

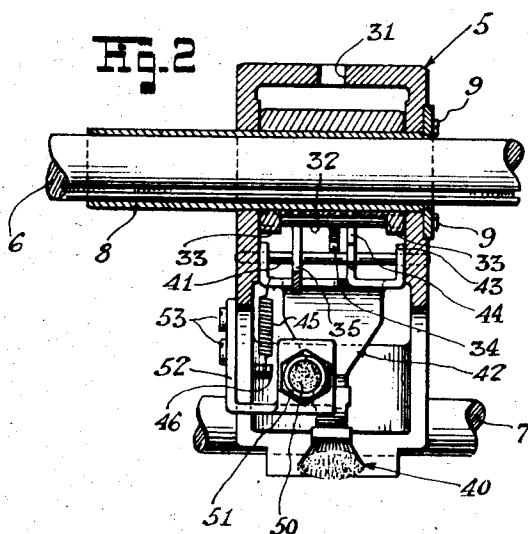
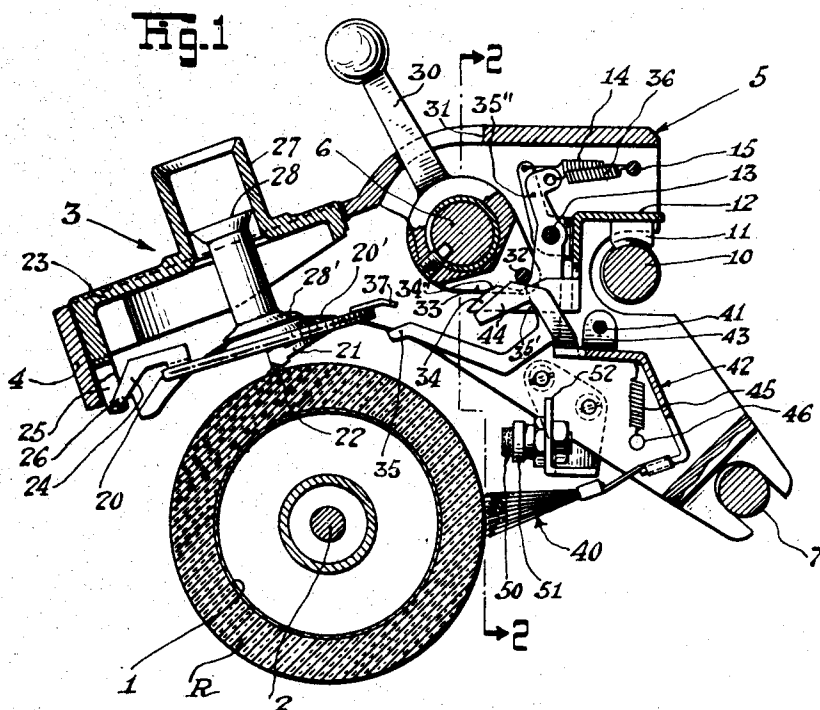
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PHONOGRAPH

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PHONOGRAPH

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This invention relates to improvements in phonographic machines and is particularly concerned with the elimination of noises and other defects in phonograph operation arising from the presence of loose dirt or particles on the surface of the phonograph records.

My invention is applicable to phonographs generally, but has particular application in connection with recording phonographs of the type which operate by cutting sound-representing grooves in records of a wax-like material. In this type of phonograph, it is customary to sweep the record surface during the phonograph operation so as to clean the record of the portions cut therefrom in the recording operation as well as of dust and other random particles such as may collect on the record. This sweeping—which is carried out by means of a soft fine brush—has, however, been only partially effective in cleaning the record. I find that this ineffectiveness is due in large measure to the particles being electrically attracted to the record because of an electrifying (that is, electrostatic charging) of the record and of these particles, the electrification being brought about during the operation of the machine by the moving or rubbing contact of the brush, and also of the cutting stylus, with the surface of the moving record. When this electrification is suitably annulled, I find that the cleaning action of the brush is very substantially improved.

It is accordingly a principal object of my invention to provide an improved record-cleaning means for phonographs whereby to bring about a reduction in noise in phonograph reproductions.

It is another object to annul the detrimental effects, in the phonograph operation, of an electrifying of the phonograph record as caused by rubbing contact with the record.

It is another object to improve the cleaning action of record brushes by a simple means and method.

It is a further object to provide in association with record brushes an ionizing means for annulling the electrifying effects of the moving contact of the brush with the record.

Other objects lie in the particular association of this ionizing means with the phonograph mechanism, and will more fully appear from the following description and the appended claims.

In the description of my invention, reference is had to the accompanying drawing of which:

Figure 1 is a partial vertical sectional view of a phonograph incorporating my invention; and

Figure 2 is a vertical section taken on the line 2—2 of Figure 1.

