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AUTOMATIC DISCONNECTING DEVICE FOR ELECTRICALLY DRIVEN PHONOGRAPHS

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Fig. 1

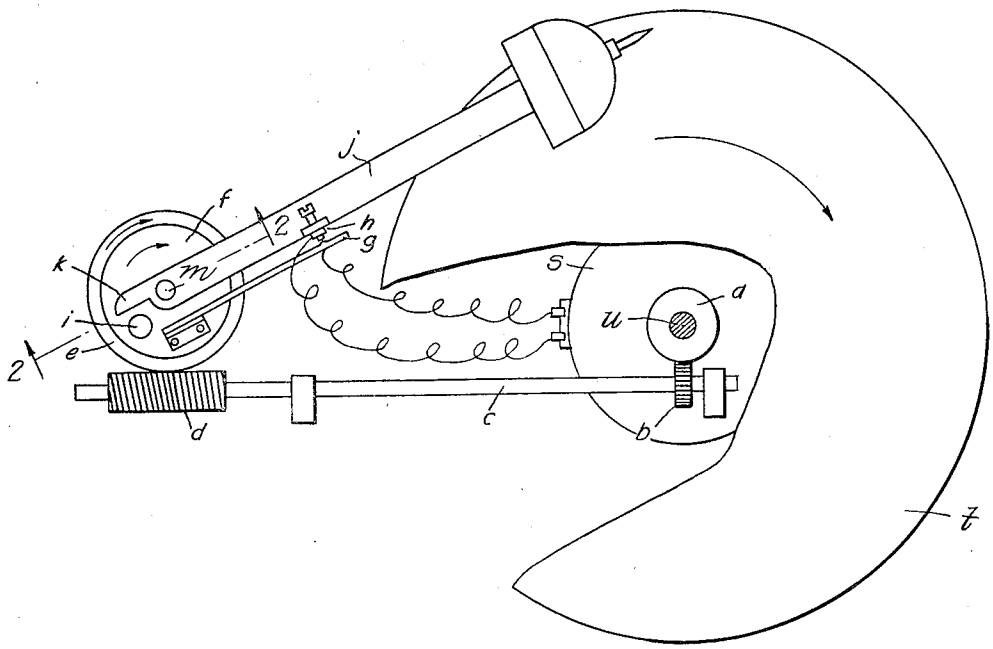
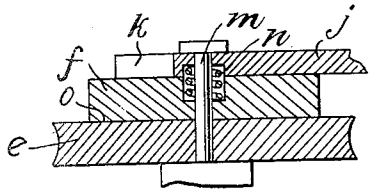


Fig. 2



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AUTOMATIC DISCONNECTING DEVICE FOR ELECTRICALLY DRIVEN PHONOGRAPHS

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5 Claims. (Cl. 192—119)

The present invention is concerned with an automatic disconnecting device for electrically driven phonographs. The basic idea underlying the invention is that one of the electrodes of a spring contact controlling the driving motor is actuated by the sound arm, and that the carrier of the co-operating electrode, owing to the pressure of the first electrode or of an element in organic connection therewith, while overcoming the friction against a surface driven by the driving motor at another rate of speed, is caused to slip against the said surface as the record is being played so that the two electrodes come to make contact during the playing of the disk and cause opening of the contact after termination of the disk. Arrangements are preferably made so that the rate of speed of the friction surface on which slips the carrier of the electrode not carrying the sound arm, is made smaller than the speed of the conveyance of the sound arm, so that the carrier of the said electrode is pushed forward by the sound arm upon its conveyance and undergoes a leading slip against the friction surface being entrained or driven along upon the ceasing of the conveying movement of the sound arm by the friction of the said surface, with the result that opening of the contact occurs automatically. In this arrangement the motor is always disconnected automatically as soon as the conveyor movements of the sound arm ceases, i. e., also when after completion of the disk the needle does not jump over into a terminal loop usually provided at a relatively greater distance from the acoustic spiral track or groove or when the needle remains always in the same sound track or groove owing to some damage of the disk.

An approved embodiment of the invention is disclosed in the accompanying drawing in which Fig. 1 is a plan view of the apparatus and Fig. 2 is an enlarged view taken on line 2—2 of Fig. 1.

The apparatus includes the usual phonograph turn table *t* which is driven from an electric motor *s* by means of a shaft *u*. A worm wheel *a* is secured to the shaft *u* and rotated with the turn table *t*. The worm wheel *a* is preferably located immediately under the turn table.

The worm wheel *a* rotates a worm *b* secured on a shaft *c*. At the other end of the shaft *c* a second worm *d* is secured. The worm *d* rotates a worm wheel *e* arranged for rotation about a shaft *m* which may be supported in any suitable manner.

