Sept. 7, 1937. A. N. GOLDSMITH 2,092,668

PHONOGRAPHIC APPARATUS

Filed May 28, 1936 2 Sheets-Sheet 1

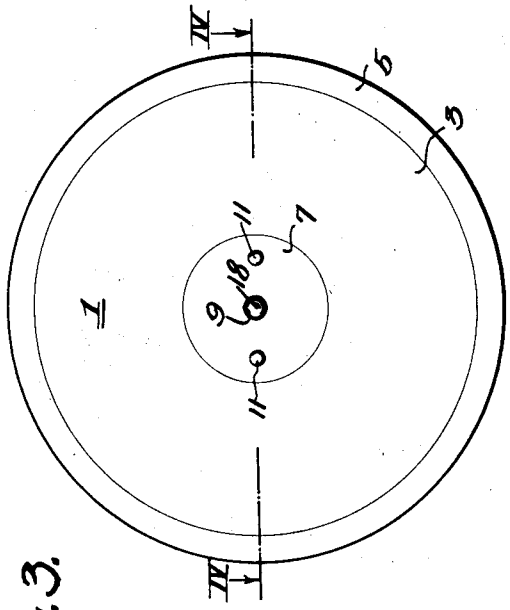


Fig. 3.

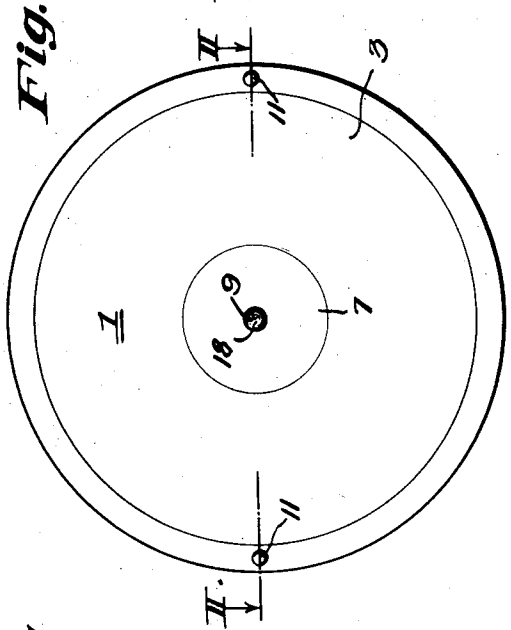


Fig. 1

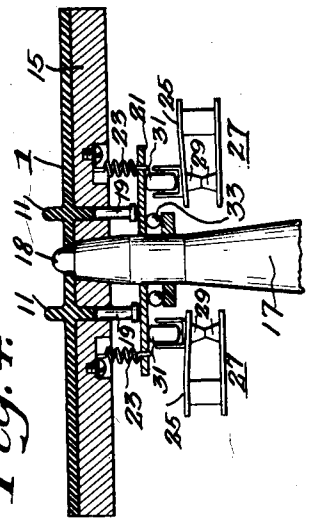


Fig. 4.

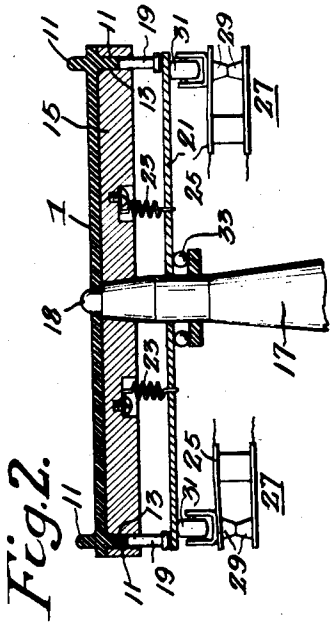


Fig. 2.

