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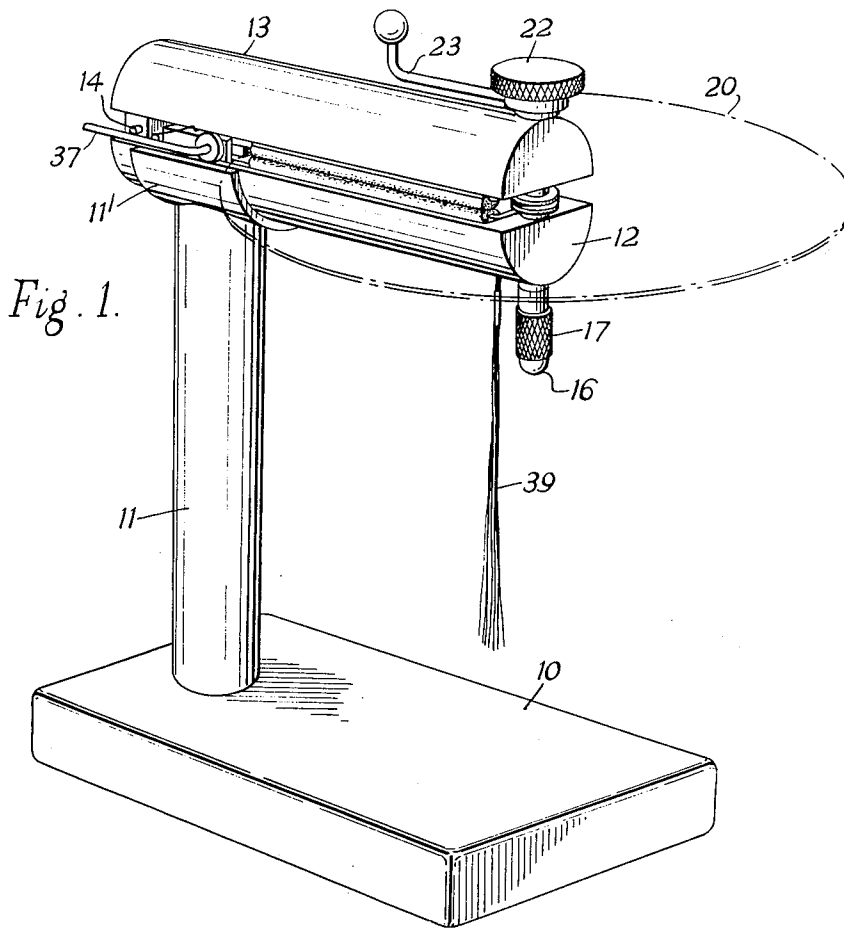
C. E. WATTS

