Jan. 10, 1928. 1,656,085

J. S. SPAINHOUR

RADIOPHONOGRAPH

Filed Nov. 27, 1925 2 Sheets-Sheet 1

FIG. 1.

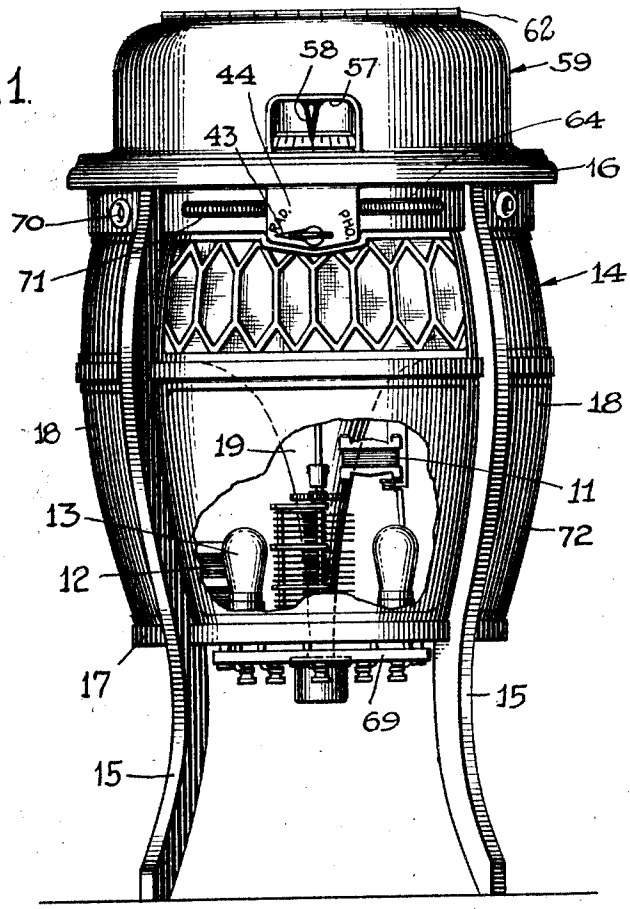


FIG. 3.

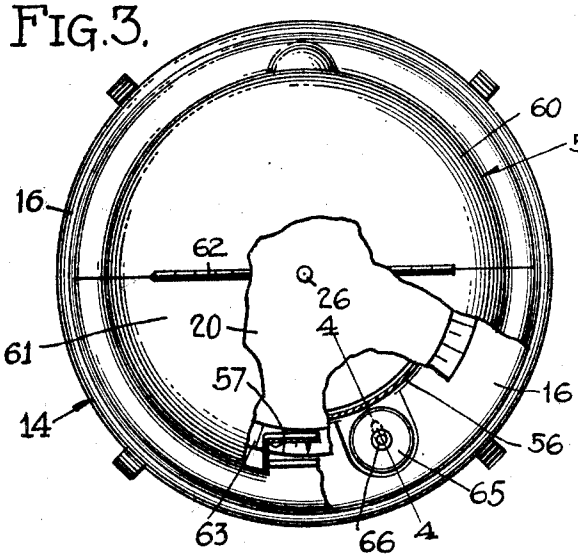
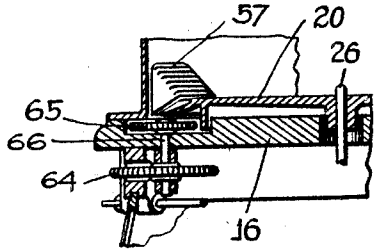


FIG. 4.



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FIG. 2.