My invention is herein illustrated in connection with a conventional business-type phonograph or dictating machine, having a mandrel 1 journaled as at 2 and supporting a hollow cylindrical record R. This record operates in relation with a translating device 3 which is mounted on an arm 4 of a carriage 5. The carriage is slidably supported on upper and lower cross rods 6 and 7. The mounting of the carriage on the upper rod is made through a long sleeve 8 which is flanged at one end and secured to the carriage by screws 9, and the mounting of the carriage on the lower rod 7 is effected by the direct slidable engagement of a slotted portion of the carriage with this rod. A feeding movement of the carriage along the rods 6 and 7 is effected through the medium of a feed screw 10 and a cooperating feed nut 11. The feed nut is mounted on a bracket 12 which is pivoted to the carriage as at 13, and is biased into engagement with the feed screw by a tension spring 14 connected between the bracket 12 and a rod 15 on the carriage. In the operation of the machine, the mandrel 1 and feed screw 10 are rotated concurrently, in a clockwise direction, to effect a relative progressive movement between the translating device and the record, the rotating means for the mandrel and feed screw being, however, not herein necessary to show.

To more fully illustrate the application of my invention, the translating device 3 is herein shown as being of a kind which operates to produce sound-modulated grooves in the record R by a cutting process. Purely by way of example, this device may be of an acoustical type having a sound box 20 provided with a stylus holder 21 in which there is mounted the cutting stylus 22. The sound box is pivotally connected to a frame 23 through an arm 24 on the sound box and a lug 25 depending from the frame at the front thereof, the arm being pivoted to the lug as at 26. Sound communication to and from the sound box is had by way of a tubular neck 27 on the frame and a tube 28 which couples the neck to the sound box, the coupling between the tube 28 and sound box comprising a spherical flange 28' on the tube and a dome 29 on the sound box which cooperate to form a universal joint.

The placing of the translating device into operative and inoperative conditions, and a coupling of the feed nut with the feed screw are each controlled by a lever 30 which is pivoted to the sleeve 8 within the carriage 5, the lever

projecting upwardly through an opening 31 in the top of the carriage so as to be manually accessible. The operative connection between the control lever 30 and the feed nut 11 comprises a cross rod 32, which is carried by the lever between two legs 33 projecting down from the hub thereof, and a cam arm 34 on the bracket 12 which is controlled by the rod 32 as the lever 30 is rocked on its axis. The operative connection of the control lever 30 with the translating device 3 comprises also the rod 32 just mentioned and an angular lifting finger 35 which is pivoted at 13 to the carriage. This finger, which underlies the control lever, has a cam 35' which is held in contact with the rod 32 by a tension spring 36 connected between the rod 15 and an upright extension 35'' on the finger 35. The lifting finger extends angularly forwardly to engage the underside of a tab 37 provided on the sound box 20. When the control lever is in a forward position—the position it occupies in Figure 1 and hereinafter referred to as its "recording" position—the rod 32 is free of the cam arm 34 and the feed nut 11 is held in engagement with the feed screw by the spring 14, but the rod 32 bears against the cam 35' of the lifting finger and holds this finger down out of contact with the sound box, the sound box being thus held by gravity on the record R to maintain the translating device in a condition for recording. As the control lever 30 is rocked rearwardly into a central or neutral position, the rod 32 engages the cam arm 34 and rocks the bracket 12 to disengage the feed nut from the feed screw, the rod coming into engagement with a notch 34'' to detent the control lever in this central position; also the rod 32 slides downwardly along the cam 35' and frees the lifting finger 35 to move upwardly, in response to its biasing, to raise the sound box 20 from the record and place the translating device in inoperative condition. Obviously, as the control lever is returned to recording position the reverse action from that just described will take place: the feed nut being reengaged with the feed screw and the translating device being returned to recording condition.

For the purpose of cleaning the surface of the record R of loose dirt, dust or other particles, particularly of record particles cut from the record in the recording operation, there is provided a record brush 40. This brush is made up of any suitable soft fine strands such as of hair, fibers or the like—for example, of pony or camel hair—and is mounted on the carriage 5 so as to be carried along the record with the translating device, the brush being held in contact with the moving record to clean the record by a sweeping action. In order that the brush will not be swept along the record surface during manual movements of the carriage, as when the carriage is returned to initial position to recondition the machine for operation on a subsequent record, the brush is movably mounted on the carriage and caused to move out of contact with the record as the control lever 30 is moved to neutral position. To this end the brush is pivoted to a rod 41 on the carriage 5 through a bracket 42 having turned-up apertured ears 43 which embrace the record, and this bracket is provided with a forward cam arm 44 which slidably contacts the cross rod 32, the cam arm being maintained in contact with this rod by a light tension spring 45 connected between the bracket 42 and a cross rod 46 on the carriage.