2,976,551

GRAMOPHONE RECORDS CLEANING MACHINE

Filed March 25, 1958

3 Sheets-Sheet 1



INVENTOR
CECIL E. WATTS

BY
Greene, Pinolis & Burr
ATTORNEY

March 28, 1961

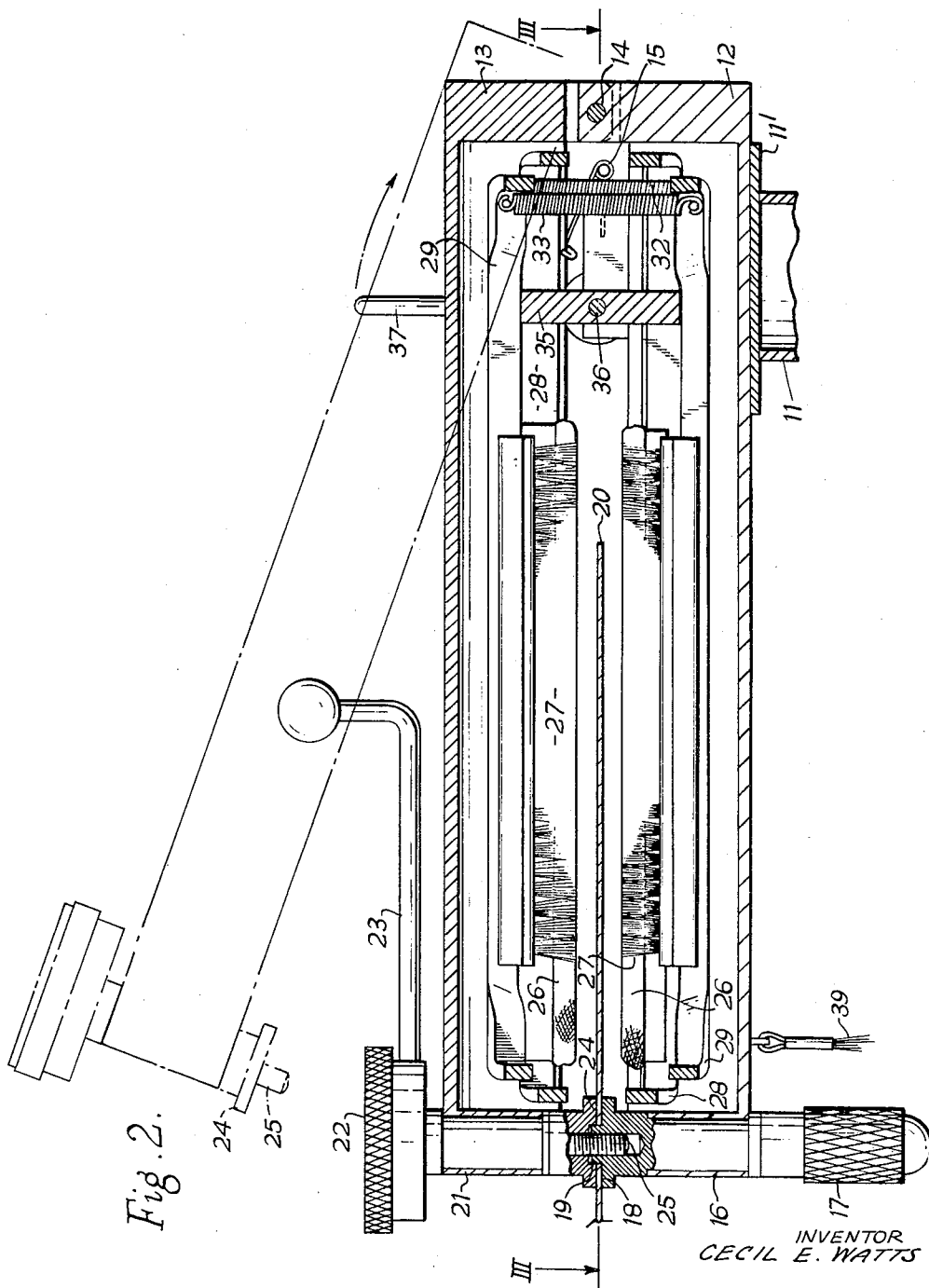
C. E. WATTS

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GRAMOPHONE RECORDS CLEANING MACHINE

