

T. C. WHITING.
 PHONOGRAPH MOTOR MECHANISM.
 APPLICATION FILED SEPT. 4, 1917.

Patented Aug. 20, 1918.

1,276,601.

FIG. I.

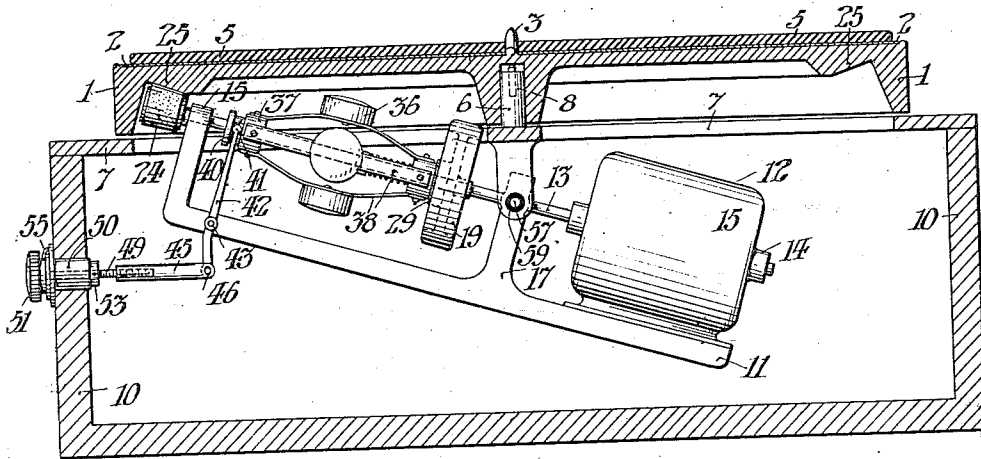
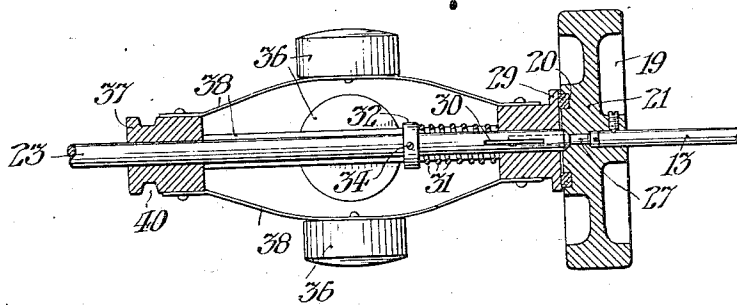


FIG. II.



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PHONOGRAPH-MOTOR MECHANISM.

1,276,601.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, THEO CLIFFORD WHITING, a citizen of the United States, residing at Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Phonograph-Motor Mechanism, whereof the following is a specification, reference being had to the accompanying drawings.

10 This invention is designed and adapted for use in connection with electric motors of gramophones and similar talking machines to variably control and regulate the speed of rotation of a turn table for a sound record.

15 As hereinafter described, my invention includes the combination with a rotary table for a sound record; of a wheel arranged to turn said table; a motor arranged to rotate said wheel; and a pivotally supported frame for said motor, so arranged that the weight of said motor tends to maintain said wheel in operative relation with said table. Power is transmitted, from said motor to said turn table, through an automatically operative

20 rotary coupling including relatively axially and circumferentially movable friction members respectively operatively connected with said motor and with said turn table; and variations in the frictional engagement of said friction members are automatically effected by adjustable governor mechanism including a weight which is free to move centrifugally in accordance with the speed of rotation to which it is subjected; where-

25 by said turn table may be rotated at any predetermined uniform rate, within the range of adjustment of said governor mechanism, regardless of variations in the rate of rotation of said motor.

40 Although I have illustrated my invention as applied to an electric motor adapted to be energized by an alternating current; it is to be understood that it may be utilized in connection with a rotary motor of any

45 kind.

My invention includes the various novel features of construction and arrangement hereinafter more definitely specified.

In the drawings: Figure I is a vertical sectional view of a rotary table for a sound record arranged to be turned by an electric motor provided with a convenient embodiment of my invention.

Fig. II is a fragmentary longitudinal sectional view showing the construction and arrangement of the friction coupling and

the adjacent portions of the wheel shaft and the motor armature shaft which drives it.

