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E. C. GUEDON

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PHONOGRAPH

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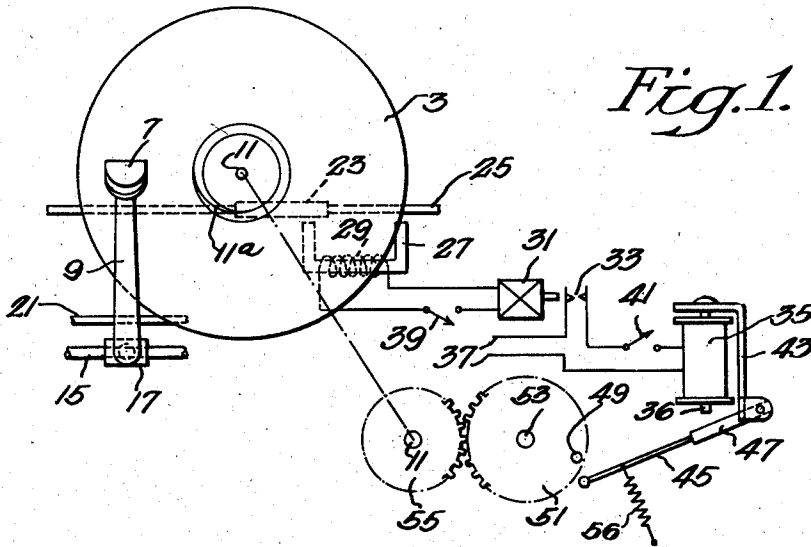


Fig. 1.

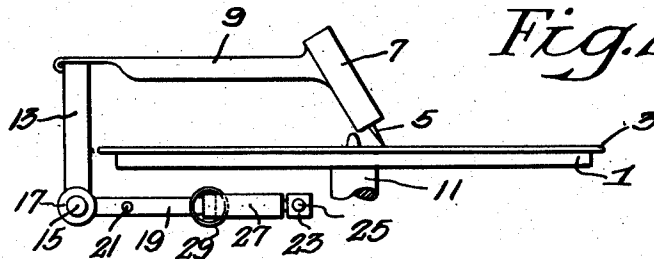


Fig. 2.

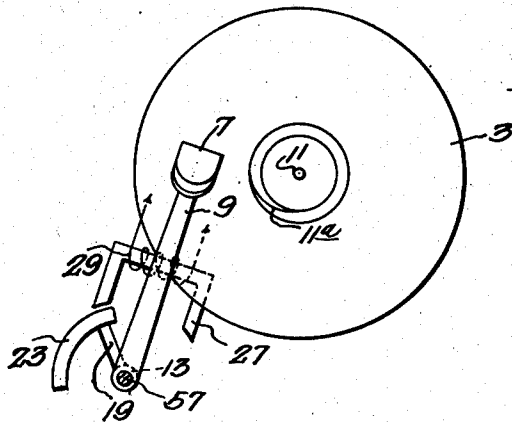


Fig. 3.

Inventor

Emile C. Guedon

J. J. J. J.

Attorney

UNITED STATES PATENT OFFICE

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PHONOGRAPH

Emile C. Guedon, Audubon, N. J., assignor to
Radio Corporation of America, a corporation
of Delaware

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7 Claims. (Cl. 192—118)

This invention relates to phonographs, and more particularly to mechanism therein for automatically stopping rotation of the turntable or for automatically initiating a cycle of automatic operations.

In recent years, considerable advance has been made in the art of recording and reproducing sound with high fidelity, and these advances have made it desirable to employ light-weight pick-up devices and light needle pressure on the records. It has been found that various automatic devices under control of the pick-up arm for operating start and stop mechanisms or other apparatus at the completion of playing of a record impose a heavy load upon the pick-up needles causing undue wear on both the needle and the record, and thereby seriously affecting the quality of reproduction. Another disadvantage of many prior art devices of this sort is that they are relatively noisy and therefore disturbing to the discriminating listener, while many of them are also so arranged that they will not operate unless and until the needle has reached a predetermined radial position on the record in proximity to the center thereof.

