J. & F. J. RUSS.

PHONOGRAPH OR THE LIKE.

APPLICATION FILED SEPT. 1, 1917.

1,259,561.

Patented Mar. 19, 1918.

3 SHEETS—SHEET 1.

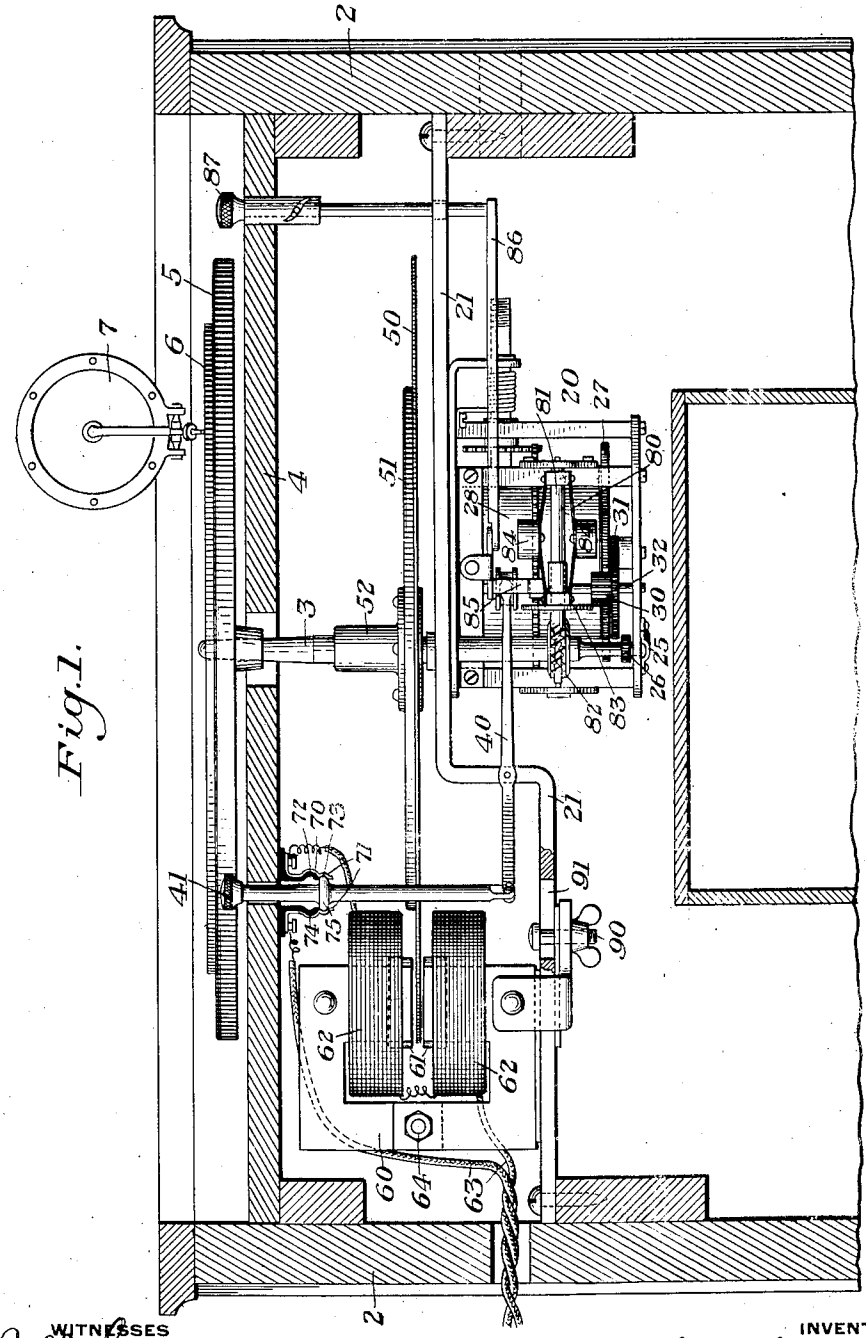


Fig. 1.