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PHONOGRAPHIC APPARATUS

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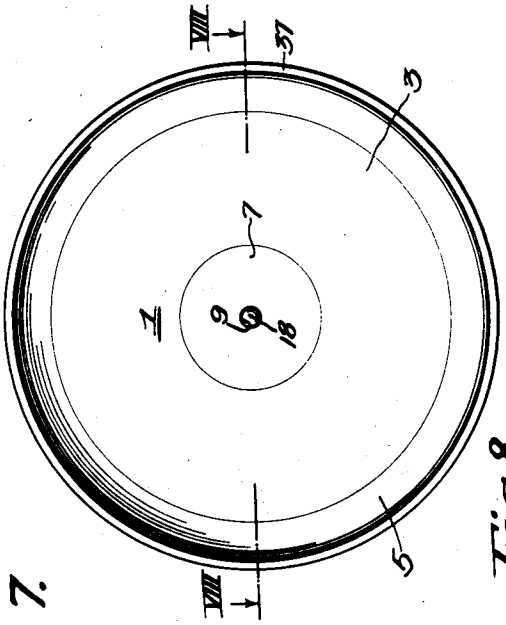


Fig. 7.

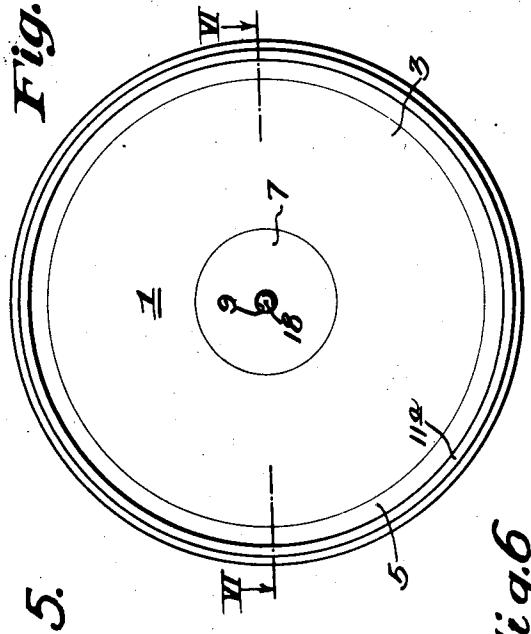


Fig.5.

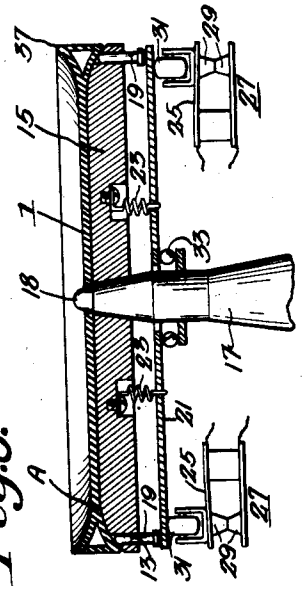


Fig.8.

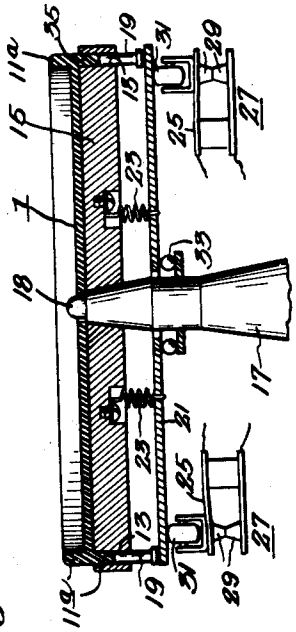


Fig.6

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PHONOGRAPHIC APPARATUS

Alfred N. Goldsmith, New York, N. Y.

Application May 28, 1936, Serial No. 82,371

19 Claims. (Cl. 274—9)

This invention relates to phonographic apparatus, and more particularly to means for controlling the operating conditions of a phonograph adapted to play various types of records, the present invention being a variation of that disclosed in my copending application, Serial No. 728,238, filed May 31, 1934.