In said figures; the rotary table 1 is provided with the felt cover 2 and axial stud 3 60 to support the sound record 5. Said table is mounted to rotate upon the vertical shaft 6 which is stationary upon the frame plate 7 and provided with the hardened point 8 which supports the weight of said table. 65 Said plate 7 forms the top of a casing 10 which incloses the driving mechanism including a swing frame 11 carrying the induction motor 12. Said motor has the rotary armature shaft 13, journaled in the 70 bearing 14 of its casing 15, which is rigidly connected with said swing frame 11, and also in the standard 17, rigidly connected with said frame. Said motor shaft 13 has the fly wheel 19 rigidly connected therewith 75 and carrying the friction member 20, which is conveniently a leather ring embedded in the hub 21 of said wheel 19.

Said shaft 13 is in axial alinement with the wheel shaft 23 which carries the driving 80 wheel 24 engaging the annular surface 25 of said table 1, so as to turn the latter. Such engagement is conveniently effected by providing said wheel 24 with a surface of leather or other suitable material capable 85 of frictionally engaging a comparatively smooth surface. However, it is to be understood that said wheel 24 may be provided with gear teeth arranged to engage corresponding teeth on said table 1; such teeth 90 being preferably of spiral form so that their cooperation is practically silent.

As shown in Fig. II, said shafts 13 and 23 are held in axial alinement by the screw stud 27 which is rigidly connected with said 95 shaft 23 but free to turn in said hub 21 of the fly wheel 19, which latter, as above described, is rigidly connected with said shaft 13. However, such connection is neither designed nor adapted to transmit rotary motion 100 from said shaft 13 to said shaft 23. Such motion and the power to turn said rotary table 1 are transmitted through the automatically operative rotary coupling for said shafts which includes said friction member 105 20 which is fixed in said wheel 19 and carried by said shaft 13, and the opposing friction member 29 which is a disk carried by, and axially movable on, said shaft 23, but adapted to turn the latter by engagement of the key 30. Said friction member 110 29 is constantly pressed toward said friction

member 20 by the helical spring 31 which encircles said shaft 23 and is compressed between the hub of said disk 29 and the axially adjustable collar 32 which it fitted on said shaft 23 and secured in adjusted position by the set screw 34.

Said friction member 29 carried by said wheel shaft 23 is provided with adjustable governor mechanism carried by said wheel shaft and connected with said friction member to shift the latter axially, including the circular series of weights 36 connected to said disk 29 and to the sleeve 37, by flexible spring bars 38. Said sleeve 37 has a circumferential groove 40 to engage the pin 41 of the lever 42 which is fulcrumed at 43 upon said swing frame 11. Said lever 42 is conveniently movable to shift said governor sleeve 37 axially on said shaft 23, by means of the screw link 45 which is pivoted at 46 to said lever 42. Said link is an internally screw threaded tube which is prevented from turning by its connection with said lever 42, but is engaged by the rotary screw 49 which extends therefrom through the bearing 50 in said casing 10 and is provided externally to said casing with the milled head 51 which bears upon said bearing 50. Said screw 49 is prevented from axial movement in said bearing 50 by the collar 53; and the arrangement is such that said link may be positively shifted longitudinally, in either direction, by corresponding rotation of said head 51. However, said link is maintained constantly under compression, (in the direction of its length, and to the left in Fig. 1,) by said spring 31, which tends to shift said sleeve 37 toward the right in the drawings.

Said screw 49 may be of such pitch that the entire range of adjustment of said sleeve 37 may be effected by one revolution of said screw, and said head 51 may carry the index 55 to traverse a circular series of graduations upon the flange of said bearing 50, exterior to said casing 10; so that the number of revolutions of said turn table 1 per minute may be predetermined by adjustment of said screw head 51, with reference to said graduations.

The construction and arrangement of said governor mechanism are designed to precisely and variably regulate the rate of rotation of said shaft 23 and, consequently, of said turn table 1, by controlling the frictional engagement of said two friction members 20 and 29; so that when any desired and predetermined rate of rotation of said wheel shaft 23 is attained, the centrifugal effect upon said weights 36 has shifted said member 29 toward the left in the drawings, and practically disengaged it from the friction member 20. Such regulation is variably effected, as above described, by precisely axially adjusting said sleeve 37 and its appurtenant elements of the governor mechanism;

so that the rate of rotation of said friction member 29, (and said shaft 23 which carries it,) is precisely regulated, regardless of the rate of rotation of the friction member 20 carried by the shaft 13, which drives 70 it; provided, of course, that said shaft 13 rotates at a higher rate than said shaft 23. In practice, I have found it possible to suddenly vary the rate of rotation of the shaft 13 to the extent of more than thirty per cent. 75 without any appreciable fluctuation in the rate of rotation of the shaft 23.