WITNESSES

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3 SHEETS—SHEET 2.

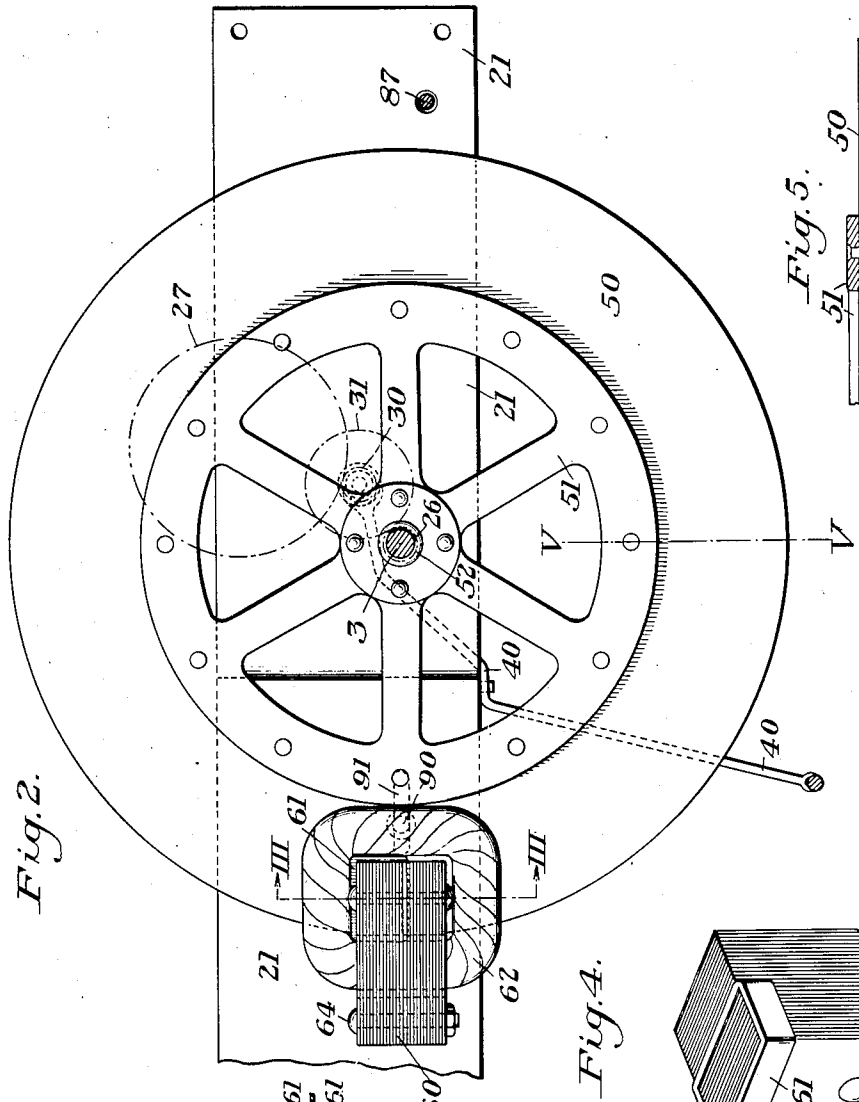


Fig. 2.

Fig. 5.

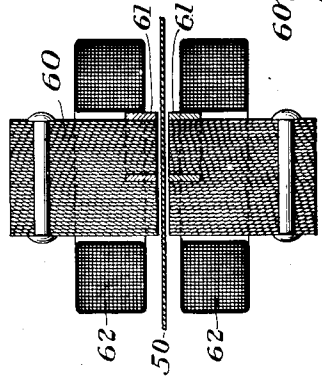


Fig. 3.