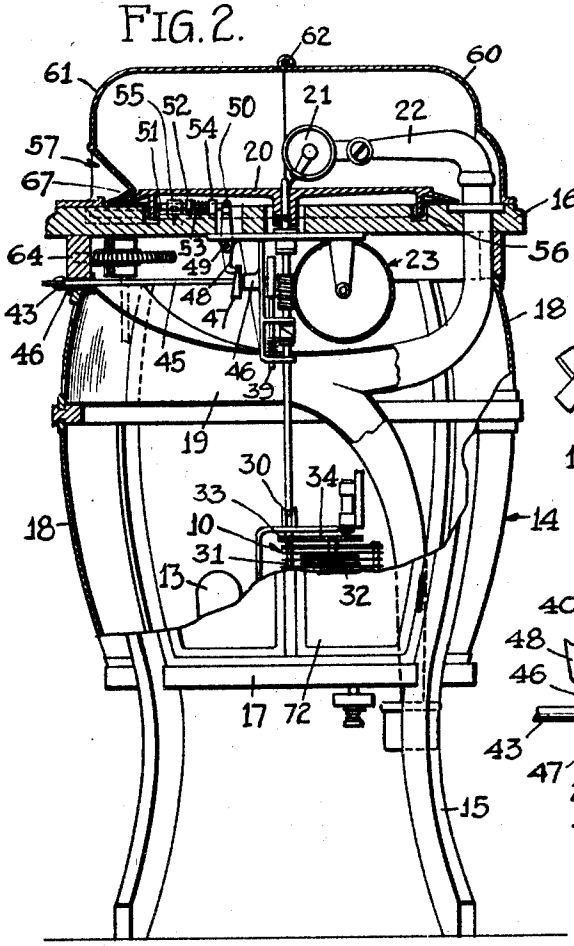


FIG. 5.

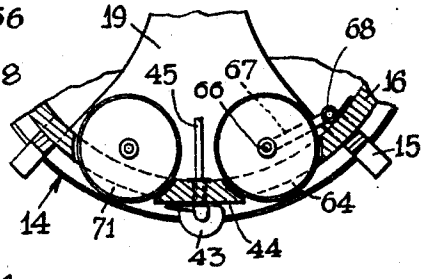


FIG. 6.

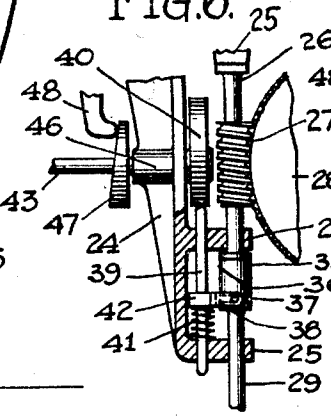


FIG. 7.

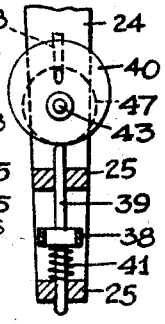
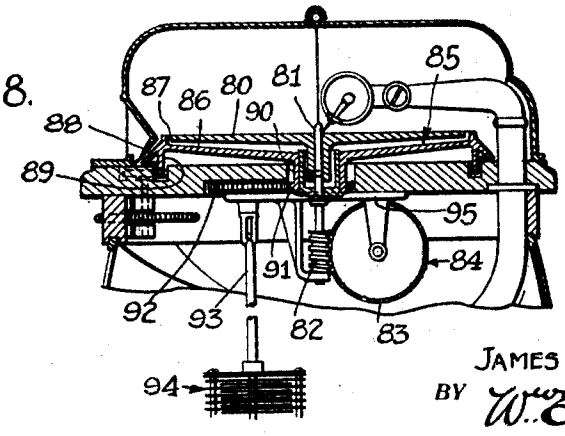


FIG. 8.



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Patented Jan. 10, 1928. 1,656,085

UNITED STATES PATENT OFFICE.

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RADIOPHONOGRAPH.

Application filed November 27, 1925. Serial No. 71,607.

My invention relates to radio phonographs.

Radio phonographs, so-called, have heretofore been used. No true combination, however, prior to the present invention, of a radio receiving unit and a phonograph unit, has ever existed. The nearest approach thereto, of which I am aware, is that resulting from the mere joint enclosure of the two distinctly separate and wholly independently acting units or instruments in a common cabinet or housing.

