

No. 785,766.

PATENTED MAR. 28, 1905.

J. SANDERS.
GRAMOPHONE.

APPLICATION FILED DEC. 13, 1904

Fig. 1.

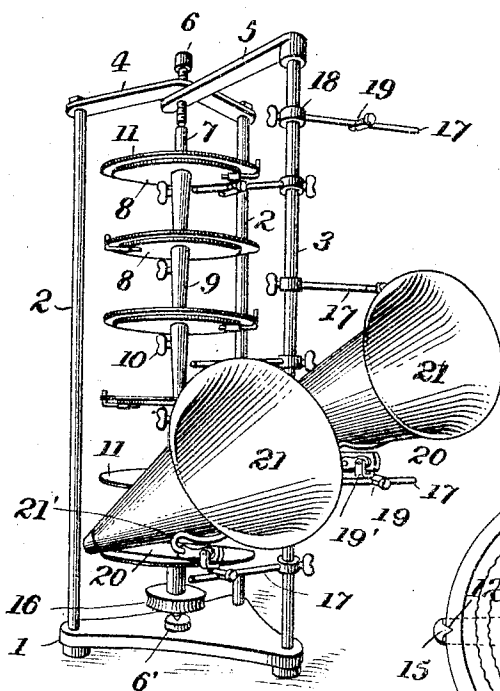


Fig.4.

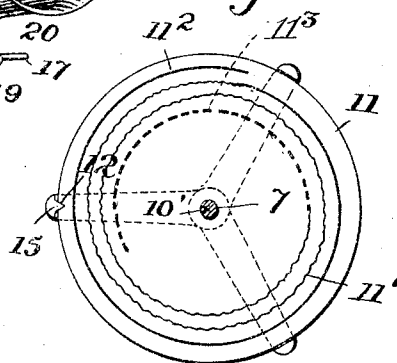


Fig. 2. $\frac{11}{+}$

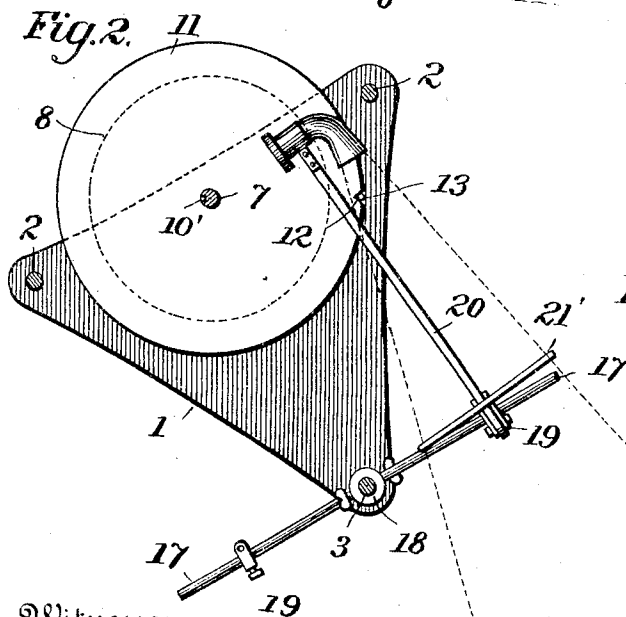
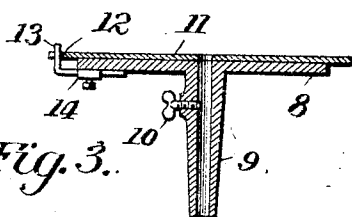


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH SANDERS, OF WASHINGTON, DISTRICT OF COLUMBIA.

GRAMOPHONE.

SPECIFICATION forming part of Letters Patent No. 785,766, dated March 28, 1905.

Application filed December 13, 1904. Serial No. 236,725.

To all whom it may concern:

Be it known that I, JOSEPH SANDERS, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Gramophones, of which the following is a specification.

This invention has reference to improvements in gramophones of the type shown and described in Letters Patent No. 692,502, granted to Emile Berliner on February 4, 1902. The gramophone of the Letters Patent was designed to greatly magnify the recorded sounds and was based upon the exact similitude of the commercial form of gramophone-record duplicates. It consisted of a number of gramophone reproducer-machines coupled together and to a common motor for simultaneous and synchronous action, so that the reproductions of several records (six being shown in the patent) were merged to have the effect of a single reproduction of greatly-increased intensity. The multiple gramophone or "multiphone" of the aforesaid Letters Patent occupied a floor-space of considerable extent, since the several record-supporting tables were each individually mounted upon a common base-plate. Also since the removal of reproduced record-tablets and the placing of others in the machine of the patent took considerable time long intervals of silence would elapse between the reproductions of records. In addition to this the multiplication of gearing necessary to drive several individual rotary tables was found to be prohibitive because of the noise produced, so that finally a flexible belting was adopted because of its easy and noiseless running. This, however, introduced a new difficulty in that absolute synchronism, so necessary to the perfect merging of the several reproductions, was sometimes lost, owing to the slight elasticity of a flexible belt and the consequent running of the record-tablets out of step.