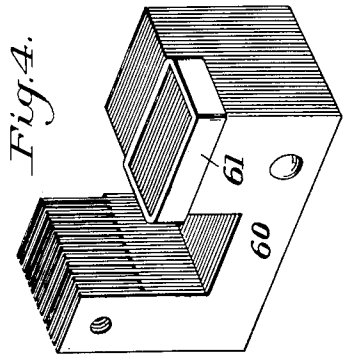


Fig. 4.

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3 SHEETS—SHEET 3.

Fig. 7.

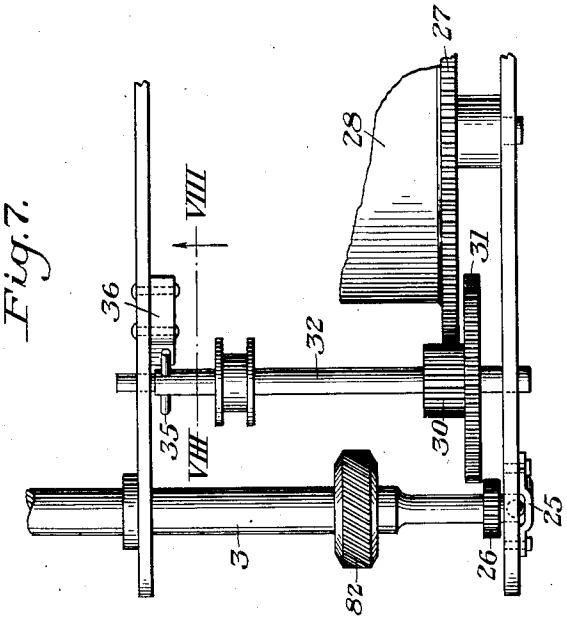


Fig. 6.

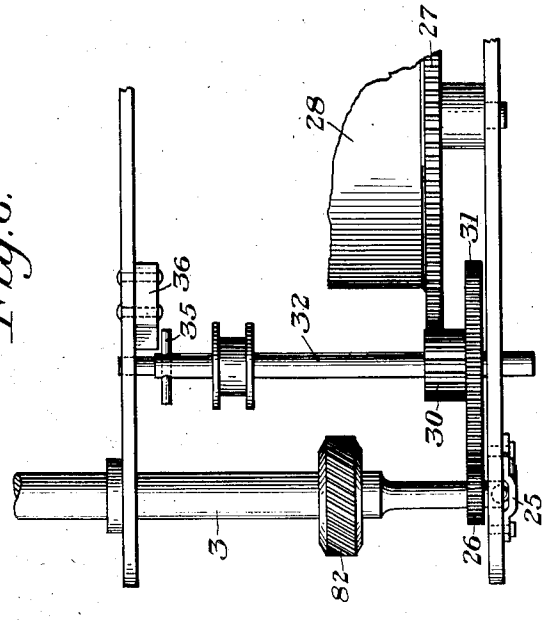


Fig. 9.

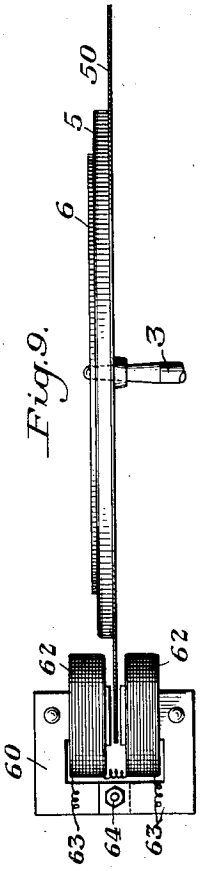
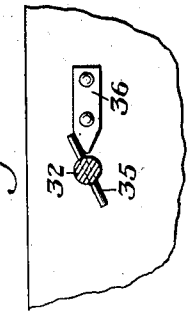


Fig. 8.



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UNITED STATES PATENT OFFICE.

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PHONOGRAPH OR THE LIKE.

1,259,561. Specification of Letters Patent. Patented Mar. 19, 1918.

Application filed September 1, 1917. Serial No. 189,238.