The principal object of the present invention is to effect such combination. Instead of constructing the radio receiving set as a single unit and associating with it a separate and complete phonograph unit, said two units are built in combination. That is to say, certain parts or elements of the radio phonograph, for the reproduction of sound mechanically, function as phonograph parts, whereas, such part or parts, in the use of the instrument as a radio unit, function in a different capacity, i. e., as necessary parts of the radio receiving apparatus. The advantages of a combination instrument thus characterized are obvious.

A more specific object of the invention is to so interconnect the revoluble table of the conventional type phonograph with the variable condenser of any conventional type electrical radio circuit as to admit of the use of the former, either as a phonograph record table in the ordinary manner or as a tuning condenser dial. Being relatively large, the record table, if used as a tuning condenser dial, is advantageous in that the finesse of control of the radio unit is very appreciably augmented.

A further object of the invention is the provision of a simple and positive means for "cutting in" or "cutting out", as it were, the record table or tuning condenser dial of the instrument to accordingly render it useful or essential in either capacity desired.

Other objects and advantages of the invention, of which there are many, will be hereinafter set forth.

In the drawings, wherein like reference characters denote like or corresponding parts,

Fig. 1 is a front elevation of the radio phonograph;

Fig. 2 is a transverse sectional view;

Fig. 3 is a plan view (partly broken away);

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a fragmentary sectional view of the cabinet illustrating the operating mechanism for rotating the tuning condenser dial;

Fig. 6 is an elevation of the clutch and a portion of the operating mechanism thereof;

Fig. 7 is a face view of that part of the clutch operating mechanism illustrated in Fig. 6, and

Fig. 8 is a transverse vertical sectional view of a modified radio phonograph structure.

As intimated, the invention contemplates a phonograph unit and a radio receiving unit in combination. Any character of phonograph unit may be employed. Also, if desired, any character of radio receiving unit may be employed. Tuned radio frequency or stabilized heterodyned radio circuits, using but a single dial, however, are preferred.

In the embodiment of the invention selected for illustration, a radio receiving unit comprising such well known radio instrumentalities as a condenser 10, a transformer 11, a coil 12, and one or more tubes 13, is shown. The condenser 10 is preferably of the three-gang variable type. Such a condenser is preferred in that it gives synchronized capacity in tuning three radio frequency transformers throughout the broadcasting range and at all points (within certain limits) in resonance with the incoming wave or waves. Other types of condenser, however, may be used.

Both the phonograph unit and the radio receiving unit are enclosed in a suitable cabinet, designated in its entirety, as 14. Such cabinet comprises legs 15 (four in number), a cabinet top 16, a base portion 17, side walls or panels 18, and a built in tone chamber or horn 19 of any conventional form. The phonograph unit, except for the revolving table 20, is of ordinary construction. It includes, in addition to the tone chamber 19, a reproducer 21, a swinging tone arm 22 and a spring or other type motor 23. The motor 23 is supported beneath the cabinet top 16 by an appropriate

casting 24 so formed and constructed as to provide, within the cabinet, three or more bearings 25. The two upper bearings of the casting 24 have journaled therein a vertical drive shaft 26 connected by a worm 27 and a gear 28 with the spring or other type motor 23. Said shaft 26, at its upper end, is carried thru and beyond the cabinet top to extend thereabove as shown. Upon its extended end, the revolving table 20 is mounted. In the use of the combination radio phonograph as a phonograph unit, said table 20 functions solely as a record table.

On the inside of the cabinet 14, and in axial alignment with the drive shaft 26, I provide a second shaft 29. This shaft 29 is fastened slidably, as at 30, to one of two grid-shafts 31 and 32, each having mounted thereon a multiple number of co-acting grid-plates. Collectively, the grid-plates of the two shafts 31 and 32 constitute the variable condenser 10. To relatively move said plates, meshing gears 33 and 34 are provided. One of said gears, the gear 33, is mounted on the grid-shaft 31, whereas the other of said gears, the gear 34, is mounted on the grid-shaft 32. Obviously, therefore, to relatively move or adjust such co-acting grid-plates, all that is necessary is to rotate or turn the shaft 29.