I have called said frame 11 a swing frame, because I prefer to pivotally connect it with the frame plate 7 by trunnions 57 80 so that the weight of said motor 12 tends to maintain said wheel 24 in operative relation to said table 1, regardless of variations in the position of the surface of the latter with which it engages; which variations are not 85 only occasioned by inaccuracies in manufacture, but are consequent upon such displacements of said table as are incident to its free turning movement upon said vertical shaft 6. Moreover, in order to minimize 90 transmission of noise vibrations at said pivotal support of said motor; I prefer to there interpose a bushing 59 of rubber or other suitable material. However, it is to be understood that it is not essential to the regulating effect of the automatically operative 95 rotary coupling, above described, that the motor shall be thus pivotally supported. It may be rigidly mounted upon the support for said turn table. 100

Therefore, I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential 105 features of my invention as defined in the appended claims.

I claim:

1. The combination with a rotary table for a sound record; of a wheel arranged to 110 turn said table; a rotary shaft carrying said wheel; an electric motor, having a rotary armature shaft in axial alinement with said wheel shaft; an automatically operative rotary coupling for said shafts, including relatively axially and circumferentially movable friction members respectively 115 carried by them; adjustable governor mechanism carried by said wheel shaft and connected with the friction member on that shaft to shift said member axially, including a weight, means connecting said weight with said wheel shaft, arranged to permit said weight to move toward and away from the axis of that shaft, in accordance with 120 the speed of rotation of said wheel shaft, and manually operative means arranged to variably regulate the speed of rotation of said table, including means arranged to axially adjust said weight connecting means; 130

a frame for said motor, so arranged that the weight of said motor tends to maintain said wheel in operative relation with said table, regardless of variations in the position of the latter; a pivotal support for said frame; and means arranged to minimize transmission of vibration at said pivotal support; whereby said turn table may be rotated at a predetermined uniform rate, by said armature shaft, regardless of variations in the rate of rotation of said armature shaft.

2. The combination with a rotary table for a sound record; of a wheel arranged to turn said table; a rotary shaft carrying said wheel; an electric motor, having a rotary armature shaft in axial alinement with said wheel shaft; an automatically operative rotary coupling for said shafts, including relatively axially and circumferentially movable friction members respectively carried by them; adjustable governor mechanism carried by said wheel shaft and connected with the friction member on that shaft to shift said member axially, including a weight, means connecting said weight with said wheel shaft, arranged to permit said weight to move toward and away from the axis of that shaft, in accordance with the speed of rotation of said wheel shaft, and manually operative means arranged to variably regulate the speed of rotation of said table, including means arranged to axially adjust said weight connecting means; a frame for said motor, so arranged that the weight of said motor tends to maintain said wheel in operative relation with said table, regardless of variations in the position of the latter; and a pivotal support for said frame; whereby said turn table may be rotated at a predetermined uniform rate, by said armature shaft, regardless of variations in the rate of rotation of said armature shaft.

3. The combination with a rotary table for a sound record; of a wheel arranged to turn said table; a rotary shaft carrying said wheel; an electric motor, having a rotary armature shaft in axial alinement with said wheel shaft; an automatically operative rotary coupling for said shafts, including relatively axially and circumferentially movable friction members respectively carried by them; adjustable governor mechanism carried by said wheel shaft and connected with the friction member on that shaft to shift said member axially, including a weight, means connecting said weight with said wheel shaft, arranged to permit said weight to move toward and away from the axis of that shaft, in accordance with the speed of rotation of said wheel shaft, and manually operative means arranged to variably regulate the speed of rotation of said table, including means arranged to axially adjust said weight connecting means; whereby said turn table may be rotated at a

predetermined uniform rate, by said armature shaft, regardless of variations in the rate of rotation of said armature shaft.

4. The combination with a rotary table for a sound record; of a wheel arranged to turn said table; a rotary shaft carrying said wheel; an electric motor, having a rotary armature shaft; an automatically operative rotary coupling for said shafts, including relatively axially and circumferentially movable friction members respectively carried by them; adjustable governor mechanism carried by said wheel shaft and connected with the friction member on that shaft to shift said member axially, including a weight, means connecting said weight with said wheel shaft, arranged to permit said weight to move toward and away from the axis of that shaft, in accordance with the speed of rotation of said wheel shaft, and manually operative means arranged to variably regulate the speed of rotation of said table, including means arranged to axially adjust said weight connecting means; whereby said turn table may be rotated at a predetermined uniform rate, by said armature shaft, regardless of variations in the rate of rotation of said armature shaft.