To all whom it may concern:

Be it known that we, JOHN RUSS, a subject of the Emperor of Austria-Hungary, and a resident of North Braddock, Allegheny county, State of Pennsylvania, and FRANK J. RUSS, a citizen of the United States, and a resident of Pittsburgh, Allegheny county, Pennsylvania, have invented a new and useful Improvement in Phonographs or the like, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which:—

Figure 1 is a front elevation taken in section through the casing of a phonograph embodying the invention.

Fig. 2 is a plan view of the driving plate and electro-magnet.

Fig. 3 is a vertical section along the line III—III of Fig. 2.

Fig. 4 is a perspective of one-half of the magnet core.

Fig. 5 is a fragmentary section along the line V—V of Fig. 2.

Figs. 6 and 7 are elevations of the spring motor clutch mechanism.

Fig. 8 is a bottom plan view taken on the line VIII—VIII of Fig. 7, and

Fig. 9 is an elevation showing a modification.

The present invention relates to phonographs or the like in which the object to be rotated, such as the phonograph record, is carried on a rotatable table which is rotated at a comparatively slow and constant speed. The present invention relates more especially to means for driving the rotatable table or record carrier.

Referring to the drawings, in which the invention is illustrated as embodied in a phonograph, the driving mechanism is inclosed in the phonograph casing 2. The rotary spindle 3 projects through the top 4 of the casing and supports the usual record holding table 5. A phonograph disk record 6 is shown as carried on the table. A needle operated reproducer 7 rests on the disk 6, the load radius on the table being in this case the distance from its axis to the point of contact of the reproducer needle.

The spindle 3 has a double drive, it being arranged to be driven either by an electric motor or by a spring motor. The spring motor, indicated generally by the reference numeral 20, is hung from the supporting plate 21. The spring motor may be of any usual construction of spring motor employed for this purpose. The spindle 3 is driven by the spring motor through a clutch mechanism illustrated particularly in Figs. 6 and 7. The spindle 3 carries at its lower end just above the step bearing 25, the pinion 26. The pinion 26 is driven by the gear 27 on the spring carrying drum 28 of the spring motor through a pinion 30 and gear 31, which are carried on a shaft 32. The shaft 32 has a limited endwise movement to throw the gear 31 in and out of mesh with the spindle pinion 26, as shown in Figs. 6 and 7. A stop pin 35 is carried on the shaft 32 and is arranged to be arrested by a stationary stop or abutment 36 when the shaft 32 is raised, as shown in Fig. 7. This prevents the spring motor from running down when it is disconnected from the spindle. The shaft 32 is shifted to connect or disconnect the spring motor from the driving spindle through the lever 40 and operating handle 41.

The spindle 3 is also arranged to be directly driven electrically by means of an annular metallic plate 50, which is supported directly by the spindle 3. As shown in Figs. 1 and 2 of the drawings, the plate 50 is riveted to a spider 51, the hub 52 of which fits around the spindle 3. The annular plate 50 may, however, be otherwise supported by the spindle so as to directly drive it. For example, as shown in Fig. 9, the plate 50 may be carried at the edge of the record carrier 5. While for structural rigidity the plate 50 is preferably supported on the spindle 3 by means of a light but stiff spider, it is obvious that the annular plate 50 might be made in disk form, and the center of the disk be clamped to the spindle 3, and a disk form of plate is intended to be covered by the term "annular" as employed in the claims. The term "annular" as employed in the claims to describe the non-magnetic metallic plate is intended as a term of description and not of limitation, and to refer to the active area of the plate, and therefore to include any form of plate which has an annular area acted upon by the driving electro-magnet.

The plate 50 is driven by means of a

shaded pole alternating current electro-magnet 60 carried on the supporting plate 21. The electro-magnet 60 has a C-shaped laminated iron core. The pole pieces of the core extend into close proximity with the opposite sides of the plate 50. The pole pieces have copper straps 61 around one-half thereof to produce a "shading" or difference in phase for rotating the plate 50 by the eddy currents induced therein. The magnet coils 62 are carried by the pole pieces and are supplied through the lead wires 63 with single phase alternating current such as is usually employed for house lighting.