The primary object of my invention is to provide improved mechanism for automatically controlling the operating condition of a phonograph, which mechanism will be free from the foregoing objections.

More specifically, it is an object of my present invention to provide improved mechanism of the type mentioned which, while under the control of the pick-up arm or other record scanning member, will not impose any undue load thereon.

Another object of my invention is to provide improved mechanism as aforesaid which is extremely quiet in operation.

Still another object of my invention is to provide improved mechanism of the type set forth which will operate with any standard record regardless of the length of the sound groove thereon, or, in fact, with any type of record which at some point therein causes the scanning member to change its rate of travel thereover.

A further object of my invention is to provide improved mechanism as aforesaid which is simple in construction and highly efficient in use.

According to my invention, the pick-up arm is provided with an armature or magnetic core which is moved at a slow and uniform speed through the magnetic field provided by a suitable magnet as the record is played. As soon, however, as the pick-up arm is actuated by the terminal lead-in or other similar groove of the record, the core is moved more rapidly and the change in flux created thereby through a coil around the magnet produces a current or voltage which is employed to actuate suitable relay mechanism which, in turn, operates the phonograph control mechanism.

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 a description of several embodiments thereof when read in connection with the accompanying drawing in which

Figure 1 is a plan view of one form of my invention,

Figure 2 is a fragmentary side elevation thereof, and

Figure 3 is a plan view of a modified form of my invention.

Referring more specifically to the drawing, wherein similar reference characters designate corresponding parts throughout, I have shown, in Figs. 1 and 2, a turntable 1 which supports a record 3 in operative relation to a needle 5 of a pick-up device 7 carried by a pick-up arm 9, the turntable 1 being driven by a shaft 11 which receives power from a suitable motor (not shown). The pick-up arm 9 is mounted on a post 13 for pivotal movement in a vertical plane and is guided in a horizontal direction along a guide rod 15 on which a bearing or sleeve 17 fixed to the lower end of the post 13 is slidably received.

Extending forwardly from the sleeve 17 is an arm 19 which a second guide rod 21 may assist in supporting, the arm 19 having a core member or armature 23 of magnetic material fixed to its forward end for movement on a third guide rod 25 across the pole faces of a U-shaped magnet 27. A coil 29 of conductive material is wound around the magnet 27 and is connected to a very sensitive relay 31 of any suitable type (for example, a vacuum tube relay) which is arranged, when energized, to close a switch 33 in series with a second and much stronger relay 35 which may be energized from a suitable source, such as mains 37. If desired, a switch 39 may be inserted in circuit with the coil 29 and the relay 31 and a second switch 41 in circuit with the relays 31 and 35 for controlling the respective circuits either manually or automatically.

The relay 35 may be suitably supported, as by a bracket 43 on which a rod 45 carrying a sleeve 47 of magnetic material is pivotally mounted in a position to engage an eccentric pin 49 on a mutilated gear 51. The gear 51 is preferably frictionally coupled to its mounting shaft 53 and is rotatable on the stationary shaft 53 when the frictional resistance offered by the frictional coupling is overcome. A second gear 55 may be mounted on the shaft 11 to be continuously rotatable and to rotate the gear 51 when its teeth are brought into mesh with the teeth of the gear 55.