5. The combination with a rotary table for a sound record; of a wheel arranged to turn said table; a rotary shaft carrying said wheel; an electric motor, having a rotary armature shaft; an automatically operative rotary coupling for said shafts, including relatively movable friction members respectively carried by them; adjustable governor mechanism carried by said wheel shaft and connected with the friction member on that shaft, including a weight, means connecting said weight with said wheel shaft, arranged to permit said weight to move toward and away from the axis of that shaft, in accordance with the speed of rotation of said wheel shaft, and manually operative means arranged to variably regulate the speed of rotation of said table, including means arranged to adjust said weight connecting means; whereby said turn table may be rotated at a predetermined uniform rate, by said armature shaft, regardless of variations in the rate of rotation of said armature shaft.

6. The combination with a rotary table for a sound record; of a wheel arranged to directly engage and turn said table; a shaft carrying said wheel; an alternating current electric motor, having an armature shaft in axial alinement with said wheel shaft; a coupling for said shafts, including friction members respectively carried by them; and governor mechanism carried by said wheel shaft and connected with the friction member on that shaft to shift said member axially, including a weight, means connecting said weight with said wheel shaft, arranged

to permit said weight to move toward and away from the axis of that shaft, in accordance with the speed of rotation of said wheel shaft, and means arranged to axially adjust the support for said weight; a frame for said motor; and a pivotal support for said frame, so arranged that the weight of said motor tends to maintain said wheel in operative relation with said table, regardless of variations in the position of the latter; whereby said turn table may be rotated at a predetermined uniform rate, by said armature shaft, regardless of variations in the rate of rotation of said armature shaft.

7. The combination with a rotary table for a sound record; of a wheel arranged to directly engage and turn said table; a shaft carrying said wheel; a motor, having a shaft in axial alinement with said wheel shaft; a coupling for said shafts, including friction members respectively carried by them; and governor mechanism carried by said wheel shaft and connected with the friction member on that shaft to shift said member axially, including a weight, means connecting said weight with said wheel shaft, arranged to permit said weight to move toward and away from the axis of that shaft, in accordance with the speed of rotation of said wheel shaft, and means arranged to axially adjust the support for said weight; a frame for said motor; and a pivotal support for said frame so arranged that the weight of said motor tends to maintain said wheel in operative relation with said table, regardless of variations in the position of the latter; whereby said turn table may be rotated at a predetermined uniform rate, by said motor shaft, regardless of variations in the rate of rotation of said motor shaft.

8. The combination with a rotary table for a sound record; of a wheel arranged to directly engage and turn said table; a shaft carrying said wheel; a motor, having a shaft in axial alinement with said wheel shaft; a coupling for said shafts, including friction members respectively carried by them; and governor mechanism carried by said

wheel shaft and connected with the friction member on that shaft to shift said member axially, including a weight, means connecting said weight with said wheel shaft, arranged to permit said weight to move toward and away from the axis of that shaft, in accordance with the speed of rotation of said wheel shaft, and means arranged to axially adjust the support for said weight; whereby said turn table may be rotated at a predetermined uniform rate, by said motor shaft, regardless of variations in the rate of rotation of said motor shaft.

9. The combination with a rotary table for a sound record; of a wheel arranged to directly engage and turn said table; a motor arranged to rotate said wheel; a frame for said motor, so arranged that the weight of said motor tends to maintain said wheel in operative relation with said table, regardless of variations in the position of the latter; a pivotal support for said frame; and means arranged to minimize transmission of vibration at said pivotal support; whereby said turn table may be rotated at a predetermined uniform rate, by said motor, regardless of variations in the rate of rotation of said motor.

10. The combination with a rotary table for a sound record; of a wheel arranged to directly engage and turn said table; a motor arranged to rotate said wheel; a frame for said motor, so arranged that the weight of said motor tends to maintain said wheel in operative relation with said table, regardless of variations in the position of the latter; and a pivotal support for said frame, whereby said turn table may be rotated at a predetermined uniform rate, by said motor, regardless of variations in the rate of rotation of said motor.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this fourteenth day of August, 1917.

THEO CLIFFORD WHITING.

Witnesses:

ARTHUR E. PAIGE,
ANNA ISRAELITZ.