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3 Sheets-Sheet 2



BY

Greene, Pinckney & Davis
ATTORNEY

March 28, 1961

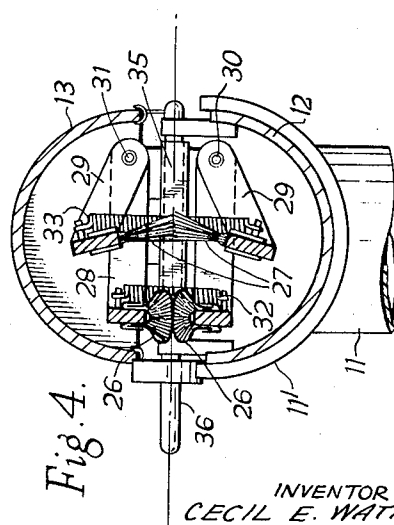
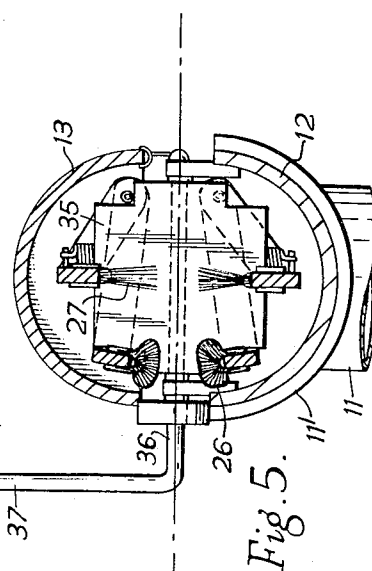
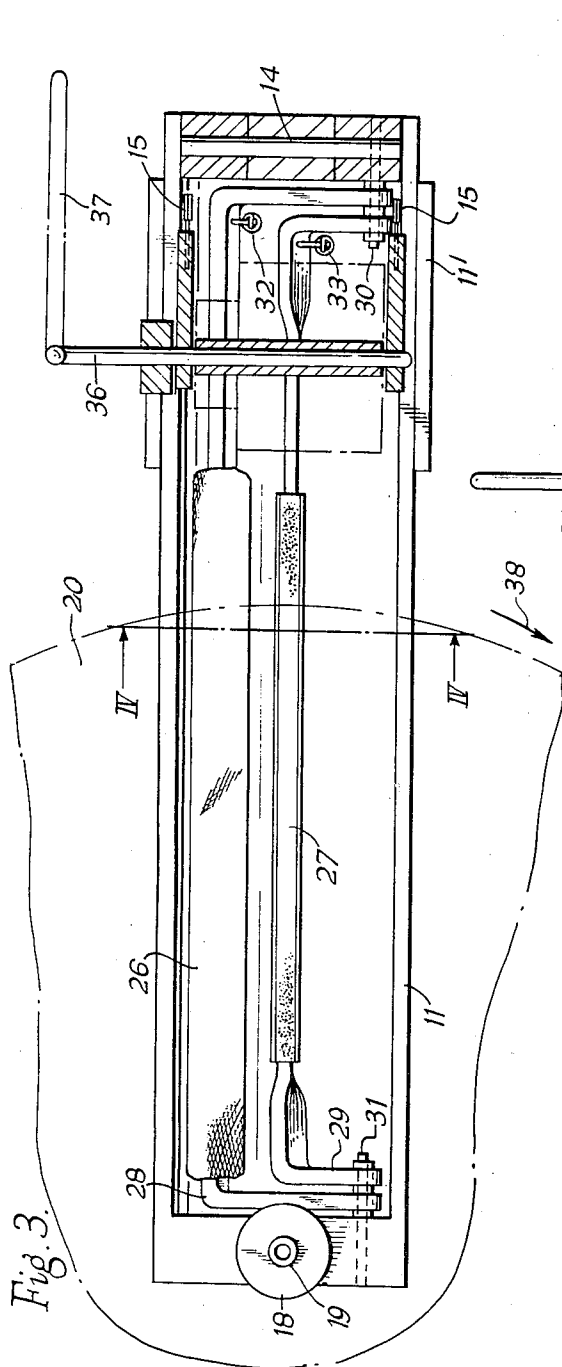
C. E. WATTS

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GRAMOPHONE RECORDS CLEANING MACHINE

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3 Sheets-Sheet 3



INVENTOR
CECIL E. WATTS

BY
Greene, Pindler & Dunn
ATTORNEY

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2,976,551

GRAMOPHONE RECORDS CLEANING MACHINE

Cecil Ernest Watts, Sunbury-on-Thames, England, assignor to Cecil E. Watts Limited, Kingston-on-Thames, Surrey, England, a company of Great Britain

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5 Claims. (Cl. 15—4)

The present invention relates to the treatment of gramophone records of the type in which a sound groove is formed in a body of electrically insulating material, such for example as polyvinyl chloride (P.V.C.). Such records are commonly of disc shape, the groove being in the form of a spiral.

The invention is based upon the following observations which have been made with the aid of a microscope. A record of the type set forth is made by recording upon a master, producing a matrix from the master, and making from the matrix the records for sale. During the process of recording upon the master the material of the master is forced outward and upward to form ridges on either side of the groove. These ridges are continuous and are therefore of spiral shape in the case of a disc record master. The ridges are found to be reproduced in the records made from the master and are usually thin and liable to break off. They thereby contribute to the dust which may collect in the sound groove and are, therefore, objectionable.

An object of the invention is to overcome or substantially reduce the objection set forth in the preceding paragraph.

A further feature of the invention is based upon the following further observations. When a sound record of the type referred to is played, or rubbed with a cloth in order to clean it, the friction produces an electric charge on the surface of the record and such a charge attracts dust. Dust is not only liable to give rise to clicks and other noise during reproduction, but also reduces the life of the record and of the stylus used to play it. This is especially true in the case of long-playing records.

If an anti-static fluid is applied to the record surface its charge-retaining properties are removed so long as the substance remains liquid. When most such substances dry, however, and in any case when the highly polished surface of the record is wiped with a cloth, the anti-static property is lost.

It is an object of the present invention to provide means whereby records of the type set forth can be rendered incapable of holding a substantial electric charge permanently or at least for a long time.

According to the invention, the spiral ridges which separate the spiral record grooves along the surface of a record disc are abraded and an anti-static fluid is applied to the recorded surface after the ridges have been removed in accordance with the principal feature of the invention. By applying an anti-static fluid to the roughened areas of spiral shape there are provided spiral paths which are sufficiently electrically conducting to remove electric charge. Whereas an anti-static substance cannot be retained by the highly polished surface of the record, it is found to be retained permanently, or at least for a long time, by the roughened surface produced as described.