In my said copending application, I have pointed out that there are many varieties of phonograph records in commercial use at the present time and that additional variations may be expected to appear in the future. For example, disc records operating at 78 R. P. M. and at 33⅓ R. P. M. are both well known, as are also records with either the lateral cut grooves or with the hill-and-dale type grooves. Also, certain records have been made to cover a relatively narrow frequency range, as from 120 to 3800 cycles, while others have been formed over an extended frequency range, as from 60 to 7000 cycles, while the better types of records which have come into commercial use in recent years and others which are expected eventually to make their appearance have included a recorded range up to approximately 10,000 cycles.

Each of the foregoing types of records presents special problems which must be met for their satisfactory reproduction. Thus, the records formed with lateral cut grooves require the use of a scanning element wherein the stylus moves from side to side, or across the groove, as the stylus traverses the record, while records formed with grooves of the hill-and-dale variety require the use of a scanning element wherein the stylus moves perpendicularly to the record. Similarly, with records having a frequency range of from 120 to 3800 cycles, for example, an amplifier must be used which will filter out the "scratch" and other relatively higher non-recorded or unintentionally and, perhaps, unavoidably recorded frequencies usually recognized as "surface noise". On the other hand, with records having a much wider recorded frequency range, it is necessary that the amplifier have a proper response covering at least the entire recorded range if satisfactory reproduction is to be obtained. It is also obvious that records having a rotational speed of 78 R. P. M. cannot be satisfactorily reproduced on phonographs which operate only at 33⅓ R. P. M. or at some other speed, and vice versa. The desirability of having a single phonograph which can play all types of records will at once be obvious, but if such a phonograph is to be provided which will satisfactorily play any type of record presented to it, provision must be made therein not only to accommodate every type of record, but it must be readily adjustable to proper operating condition depending upon the particular type of record presented to it at any time.

In my aforementioned copending application, I have disclosed and claimed a novel form of phonograph wherein all parts are included essential to the proper reproduction of any type of disc record. To insure the proper conditioning of the apparatus to play any particular record which may be presented to it, I have formed the spindle of two or more parts, one of which is fixed in an axial direction, and at least one other of which is movable in an axial direction and normally constrained to an elevated position flush with the top of the spindle. The spindle may have an outside diameter like that of any conventional spindle, and the movable element thereof may, for example, comprise a segment which can be depressed by a lug or projection on a specially formed record having a projection extending into the conventional circular centering hole. When such a record is placed on the turntable, the projection thereon depresses the movable segment to complete an electrical circuit which may be arranged to automatically control the selection of the appropriate pick-up device and the appropriate needle pressure, the appropriate amplifier circuit, the desired speed of rotation of the turntable, etc., all as fully disclosed in my aforesaid copending application. Under certain conditions, however, it may be preferable to retain the conventional spindle, in which case resort must be had to other means for controlling the operating condition of the apparatus.

The primary object of my present invention, therefore, is to provide improved means for controlling the operating condition of a phonograph of the type described.

More specifically, it is an object of my invention to provide improved means of controlling the operation of a phonograph as aforesaid, which means will be entirely independent of the spindle of the phonograph.

Another object of my invention is to provide an improved record and turntable arrangement for controlling the operation of a phonograph, the turntable being such that it will receive and rotate a conventional record in the conventional manner, but which will, with equal facility, receive a specially formed record, and, in cooperation therewith, automatically condition the phonograph to properly reproduce that particular record.

Still another and very important object of my

present invention is to provide an improved phonograph record of the disc type which will effectively cooperate with a turntable of the type set forth and for the purposes heretofore indicated.

A further object of my invention is to provide improved means for preventing the new types of records from being injured by any attempt to play them on conventional phonographs or other phonographs not designed for their proper reproduction.

It is a further object of my invention to provide an improved record and turntable as aforesaid, both of which are simple in construction, readily lend themselves to the requirements of economical manufacture, and are highly efficient in operation.