As shown in Figs. 1 and 4 the magnet core is formed in two parts, the laminations being arranged so that the core is split at the back, the plates lapping together as shown and being clamped by the bolt 64. This permits the magnet core to be readily assembled or disassembled to mount or replace the coils 62.

A switch 70 is inserted in one of the lead wires 63. The switch 70 may be of any suitable type. In the drawings the switch 70 is indicated as two spring plates 71 having upper and lower socket recesses 72 and 73. The recess 72 is lined with insulation 74. A conducting button 75 carried on the rod of the handle 41 fits in the sockets 72 and 73. When the handle 41 is raised the conducting button 75 is pushed into the upper socket 72 and the electric circuit is broken. When the handle 41 is pressed down the button 75 is pushed into the socket 73 and the circuit closed. The spring sockets 72 and 73 also serve to hold the handle 41 in raised or lowered position. When the handle 41 is raised to connect the spring motor to the spindle 3, the circuit of the electro-magnet is broken so that the operator cannot drive the record carrier electrically. When the handle 41 is depressed disconnecting the spring motor, the electro-magnet circuit is closed and the phonograph is in condition to be driven electrically when the current is switched on. When the electro-magnet 60 is deënergized, the plate 50 is driven idly and offers no resistance to the drive furnished by the spring motor. As shown in the drawings, the plate 50 is the only moving part in the electric drive, and as the plate 50 is supported directly by the spindle 3 without any gearing or clutch connections, no resistance is offered thereby to the rotation of the record carrier when the spring motor drives it.

The speed of rotation of the record carrier is accurately adjusted and maintained by means of a spring governor 80. The spring governor 80 may be of any usual construction. In the drawings it is indicated as comprising a horizontal spindle 81 driven by means of worm gear 82 from the spindle 3. A friction plate 83 is moved along the spindle by means of the spring supported weights 84. A brake having a surface of felt or the like is carried on the end of an arm 85, the position of which may be adjusted by means of a lever 86 and handle 87. When the speed of rotation reaches normal the disk 83 is brought against the brake and the speed is frictionally held at the right point. The speed may be varied by the handle 87, as will be understood by those skilled in this art.

The spring governor 80 is always operatively connected with the spindle 3 so as to furnish a common governor for both the spring motor and the electric drive. Both the spring motor 20 and the spring governor 80 are preferably of standard type now used in phonographs. It will be apparent, therefore, that by the arrangement above indicated, the auxiliary electric drive can be added with but slight change from the standard parts.

The speed at which the record carrier is electrically driven may also be varied adjusting the magnet 60 radially of the plate 50. For this purpose a clamping bolt 90 and slot 91 are indicated. When a light load, such as that of a phonograph needle is carried, it is found that by moving the magnet 60 toward the axis of the plate 50, the angular speed of rotation is increased and vice versa. Under all conditions a marked decrease in speed may be obtained by moving the magnetic pole pieces partially off the edge of the plate.

As shown, the record carrying table 5 and the plate 50 are both carried in the spindle 3 so that the record carrier is driven by the motor plate 50 directly and without any intermediate connection. The plate 50 is relatively large, having approximately the same diameter as the record table 5, which is usually about 10 or 12 inches. This permits the necessary driving torque at the low plate speed required. The torque has been found amply sufficient to play the large 14 inch Pathé records. The magnet 60 may, if desired, be constructed and adjusted so as to put little, if any duty on the spring governor 20. The magnet 60 tends to drive the plate at a constant speed, and even without the spring governor 20, little, if any, variation in speed is observed as the reproducer needle travels toward the center of the record disk.