In operation, the sound groove of the record

3 causes the pick-up arm 9, the rod 13 and the arm 19 to move slowly to the right as viewed in Fig. 1 and to slowly feed the core or armature 23 across the pole faces of the magnet 27 through the flux provided by the magnet. As long as the armature 23 is fed along at a slow rate, the extremely small current induced in the coil 29 is insufficient to operate the relay 31. When, however, the needle reaches the rapid spiral lead-in groove 11a of the record, the core 23 is given a rapid movement which creates a change of flux through the coil 29, and a current or voltage of sufficient magnitude is induced in the coil 29 to actuate the relay 31, assuming the switch 39 to be closed, of course. The relay 31 then closes the switch 33 which allows the coil of the relay 35 to be energized if the switch 41 is also closed, and the core or armature 36 of the relay 35 then attracts the sleeve 47 and draws the rod 45 toward it a distance sufficient to enable the free end of the rod 45 to engage the eccentric pin 49 and impart initial rotation to the gear 51. This causes the teeth of the gear 51 to mesh with the teeth of the gear 55 whereby it continues to rotate and effect a series of automatic operations through suitable mechanism immaterial to the present invention and well known in the prior art, such as removing the pick-up from the turntable, changing records, and replacing the pick-up on the new record. The mechanism may be arranged to open the switch 41 during the cycle whereby the relay 35 is de-energized and the rod 45 reset under the influence of a spring 56, after which the switch 41 is again automatically closed. Eventually, during the cycle, the gear 51 again reaches the position shown in Fig. 1 and its rotation is stopped by the frictional coupling previously mentioned.

In the modification of my invention shown in Fig. 3, the post 19 is pivotally carried by a vertical pin 57 so that the pick-up arm 9 may swing across the record in an arc. The core or armature 23 may then be made somewhat arcuate and the arm 19 considerably shortened to reduce its weight, and the magnet 27 is placed in the position shown. The operation of this form of the invention is identical with that previously described in connection with Fig. 1.

Although I have shown and described but two modifications of my invention, I am fully aware that many other modifications thereof and changes therein are possible. For example, in place of the permanent magnet 27, an electromagnet may be used. Also, instead of operating automatic phonograph mechanism of the type herein referred to, the relay 35 may be made to operate brake mechanism or the switch of an electric driving motor to stop rotation of the turntable. Many other changes will, no doubt, readily suggest themselves to those skilled in the art, and I therefore desire 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 scanning member movable over a record, means for automatically controlling the operating condition of the phonograph, means including a source of flux for rendering said first named means operative to alter the operating condition of the

phonograph, and means movable with said scanning member and operable to affect the flux upon a change in the rate of movement of said scanning member over the record whereby to render said first named means operative.

2. In a phonograph, the combination of a record scanning member movable over a record, means for automatically controlling the operating condition of the phonograph, a source of magnetic flux, means associated with said flux source for rendering said first named means operative to alter the operating condition of the phonograph, and means movable with said scanning member and operable to affect the flux upon a change in the rate of movement of said scanning member over the record whereby to energize said second named means and cause the latter to render said first named means operative.

3. In a phonograph, the combination of a record scanning member movable over a record, means for automatically controlling the operating condition of the phonograph, a source of magnetic flux, a coil of conductive material associated with said source, means associated with said coil adapted to render said control means operative to alter the operating condition of the phonograph, and an armature coupled to and movable in response to said scanning member through said flux, said armature being effective, upon a change in the rate of movement of said scanning member over the record, to create a change of flux through said coil whereby to induce a current therein for energizing said second named means.

4. In a phonograph, the combination of a scanning member movable over a record, means for automatically controlling the operating condition of the phonograph, a permanent magnet, a coil of conductive material around said magnet, means associated with said coil adapted to render said control means operative to alter the operating condition of the phonograph, and an armature coupled to said scanning member, said armature being arranged to be moved by said scanning member through the path of flux supplied by said magnet whereby, upon a change in the rate of movement of said scanning member over the record, said armature creates a change of flux through said coil and causes a current to be induced therein for energizing said second named means.

5. The invention set forth in claim 4 characterized in that said magnet is U-shaped and characterized further in that said armature is arranged to be moved in a path across the pole faces of said magnet.

6. The invention set forth in claim 4 characterized in that the means associated with said coil for rendering the control means operative includes a sensitive relay adapted to be operated by the current induced in said coil.

7. The invention set forth in claim 4 characterized in that the means associated with said coil for rendering the control means operative includes a sensitive relay adapted to be operated by the current induced in said coil, and a second relay adapted to be rendered operative by said first named relay to effect operation of said control means.

EMILE C. GUEDON.