally supported on the other carriage member and extending from the latter to the sound box
5 and there pivotally connected to said sound box.

In testimony that I claim the foregoing as

my own, I have hereto affixed my signature in the presence of two witnesses.

ESTEY MURRELL TURNER.

Witnesses:

NEWTON BURKHARDT,
C. M. TURNER.