The shaft 29, in addition to being rotatable, is also axially movable. At its inner or upper end it is slidably journaled in the lower bearing 25 of the casting. The sliding or axial movement of said shaft 29 is adapted to make and break a clutch connection between said shaft and the drive shaft 26, provided at said inner or upper shaft end. This clutch connection (see Fig. 6) comprises co-acting clutch members 35 and 36 carried respectively by said shafts 26 and 29. One of said clutch members, i. e., the clutch member carried by the shaft 29, has formed therein an annular groove 37. Within this groove 37 the forked end of an arm 38 fastened to a vertically sliding rod 39 is seated. Said rod 39 is mounted at one side of the clutch connection and is adapted to be operated by an eccentric 40 having its peripheral surface in bearing contact with said rod. A spring 41, encircling the rod 39 and bearing at its opposite end against an abutment 42 on said rod and against the lower bearing 35 of the casting, constantly urges said rod 39 toward, and maintains at all times contact between, said rod and said eccentric.

The operating mechanism for clutching and declutching the aligned shafts 26 and 29 is carried without the cabinet. It comprises a control lever 43 which may or may not be positioned in front of and closely adjacent to the cabinet top. Preferably said control lever has associated with it an appropriate dial 44 for indicating which of the two settings herein provided for is at the time effective. The lever 43, in one position of adjustment, effects and at the same time indicates a clutched shaft condition, whereas in a different position of adjustment said lever effects and indicates a declutched shaft condition. The shafts 26 and 29, when clutched, admit of the use of the radio phonograph as a radio receiving unit, and when declutched, admit of its use as a phonograph.

Both the control lever 43 and the operating eccentric 40 are mounted on a shaft 45 journaled in bearings 46 formed respectively on the underside of the cabinet top 16 and in the casting 24. Said shaft 45 also carries, intermediately of its ends, a cam 47. This cam 47, or rather the working face thereof, is in bearing contact with the free end of a brake lever 48, fulcrumed as at 49 to, and extended vertically thru the casting 24 for projection above the cabinet top. At its projected or upper end said lever 48 has pivotally fastened to it, as at 50, a brake rod 51. This rod 51, from said lever 48, extends outwardly toward the periphery of the table 20 between it (the table) and the cabinet top. Like the rod 39, the rod 51 has formed thereon an abutment 52 against which a spring 53, encircling the rod, bears at one end. Said spring 53, at its opposite end, is in bearing contact with a fixed abutment 54 fastened to the cabinet top; the relation of said spring 53 to the rod 51 being such that the latter, regardless of the position of the lever 48, is at all times urged outwardly or toward the table periphery, and the lever 48, at all times, held in bearing contact with its operating cam. If desired, a guide 55 for the brake rod 51 may be provided.

The table 20 is preferably horizontally flat and circular. On its underside and adjacent to its periphery, it is provided with an annular right angle flange 56. This flange, not only reinforces the table 20, but acts also as a brake drum against which the outer or free end of the brake rod 51 frictionally bears. In the operation of the radio phonograph as a radio receiving unit, such frictional contact between the brake rod 51 and the brake drum 56 is sufficient to prevent the free rotation of the table under the action of the motor 23, tho insufficient to prevent its rotation otherwise. The moment, however, said brake rod is withdrawn from its engagement with the brake drum, the table 20 being frictionally released, is immediately conditioned for subsequent use as a phonograph record table.

Except for the provision of a sight opening 57 and an indicator 58, the cabinet cover or top, designated in its entirety as 59, may be of any well known construction. As herein shown, said cover 59 comprises a

fixed part 60 and a removable part 61, the latter being hinged as at 62 to the former. The sight opening 57, it will be noted, is formed in said removable part 61, directly above the control lever 43. To improve visibility, that portion of the cover section 61 in the immediate vicinity of the sight opening, is depressed or carried inwardly so as to overhang the outer edge of the table 20.