It is the object of the present invention, first, to greatly reduce the floor-space occupied by the machine; second, to so arrange the record-tablet supports that both the record-tablets and their supporting-tables may be removed from and replaced in the machine

bodily, so that while one set of records is being reproduced another set may be prepared for insertion and when desired may be inserted into the machine with the same facility and in practically the same time required to place one record-tablet upon a non-removable tablet-supporting table, and, third, to provide means whereby all the tables are in rigid and unyielding connection with the common motor and must therefore rotate in absolute synchronism. All this is fully set forth in the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved multiphone with the driving mechanism and some of the reproducer-heads and amplifying-horns omitted for the sake of clearness of illustration. Fig. 2 is a cross-sectional plan view with parts omitted. Fig. 3 is a vertical section of one of the record-supporting tables with a record-tablet in place, and Fig. 4 is a plan view of a modified form of record-supporting table with a record-tablet in place and showing the table-carrying arbor or shaft in cross-section.

Referring to the drawings, there is shown a triangular base 1, from the corners of which rise three uprights 2, 2, and 3. The upper ends of the uprights 2 2 are connected by an angle-piece 4, and the upper end of the upright 3 is connected to the center or angle of the angle-piece 4 by an arm 5. At the junction of the angle-piece 4 and arm 5 there is tapped a screw 6, passing downward through both and having the lower end tapered to engage a socket in the upper end of an upright arbor or shaft 7, the lower end of which is stepped in a suitable bearing 6' in the triangular base underneath and in line with the screw 6. Upon this shaft or arbor 7 there are a number of record-supporting tables 8, each having a central hub 9, projecting from one face and fitting closely on said shaft. Each table is held on the shaft by a thumb-screw 10 entering a longitudinal groove 10' in the shaft. The tables 8 may be disk-shaped, as shown in Figs. 1, 2, and 3, or they may consist of three radial arms disposed one hundred and twenty degrees apart, as shown in Fig. 4.

In order that the record-tablets 11 used upon the tables 8 may all agree in relative position for simultaneous reproduction, they are each provided with an identically-located peripheral notch 12, into which a finger 13 engages, being adjustably secured in a bracket 14 on the under side of each table 8 in the form shown in Fig. 3, so that different-sized records may be used, or the finger may be integral with one of the arms of the form shown in Fig. 4, as shown at 15. The peripheral notch 12, with the finger 13 engaging the same, is a particularly accurate means of locating the record-tablet in a definite position on the rotating table, since the notch in the record-tablet would be located by making such a notch in the edge of the matrix from which the record-tablet is pressed out. Thereby the location of the notch with respect to the record itself will be the same in any number of record-tablets made from the same matrix. Such notch I call a "position-notch."

A number of tables 8, (six being shown in the drawings,) each with a record-tablet in place, are strung upon the shaft 7 and are secured thereto by the thumb-screws 10, which latter enter into the groove 10', and so determine the relative position circumferentially upon the shaft. The distances between the tables are determined by the hubs 9. The shaft, tables, and record-tablets thus assembled constitute a single compact structure which may be placed into or removed as a whole from the machine, the shaft fitting between the step-bearing 6' in the base 1 and the screw 6, the latter being screwed downward until its end engages the socket forward in the upper end of the shaft. The shaft and its tables may now be rotated by any suitable source of power, and in the drawings, Fig. 1, there is shown a pulley 16 on the lower end of the shaft as a means for applying power. Other means may be used, it only being necessary that the driving mechanism be such that the shaft may be readily placed into or removed from the machine.

Secured to the upright 3 are a number of arms 17, each projecting from a collar 18, fixed adjustably to the upright by a thumb-screw. Adjustably fixed to each arm is a socket 19, receiving the pintle of the fork 19' of the usual universal joint of the swinging arm 20 for carrying the amplifying-horn 21 and sound-box 22 of the ordinary commercial gramophone. The horn is supported on the curved cross-arm 21', as usual. The arms 17 and sockets 19 need not be adjustable. For economy of space the arms 17, one for each table 8, project alternately from opposite sides of the upright 3 and the reproducer-heads and amplifying-horns are arranged alternately on either side of the said upright 3. The alternate reproducer-stiles will therefore engage the records from opposite edges, and the fingers 13 are therefore arranged on correspond-

ingly opposite sides of the tables 8, so that when the parts are all in place the stiles will engage the record grooves all at the same point.