When the control lever is in recording position, the spring 45 holds the bracket in its most clockwise position wherein the brush 40 is held in a substantially horizontal position in contact with the back side of the record, but as the control lever 30 is shifted to neutral position it cams the bracket 42 in a counterclockwise direction to move the brush downwardly out of contact with the record, the brush being returned into contact with the record as the control lever is returned to recording position. This moving of the brush—which occurs with each shift in the conditioning of the translating device—has also the beneficial effect of shaking particles from the brush which tend to collect thereon in the sweeping of the record.

In phonographs which use records of nonconducting material, as is the case in the present instance, I find that the sliding of the brush and of the recording stylus across the surface of the record causes the record and the particles thereon to become electrified, as has been hereinbefore mentioned. This electrification impairs the cleaning action of the brush since it causes the loose dirt and record particles to be attracted to the record. I find, however, that upon subjecting the record to the influence of a suitable ionizing means the effects of this electrification may be annulled and the cleaning action of the brush be greatly improved. This annulment may be accomplished in a particularly simple and effective manner by exposing the record to a suitable radioactive material or radium salt such as radium chloride. This radioactive material, which may be in the form of a pellet 50 mounted on a holder 51, is preferably carried by the carriage 5 at a place just in advance of the brush, as determined with respect to the direction of rotation of the record, the mounting for the holder 51 comprising a bracket 52 secured to the carriage by screws 53. The radiation given out by this radioactive pellet 50 serves to ionize the air at the brush and, through this ionization, to neutralize the charges developed on the record. Thus, that portion of the record which is engaged by the brush is progressively placed in an uncharged condition by the ionizing means during the operation of the machine and, as a result, the brush is rendered much more effective in its cleaning action.

Although I have herein illustrated and described my invention in connection with a particular kind of recording phonograph, it will be understood that my invention may also be employed to advantage, for the purposes herein set forth, in reproducing phonographs. Furthermore, it will be understood that the particular embodiment of my invention herein shown and described is subject to many changes and modifications without departure from the scope of my invention, which I undertake to express according to the following claims.

I claim:

1. In a phonograph including a record: the combination of a brush in moving contact with the record to sweep loose dirt or particles from the surface thereof, the moving contact of said brush with the record tending to electrify the record surface and cause the said loose particles to be attracted to the record; and ionizing means associated with the record and effective to neutralize the electrification of the record whereby to facilitate the cleaning action of said brush.

2. The combination in a phonograph mechanism having a stylus operable to record on a

moving record, of a brush held in contact with the moving record to sweep its surface clean of loose dirt or particles; and a radioactive material associated with and effective on said record to neutralize charges acquired by the record from its rubbing contact with said brush and stylus whereby to facilitate the cleaning action of the brush.

3. In a phonograph including a record: the combination of a brush in moving contact with the record to sweep the surface thereof clean of loose dirt or particles; and ionizing means adjacent to the record and effective on the portion of the record at said brush.

4. In a phonograph including a moving record: the combination of a carriage for a translating device mounted for movement across the record; a brush carried with said carriage and in contact with the surface of the record; and ionizing means carried with said carriage and effective on the portion of the record in the vicinity of said brush.

5. In a phonographic system including a recording mechanism adapted to operate on a moving wax-like record to cut a progressive sound-representing groove therein: the combination of a brush in moving contact with the record to sweep the surface thereof clean of loose dirt and record particles cut from the record in the recording process, said brush having strands tending in their moving contact with the record to electrify the record and cause the said dirt and record particles to be attracted thereto; and a radioactive material associated with the record to neutralize the charges thereon whereby to facilitate the cleaning action of said brush.

6. In a recording phonograph operating by a

cutting action of a stylus on a moving record body: the combination of a brush associated with the record to sweep the record surface clean of record particles cut from the record body in the recording operation; and ionizing means in the vicinity of the record and to which the record is exposed to neutralize charges acquired by the record from its moving contact with said brush, whereby to reduce electric attraction of the particles with the record and facilitate the cleaning action of the brush.

7. In the operation of a phonograph including a record: the method of removing loose dirt or particles from the surface of the record which comprises simultaneously sweeping the record and ionizing the air at the place of said sweeping.

8. In the removal of loose particles from the surface of a phonograph record, the method which comprises sweeping the record surface and simultaneously neutralizing, by ionization, the electrification of the record caused by said sweeping.

9. In a phonograph operation wherein loose particles are swept from the moving record by a brush: the method of improving the cleaning action of said brush which comprises ionizing the air at the brush to neutralize the electrification of the record caused by the moving contact of the brush with the record.

10. The method of cleaning loose particles from a phonograph record which comprises sweeping the record surface and concurrently subjecting a portion of the record surface at the place of sweeping to the influence of a radioactive material.

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