The table 20, upon its periphery, is provided with a dial flange 63. This flange 63, as distinguished from the right-angle flange 56, is outwardly and downwardly inclined. Preferably it is formed as an integral part to the table 20 to rotate with it. Its relation to the sight opening 57 is such that the top face of the dial is visible at all times thru said opening. Suitable markings upon the dial flange, in conjunction with the indicator 58, indicate, in the use of the radio phonograph as a radio receiving unit, the various settings of the variable condenser 10. The character of markings impressed or otherwise formed on the dial flange is immaterial.

It is obvious from the above that the table 20 is useable either as a record table in conjunction with the phonograph unit or as a dial in conjunction with the radio receiving unit. To use said table as a phonograph record table, the shafts 26 and 29 should be declutched and the brake rod 51 withdrawn from frictional contact with the brake drum 56. This is accomplished by a single operation, or movement in one direction (as indicated by the dial 44), of the control lever 43. To use said table as a dial in conjunction with the radio receiving unit, a reverse movement of the control lever is required. Such reverse movement of said lever simultaneously operates the brake and clutch inversely. With the friction brake applied and the shafts 26 and 29 properly clutched, a connection between the table (used now as a dial) and the variable condenser 10 is established. Being relatively large, the table 20, used as a dial, admits of finesse of adjustment.

The mechanism for manually rotating the table is best illustrated in Fig. 4. Preferably it is positioned at one side of the control lever 43 in the same relation to the cabinet top. A relatively large disc 64, having a nurled periphery, and a comparatively small disc 65, are used. Both said discs are mounted on a shaft 66 which extends vertically thru the cabinet top directly beneath the overhanging dial flange 63 of the table. The larger disc 64 is carried partly without the cabinet to be conveniently operated by either the thumb or finger in effecting its rotation. The smaller disc 65 is positioned below said dial flange in close proximity to the brake drum 56. In Fig. 5 it will be seen that the shaft 66, instead of being fixed in its relation to the cabinet, is bodily shiftable toward and from the axis of rotation of the drum. Accordingly, as pressure is exerted on the larger disc 64 it, the shaft 66 and the smaller disc 65, are swung inwardly toward the drum axis until the latter, the disc 65, frictionally engages the outer face of said drum. By continuing such inward pressure and simultaneously rotating the disc 65 with the thumb or finger, the table 20 is proportionately turned and its rotative movement directly transmitted, via the shafts 26 and 29, to the variable condenser 10. Arms 67, pivoted as at 68 to the cabinet top, support the shaft 66 in the manner described.

A radio phonograph characterized as herein disclosed may or may not have associated with it (as part of the radio equipment) a panel 69 for the attachment of the aerial and other outside radio connections, a phone jack 70 for head phone use, if and when such use is desired, and a disk 71 for regulating or controlling the volume of sound. Such agencies or instrumentalities, however, form no part of the invention claimed, nor are they in any way essential to the proper operation of the radio receiving unit. Moreover, if desired, a door 72 may be formed in the cabinet 10 that access may be had to the radio parts enclosed therein.

Referring next to the modification of Fig. 8, it will be noted that the clutch mechanism and the brake mechanism of the preferred form of the invention have been dispensed with. The revolving table of said modification, designated as 80, is wholly independent of the dial. As in the preferred form of the invention said table 80 is mounted on a vertical shaft 81 having a worm (82) and gear (83) connection with the motor 84 of the phonograph unit. The dial 85, instead of being formed as an integral part of the table 80, is separately formed and independently rotatable. Said dial comprises a circular body portion 86, recessed as at 87 to accommodate the table; a peripheral portion 88 (downwardly inclined); a depending annular flange portion 89; and a centrally located sleeve or collar portion 90. The collar portion 90 has formed upon it a gear 91 which is adapted to mesh with a relatively large gear 92 mounted on a shaft 93 directly connected with the variable condenser 94 of the radio receiving unit. Preferably, the collar 90 of said dial rests directly upon the casting 95 which supports not only the record table 80 but the mechanism provided for rotating it. Thus organized, said record table and said dial 85 have a common axis of rotation; the shaft 81 of the record table being extended vertically thru the collar or extension of said dial. In all other respects the two forms of the invention are substantially identical.