The synchronous rotation of the several tables being assured by the shaft 7 and the identity of position of the record-tablets being assured by the fingers 13 or 15 engaging the notches 12, it follows that if care be taken to place the stile of each reproducer-head upon the same line, but preferably the first line of each record, an absolute coincidence of all the reproductions must result. To facilitate the placing of the stile upon the first line of the record, which is always a difficult and uncertain procedure on account of the shallowness and narrowness of the grooves, I make the first or a part of the first turn of the groove much deeper and wider than the remainder of the spiral groove, so that it is clearly visible to the unaided eye and will stand out prominently as a mark which cannot be missed. This widened and deepened portion of the first line of the spiral groove I make by preference a smooth groove, containing no record, and this guide-groove may, if desired, run out into or near to the edge of the record-disk. This construction is indicated in Fig. 4, on which the record-groove proper is represented diagrammatically by the spiral 11', while the guide-groove is indicated by the heavier portion 11² of the spiral which represents the case where the record progresses from the outer turns of the spiral inwardly; but when, as has been proposed, the record progresses from the inner turns of the spiral outwardly the guide-groove is of course made to lead into the innermost turn of the record-groove. Such guide-groove is indicated in dotted lines at 11³. An additional advantage of the deep guide-groove is that it prevents the needle from being shaken out and displaced into another groove by the shock at the starting of the machine. With a single gramophone plate and reproducer such displacement of the needle at the start frequently occurs, but is there of no consequence, since at the worst nothing is lost but a small portion of the reproduction, while in a multiphone such accident would be fatal, since thereby one needle might come into engagement with one part of the record while another needle or all the other needles might be in engagement with another part of the record, and thus the coincidence of all reproductions which is absolutely necessary would be lost.

In the apparatus described there is no danger of any of the records getting out of step because of flexibility of connections for driving the tables.

I do not herein claim the gramophone-tablet shown and described, since the same is claimed in my application filed as a division hereof on February 1, 1905, Serial No. 243,705.

Having now fully described my invention,

what I claim, and desire to secure by Letters Patent, is—

1. A multiphone comprising a number of rigidly-connected supports for a like number of identical gramophone record-tablets, means for rotating said supports and tablets synchronously about a common axis, and a number of sound-reproducers, one for each tablet, and all adapted to be placed in and to maintain the same operative relation to identical parts of the records, substantially as described.

2. A multiphone comprising a number of rigidly-connected supports for a like number of identical gramophone record-tablets, arranged for rotation about a common vertical axis, and a number of sound-reproducers, one for each tablet, and all adapted to be placed in and to maintain the same operative relation to identical parts of the records, substantially as described.

3. A multiphone comprising a number of rigidly-connected supports for a like number of identical gramophone record-tablets, arranged for rotation about a vertical axis and provided with means for locating and maintaining the several record-tablets in definite relation to each other, and a number of sound-reproducers, one for each tablet, all adapted to be placed in and to maintain the same operative relation to identical parts of the records, substantially as described.

4. A multiphone comprising a shaft, a number of supports for identical gramophone record-tablets, removably but rigidly mounted upon said shaft for synchronous rotation, and a like number of sound-reproducers each adapted to be placed in and to maintain the same operative relation to the same parts of a record as all the others, substantially as described.

5. A multiphone comprising a suitable frame, a removable, vertical shaft mounted therein, a series of supports for identical gramophone record-tablets, rigidly but removably secured on said shaft, and a like number of sound-reproducers each adapted to be placed in and to maintain the same operative relation to the same parts of a record as all the others, substantially as described.

6. A multiphone comprising a suitable frame, a removable vertical shaft mounted therein, a series of supports for identical gramophone record-tablets rigidly but removably secured on said shaft, a corresponding series of sound-reproducers arranged alternately upon opposite sides of said shaft, and means for establishing and maintaining the several record-tablets in definite relation to each other and all in identical relation to the corresponding reproducers, substantially as described.

7. An exchangeable element for a multiphone consisting of a shaft and a number of supports for gramophone record-tablets, rigidly but removably secured upon said shaft, substantially as described.

8. An exchangeable element for a multiphone consisting of a shaft and a number of record-tablet supports rigidly but removably secured thereon in definite relation to each other, and means on each support for locating and maintaining a record-tablet in definite position thereon, substantially as described.

9. A supporting-table for a gramophone record-tablet having an adjustable stop for determining the position of record-tablets of different sizes on the said table, substantially as described.

10. A supporting-table for a gramophone record-tablet having a peripheral, radially-adjustable stop for determining the position of record-tablets of different sizes on said table, substantially as described.

11. In a multiphone, the combination of a number of supporting-tables each having a stop for determining the position of a record-tablet on the table, with an identical record-tablet for each table and each provided with a notch identically located in relation to the same selected portion of the record-groove and adapted for engagement by the stop, substantially as described.

12. The combination of a gramophone record-tablet formed with a peripheral notch, with a supporting-table for the tablet provided with a stop for engagement with the notch in the tablet, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH SANDERS.

Witnesses:

F. T. CHAPMAN,
EDWIN S. CLARKSON.