The worm wheel *e* has a friction surface *o* against which a friction disc *f* is pressed by suitable means such as the spring *n*. The friction disc *f* is rotatable about the shaft *m*. The disc *f* carries a stop pin *i* and suitable means for supporting a contact member *g*. The contact member *g* is preferably a spring-like member.

A tone arm *j* is likewise supported for rotation about the shaft *m*. The tone arm carries a contact member *h*. The tone arm also has a portion *k* which extends beyond the shaft *m* and is adapted to contact the stop pin *i*. Suitable leads extend from the contacts *g* and *h* to the motor *s*.

In operation, the turn table *t*, the worm wheel *e* and the disc *f* all rotate in a clockwise direction, as shown by the arrows. The tone arm *j* also moves about the pivot *m* in a clockwise manner. The gearing ratio between the shaft *u* and the worm wheel *e* is such that the angular speed of rotation of the worm wheel *e* is slightly slower than the angular speed of rotation of the tone arm *j*.

After a phonograph record is placed on the turn table *t* the tone arm *j* is moved inwardly (in a clockwise manner) to the position indicated in Fig. 1. This movement of the tone arm causes the electrode *h* to contact with the electrode *g* and the circuit is closed. Rotation of the shaft *u* causes the worm gear *e* to move in a clockwise direction and the frictional engagement between the worm gear *e* and the disc *f* causes the disc *f* to also move in a clockwise direction. The angular speed of the disc *f* however, is not quite as fast as the angular speed of the tone arm *j* so the contact is maintained between the electrodes *h* and *g*. As a result of the difference in angular speeds of the arm *j* and disc *f*, the contact member *h* pushes against the member *g* and causes a slight slipping between the worm wheel *e* and the disc *f* while maintaining the contact between the members *g* and *h*.

When the tone arm has moved to its extreme inner position and the record has been played, the angular movement of the tone arm ceases, but the angular movement of the worm wheel *e* and the disc *f* continues due to the continued rotation of the turn table. Just as soon as the angular movement of the tone arm *j* ceases, the continued rotation of the disc *f* moves the electrode *g* away from the electrode *h* and the contact is broken, stopping the motor. When the tone arm is moved back to its rest position, the portion *k* engages the stop pin *i* and rotates the disc *f* in a counterclockwise manner overcoming the frictional en-

gagement between the worm wheel *e* and the disc *f*.

While I have shown and described an approved form of my invention, it is to be understood that various modifications can be made thereto without departing from the spirit of the invention. I therefore desire to be limited only by the scope of the appended claims.

What I claim is:

1. Phonograph apparatus comprising a turntable, means for rotating said turntable, a tone arm, a switch member mounted to move when said tone arm moves, a second switch member, and means moving in its place said second switch member in the same direction as the first mentioned switch member and at a different rate of speed from that of the first mentioned switch member, during the entire period of rotation of said turn table.

2. Phonograph apparatus comprising a turntable, means for rotating said turntable, a pair of electrodes for controlling said rotating means, a tone arm, a member rotated from the means rotating said turn table, a member frictionally engaging the first mentioned member and adapted to rotate with said first mentioned member until external forces are applied causing said member to rotate relative to the first mentioned member, one of said electrodes being carried by the last mentioned member and movable therewith, and means for moving the other of said electrodes by movement of said tone arm, in the same direction the first electrode is moved but at a different rate of speed.

3. Phonograph apparatus comprising a turntable, a motor for rotating said turntable, a first disk, a second disk frictionally engaging said first disk, a tone arm, a first contact member positioned to be moved through an arc by movement of said tone arm, a second contact member carried by said second disk, said contact members controlling said motor, and means for rotating said first disk from said motor at a slower angular speed than the angular speed of the first contact member.

4. Phonograph apparatus comprising a tone arm, a turntable, a motor for rotating said turntable, an electric switch for controlling said motor, said electric switch consisting of a pair of contact members, adapted to move along the same path, means for moving one of said contact members proportionally to the movement of said tone arm, means for moving the other contact member during the entire period of time said turntable rotates and at a slower rate of speed than the rate of speed of the first mentioned contact member, the last mentioned means including means permitting relative movement between the second mentioned contact member and its driving member.

5. Phonograph apparatus comprising a turntable, an electric switch for controlling rotation of said turntable, said electric switch including a pair of contact members, means moving said contact members in the same direction but at different rates of speed during the entire playing period of the phonograph record, and means permitting one of said contact members to contact with and move the second contact member at the same rate of speed.

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