In accordance with my present invention, I form a disc record with one or more studs or with annual projections on one or both surfaces thereof, depending upon whether the record is of the so-called "single-sided" or "double-sided" type, and provide a turntable with a corresponding number of openings into which the studs or the like are adapted to fit. Slidably fitted in the turntable openings are circuit controlling members which, upon being depressed by the lugs of the record when the record is placed on the turntable, effect the closing of a switch in an electric circuit which controls the automatic selection of those parts of the reproducing mechanism that are appropriate for the particular record to be played. The turntable carried circuit controlling elements of my present invention correspond to the movable element of the spindle disclosed in my above-mentioned copending application. Since these elements are carried by the turntable in my present invention, the spindle may be of the conventional type. Also, since the records must be provided with projections for actuating these elements, it will be obvious that when any other record, such as a conventional record, is placed upon the turntable, the operating condition or characteristics of the phonograph, as originally set, will not be disturbed. Also, by making the height of the projections or studs on my novel record greater than the length of the spindle tip which protrudes above the turntable in conventional phonographs, it will be impossible to fit my novel records to conventional turntable arrangements for playing.

The novel features that I consider characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, together with additional objects and advantages thereof, will best be understood from the following description of several embodiments thereof when read in connection with the accompanying drawings, in which

Figure 1 is a plan view of one form of my novel record in operative relation to an associated turntable,

Figure 2 is a central sectional view thereof taken on the line II—II,

Figures 3, 5, and 7 are plan views similar to Figure 1, but showing several modifications of my novel record, and

Figures 4, 6, and 8 are views similar to Figure 2 taken, respectively, on the lines IV—IV, VI—VI, and VIII—VIII of Figures 3, 5, and 7.

Referring more specifically to the drawings, wherein similar reference characters designate corresponding parts throughout, there is shown, in Figures 1 and 2, a disc record 1 (preferably a slow speed, wide range record) having a grooved area 3 between the ungrooved, annular, peripheral area 5 and the ungrooved, central area 7, the latter being provided with the usual centering hole 9. The record 1 is formed with two pairs of integral, diametrically opposed and oppositely extending projections or studs 11 thereon adapted to be fitted into a pair of correspondingly placed openings 13 which extend through a turntable 15 mounted on a conventional spindle 17 the tip portion 18 of which extends above the turntable top a distance less than the length of any of the studs 11. Thus, unless the lower studs 11 are inserted into the openings 13, the spindle tip 18 will not extend into the center hole 9 of the record and consequently there will be no means of retaining the record on the turntable when it rotates. Moreover, unless the lower studs 11 are inserted into the openings 13, they will rest on top of the turntable and the record will tilt to an angular position with respect to the turntable by reason of the location of the studs 11 thereon. In this position, therefore, it will be impossible to play the record.

Slidably fitted in each of the openings 13 is a pin 19 which rests on a supporting member 21 constrained toward the turntable 15 by a plurality of springs 23. The springs 23 are of sufficient strength to normally maintain the member 21 in raised position, but when a record of the type shown in Figs. 1 and 2 is placed upon the turntable with the studs 11 inserted in the openings 13, the weight of the record will be sufficient to depress the pins 19 and the plate 21 to the lowered position shown. In this position, the plate 21 will depress the spring blades 25 of one or more switches 27 to close the contacts 29 thereof and thereby complete one or more electric circuits (not shown) which are arranged to automatically control any predetermined reproducing characteristics of the phonograph and in any predetermined sequence, all as fully disclosed in my aforesaid copending application. The blades 25 may each carry a roller 31 with which the supporting member 21 engages in its lowered position to depress the spring blades 25, the roller 31 serving, also, to reduce friction as the member 21 rotates, and a ball or other suitable bearing 33 may also be provided for the latter purpose.

The modification of my invention shown in Figs. 3 and 4 is very similar to that shown in Figs. 1 and 2. In this modification, however, the studs 11 are formed on the central area 7 instead of on the peripheral area 5 as in Fig. 1, but the operation is exactly the same as in the modification of Figs. 1 and 2. Obviously, the studs 11 may be placed in any desired position on the record. For example, some may be placed on the central area 7 and some on the peripheral area 5. In records of the type having several selections recorded thereon at spaced intervals, the studs 11 may be formed on the ungrooved areas between the grooved or recorded portions. If desired, only a single stud may be used, but in such case, it should be of sufficient height to prevent the record from being threaded on the spindle tip 18 except when the stud is inserted into the opening 13. In any case, the studs 11 must, of course, be radially spaced from the center hole of the record, and where more than one stud is used on each surface of the record, they should be circumferentially spaced from each other to an extent dictated by the exigencies of any particular situation.