While I have described my invention in

detail in its present preferred embodiment, it will be obvious to those skilled in the art after understanding my invention, that various changes and modifications may be made therein without departing from the spirit or scope thereof. I aim in the appended claims to cover all such modifications and changes.

What I claim is:

1. The combination, in a radio phonograph, of a phonograph unit, a radio receiving unit including a tuning condenser, a record table for said phonograph unit having associated with it a tuning condenser dial, said record table and its associated tuning condenser dial having a common axis of rotation and selective means operable to admit of the use of said record table as such or of its use as a tuning condenser dial.

2. The combination, in a radio phonograph, of a phonograph unit, a radio receiving unit including a tuning condenser, a record table for said phonograph unit having formed on its periphery a series of graduations, said record table being useable either as a record table with said phonograph unit or as a tuning condenser dial with said radio receiving unit, and means operable to regulate such selective use.

3. The combination, in a radio phonograph, of a radio receiving unit including a tuning condenser, a record table for said phonograph unit having formed on its periphery a series of graduations, said record table being useable either as a record table with said phonograph unit or as a tuning condenser dial with said radio receiving unit, means operable to rotate said record table when used as such with said phonograph unit, and means operable independently of said last mentioned means to rotate said table when used as a tuning condenser dial.

4. The combination, in a radio phonograph, of a phonograph unit, a radio receiving unit, including a variable condenser and an operating shaft therefor, a table common to both said units and useable either as a record table in conjunction with the phonograph unit or as a tuning condenser dial in conjunction with the radio receiving unit, a connection between said table and said condenser operating shaft, and mechanism operable to make or break said connection.

5. The combination in a radio phonograph, of a phonograph unit, a radio receiving unit, a table common to both said units and useable either as a record table in conjunction with the phonograph unit or as a dial in conjunction with the radio receiving unit, mechanism operable to regulate such use, and a table brake operable in conjunction with said mechanism.

6. The combination, in a radio phonograph, of a phonograph unit, a radio receiving unit, a table common to both said units and useable either as a record table in conjunction with the phonograph unit or as a dial in conjunction with the radio receiving unit, mechanism operable to regulate such use, a table brake, and means for operating said brake simultaneously with the operation of said mechanism.

7. The combination, in a radio phonograph, a phonograph unit, a radio receiving unit, a table common to both said units and useable either as a record table in conjunction with the phonograph unit or as a dial in conjunction with the radio receiving unit, mechanism operable to regulate such use and selective means respectively power operated and manually operated, for rotating said table according to its particular use.

8. The combination, in a radio phonograph, of a cabinet, a phonograph unit housed within said cabinet, a radio receiving unit likewise housed within said cabinet, a revoluble table common to both said units and useable either as a record table in conjunction with the phonograph unit or as a dial in conjunction with the radio receiving unit, means operable to regulate such use, a power means for rotating said table when used as a record table and means manually operable from without said cabinet to rotate said table when said table is used as a dial.

9. The combination, in a radio phonograph, of a cabinet, a phonograph unit housed within said cabinet, a radio receiving unit likewise housed within said cabinet, a revoluble table common to both said units and useable either as a record table in conjunction with the phonograph unit or as a dial in conjunction with the radio receiving unit, a variable condenser disposed beneath said table and within said cabinet and forming a part of said radio unit, a table shaft, a shaft in axial alignment with said table shaft and fastened to said variable condenser, a power means for rotating said table when used as a record table, means manually operable to rotate said table when used as a tuning condenser dial, and mechanism operable to connect or disconnect said aligned shafts according to whether or not said table is used as a record table or as a tuning condenser dial.

In testimony whereof I hereunto affix my signature.

JAMES S. SPAINHOUR.