The present invention is particularly applicable to phonographs and has been described as applied thereto for rotating at a slow to constant speed the record carrying table. It is obvious, however, that the invention might be applied for slowly rotating carriers or tables upon which other objects to be rotated are carried, such as tables for carrying advertising displays. The present invention is not limited to its illustrated embodiment, but may be embodied in

other structures within the scope of the following claims:

1. In a device of the character described, a rotatable spindle, a carrier supported on the spindle for holding the phonograph record or the like which is to be rotated, an annular non-magnetic metallic plate also supported on the spindle, a shaded pole alternating current magnet for inductively driving the plate, a spring motor, and a combined switch and clutch mechanism for breaking the circuit of the electro-magnet and simultaneously operatively connecting the spring motor with the spindle and for closing the circuit of the electro-magnet and simultaneously disconnecting the spring motor from the spindle; substantially as described.

2. In a device of the character described, the combination of a rotatable spindle, a carrier supported on the spindle for holding the phonograph record or the like which is to be rotated, an annular non-magnetic metallic plate supported on the spindle, and a shaded pole alternating current electro-magnet for inductively driving the plate, a spring motor, a clutch for operatively connecting and disconnecting the motor and spindle, and a speed governor connected with the spindle for controlling the speed of both the spring and the electric drive; substantially as described.

3. In a device of the character described, the combination of a rotary spindle, a carrier supported on the spindle for holding the phonographic record or the like which is to be rotated, an annular non-magnetic metallic plate supported on the spindle and of a diameter not substantially less than that of the carrier, and a shaded pole alternating current electro-magnet located adjacent to the rim of the plate for inductively driving it whereby a comparatively large torque slow-speed direct drive is applied to the object to be rotated; substantially as described.

4. In a device of the character described, a rotatable spindle, a carrier supported on the spindle for carrying the phonograph record or the like which is to be rotated, an annular non-magnetic metallic plate supported on the spindle, a shaded pole alternating current electro-magnet for inductively driving the plate and thereby directly driving the object to be rotated, and means for varying the speed at which the object is rotated comprising means for bodily shifting the electro-magnet radially with relation to the spindle: substantially as described.

5. In a device of the character described a rotatable spindle, a carrier supported on the spindle for carrying the phonograph record or the like which is to be rotated, a non-magnetic metallic plate having its active portion lying in a plane parallel to that of the carrier and supported by the spindle so as to directly drive it, and an alternating current electro-magnet inductively associated with the plate for driving it and thereby directly driving the object to be rotated, the diameter relation between the portion of said plate which is acted on by the electro-magnet and the carrier being such that the torque exerted by the magnet on said plate will act through a lever arm not materially shorter than the load radius on said carrier, substantially as described.

6. In a device of the character described a rotatable spindle, a carrier supported on the spindle for carrying the phonograph record or the like which is to be rotated, a non-magnetic metallic plate supported on the spindle at a distance below the carrier and having its active portion lying in a plane parallel to that of the carrier and supported by the spindle so as to directly drive it, and an alternating current electro-magnet inductively associated with the plate for driving it and thereby directly driving the object to be rotated, the diameter relation between the portion of said plate which is acted on by the electro-magnet and the carrier being such that the torque exerted by the magnet on said plate will act through a lever arm not materially shorter than the load radius on said carrier, substantially as described.

7. In a device of the character described, a rotary spindle, a carrier supported on the spindle for holding the phonograph record or the like which is to be rotated, a spring motor geared to the spindle, an annular non-magnetic metallic plate carried on the spindle and a shaded pole alternating current electro-magnet for driving the plate, and means for operatively disconnecting the spring motor from the spindle when it is driven by the electric drive; substantially as described.

8. In a device of the character described, a rotary spindle, a carrier supported on the spindle for holding the phonograph record or the like which is to be rotated, a spring motor for driving the spindle, a non-magnetic metallic plate carried on the spindle so as to directly drive it, and an alternating current electro-magnet inductively associated with the plate for driving it and thereby directly driving the object to be rotated, and means for operatively disconnecting the spring motor from the spindle when it is driven by the electric drive, substantially as described.

In testimony whereof, we have hereunto set our hands.

JOHN RUSS.
FRANK J. RUSS.