In the modifications of my invention thus far described, the records must be so placed on their

turntables that the studs 11 will be aligned with the openings 13, and if such a record is originally set on the turntable in any other position, it must be rotated one way or the other relative to the turntable until the studs 11 overlie the openings 13. This objection is entirely overcome by forming the record with a projecting annular flange or rim 11a on each surface thereof at the peripheral area 5, as shown in Figs. 5 and 6, the flanges 11a each being higher than the spindle tip 18 and preferably concentric with the record 1. The turntable 15 is then provided with an annular groove 35 with which the openings 13 communicate and into which the pins 19 normally project. However, when a record such as shown in Figs. 5 and 6 is deposited on the turntable, one or the other of the projecting rims 11a will enter the groove 35 and depress the pins 19 to effect closing of the switches 27 in the manner heretofore described.

The above mentioned objection to the modifications of Figs. 1 to 4 may also be overcome by using a turntable such as that shown in Fig. 6 and by connecting the upper ends of the pins 19 by an annular ring resting in the groove 35. With this construction, the records of Figs. 1 to 4 will be properly received by the turntable regardless of whether or not the studs 11 overlie the pins 19 and will lie flat on the turntable for suitable reproduction. Obviously, the peripheral flanges 11a could be replaced by cylindrical projections on the central areas 5, in which case the turntable groove 35 would be formed adjacent the turntable center and the pins 19 disposed as in Figure 4.

Figures 7 and 8 show a further modification of my present invention wherein the record 1 is gradually increased in thickness at the peripheral area 5 to provide a thickened rim portion 37 half the thickness of which exceeds the length of the spindle tip 18 of conventional phonographs. For such records, the turntable 15 is flat from the center radially outwardly to a circle represented approximately by the point A, after which the turntable edge portion tapers off on a contour corresponding to that of the record, the openings 13 being formed in the turntable under the tapering portion, as clearly shown in Fig. 8. Unless the spindle tip 18 is unusually high, the last described record cannot be played on a flat turntable and can only be played on a turntable like that shown. On the other hand, a flat record can be readily accommodated on and played from a turntable of this type. If desired, the thickened portion 37 of the record may be formed on the central area 5, or, in the case of a multi-selection record, it may even be formed between the recorded portions of the record, in which case the several thickened portions will also serve to clearly set apart the various recorded portions of the record. In any case, the turntable should be correspondingly shaped to readily accommodate my improved record.

From the foregoing, it will be noted that I have provided a novel construction of record and turntable whereby suitable control may be exercised over a phonograph adapted to play various types of records, the controlling studs or other projections being located on the record on the surface thereof opposite that which is to be played. It will also be noted that my improved records safeguard themselves against damage which may be caused by playing them on phonographs not designed for their playing, since they will not engage the spindles of conventional turntables, nor will they lie horizontally thereon if formed as shown in Figs. 1 to 4. At the same time, turntables formed in accordance with my present invention can be used in conjunction with either my improved records or with the conventional flat record discs. It will also be apparent to those skilled in the art that instead of controlling the phonograph electrically, it may be controlled entirely mechanically with the aid of my present invention.

Although I have shown and described several embodiments of my invention, I am fully aware that many other modifications thereof are possible, as are also numerous changes in the specific forms herein disclosed. I desire, therefore, that my invention shall not be limited except insofar as is necessitated by the prior art and by the spirit of the appended claims.

I claim as my invention:

1. In a phonograph, the combination of a preformed record of the disc type having a portion extending out of the plane thereof, and a turntable for said record having a record receiving surface correspondingly formed for accommodation of said outwardly extending portion of the record.

2. In a phonograph, the combination of a disc record having at least one projection thereon, and a turntable for said record having an opening for the reception of said projection.

3. In a phonograph, the combination of a disc record having at least one projection thereon extending out of the plane thereof, and a turntable for said record having an opening for the reception of said projection.

4. In a phonograph, the combination of a disc record having at least one projection thereon extending out of the plane thereof, a record centering spindle, and a turntable mounted on said spindle, said spindle extending above said turntable a distance less than the length of said projection, and said turntable having an opening therein for the reception of said projection.

5. The invention set forth in claim 3 characterized in that said record projection comprises a stud formed integrally therewith.

6. The invention set forth in claim 3 characterized in that said record projection comprises a stud formed integrally therewith and characterized further in that said record has at least one grooved surface, said stud being formed on the surface of the record opposite to the grooved surface.

7. The invention set forth in claim 3 characterized in that said record projection comprises an annular member formed integrally therewith.

8. The invention set forth in claim 3 characterized in that said record projection comprises an annular member formed integrally and concentrically therewith, and characterized further in that said record has at least one grooved surface, said annular member being formed on the surface of the record opposite to the grooved surface.

9. In a phonograph, the combination of a disc record having a portion thereof thicker than another portion, and a turntable for said record, said turntable having a thinned portion for accommodation of said thickened portion of the record.

10. The invention set forth in claim 9 characterized in that said thick record portion is constituted by a projection on the record of gradually increasing cross-section in a radial direction of the record, and said thinned turntable

portion is constituted by a corresponding recession thereof of gradually decreasing cross section in a radial direction, the rate of taper of both said gradually changing portions being substantially the same and said portions being superposed one over the other when the record is on the turntable.

11. A phonograph record comprising a disc having a grooved surface, and at least one projection on the opposite surface thereof for controlling the operating condition of a phonograph.

12. A phonograph record comprising a disc having a grooved surface, and a plurality of integrally formed studs on the opposite surface thereof for controlling the operating condition of a phonograph, said studs being spaced radially from the center of the record and circumferentially about the record with respect to each other.

13. A double-faced phonograph record comprising a disc having a grooved area and an ungrooved area on each surface thereof, and at least one projection on the ungrooved area of each of said surfaces for controlling the operating condition of a phonograph, the projections on each surface of said record cooperating with the grooved areas on the opposite surfaces of the record.

14. A phonograph turntable comprising a record supporting member and means movably carried by said member for controlling the operating condition of a phonograph.

15. A phonograph turntable comprising a record supporting member having at least one opening extending therethrough, and means movably mounted in said opening for controlling the operating condition of a phonograph.

16. In a phonograph, the combination of a turntable, an electric circuit arranged to control the operating condition of the phonograph, and means movably carried by said turntable for selectively opening and closing said circuit whereby to control the phonograph.

17. In a phonograph, the combination of a turntable having an opening extending therethrough, a pin movably carried in said opening and normally occupying an elevated position, a record, and means on the record adapted to cooperate with said pin when the record is mounted in playing position on said turntable for depressing said pin and retaining it in depressed position.

18. In a phonograph, the combination of a turntable having an opening extending therethrough, an electric circuit arranged to control the operating condition of the phonograph, a pin movably carried in said opening and adapted, when in lowered position, to effect the closing of said circuit, means constantly urging said pin to elevated position within said opening, a record, and a projection on said record adapted to be received in said opening when said record is mounted in playing position on said turntable for depressing said pin whereby to close said circuit.

19. In a phonograph, the combination of a turntable having at least one opening extending therethrough, said opening being spaced radially from the center of the turntable, an electric circuit including a switch for controlling the operating condition of the phonograph, a pin movably carried in said opening and adapted, when in lowered position, to effect closing of said switch, means constantly urging said pin to elevated position within said opening, and a record having a playing surface and a projection on the opposite surface thereof, said projection being radially spaced from the record center the same distance as said turntable opening is spaced from its center whereby, when said record is mounted on said turntable in playing position, said projection enters said opening and depresses said pin to effect closing of said switch.

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