The invention provides a machine for treating gramophone disc records comprising a first elongated member

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fixed to a support, a second elongated member hinged to the first member near to one end, record-supporting means rotatably mounted in the first member near to the end thereof remote from the hinge and including a spigot to engage in the central hole in the record and means for clamping the record to the supporting means, a pad extending along at least one of the said members and in a position to engage the surface of the record, means for securing the two members together, after a record has been inserted in the supporting means, with the pad engaging the record surface, means whereby, when the members are so secured together, to press the pad yieldingly against the record surface, and means for rotating the supporting means against the friction of the pad upon the record. Conveniently the yielding pressure is produced by mounting the pad yieldingly on the member which carries it. Although the means for rotating the record-supporting means may be power operated, for example by an electric motor, it is usually sufficient to provide a manually operable lever.

The invention will be described, by way of example, with reference to the accompanying drawings in which

Fig. 1 is a perspective view of a machine according to the invention,

Fig. 2 is an enlarged view in sectional elevation of a part of the machine in Fig. 1,

Fig. 3 is a plan view on the line III—III in Fig. 2, and Figs. 4 and 5 are views in section on the line IV—IV of Fig. 3 showing the pads in the engaged and retracted positions respectively.

Referring to the drawings, the machine comprises a relatively heavy support or base 10, for instance of metal, having a pedestal 11 fixed thereto. A first mounting member 12 is fixed near one end to a semi-cylindrical support 11' at the top of the pedestal 11 and projects therefrom over the base 10. A second mounting member 13 is hinged to the first mounting member at 14. These two mounting members 12 and 13 are in the form of half-cylindrical shells. They may be of any material but are conveniently of a transparent plastic.

The two mounting members are urged apart (that is to the relative position shown in phantom in Fig. 2) by means of springs 15. In the first mounting member 12 near to the end thereof remote from the hinge 14 is rotatably mounted a record-supporting means 16 having a knurled portion 17, a record-supporting surface 18 and a center spigot 19 to engage in the central hole in a record 20.

In the second mounting member 13 is rotatably mounted a clamping member 21 having a knurled knob 22 and operating or driving lever 23 at one end and at the other end a record-engaging surface 24 and a clamping screw 25 adapted to be screwed into a threaded hole in the record-supporting means 16.

Within each of the mounting members 12 and 13 are mounted a treating pad 26, for example of plush, and a brush 27, for example of fine nylon bristles. The individual bristles have their tips pointed so that they can reach the bottom of the sound grooves. Each pad 26 is carried on a U-shaped treating member 28 and each brush 27 on a U-shaped treating member 29, the treating members 28 and 29 being hinged at 30 and 31 to the mounting member 12 or 13. A tension spring 32 urges the two treating members 28 toward one another and a tension spring 33 similarly urges the treating members 29 toward one another. A control plate 35, acting as a cam, carried, on a spindle 36 which is rotatably mounted in the mounting member 12, is rotatable by means of a control lever 37 between the position shown in Fig. 4 in which the cam 35 is inoperative and the pads 26 and brushes 27 are pressed toward one

another by the springs 32 and 33, and the position shown in Fig. 5 in which the pads and brushes are held apart, against the action of the springs 32 and 33.

In use, starting from a position in which the mounting members 12 and 13 are separated as shown in phantom in Fig. 2, and in which the lever 37 is set as shown in Figs. 2 and 5, a record 20 is placed on the surface 18 with the center spigot 19 engaging in the hole in the record. The record support member 16 is held stationary with one hand and with the other hand the mounting member 13 is lowered to engage the screw 25 in the threaded hole in the record-support member 16. The knob 22 is rotated until the record 20 is securely clamped between the surfaces 18 and 24. The driving lever 23 is then turned clockwise (that is in a direction such as to turn the record in the direction of the arrow 38 in Fig. 3) at about 30 to 45 r.p.m. with one hand while the other hand is applied to the control lever 37. While the record is rotating, the control lever 37 is put into the position shown in Fig. 4, thus allowing the treating pads 26 and brushes 27 to be pressed by the springs 32 and 33 against the upper and lower surfaces of the record. After the record has been rotated four or five times, and while it is still rotating, the control lever 37 is raised to the position of Fig. 5. The record can then be removed from the machine.

The number of rotations of the record required will, of course, depend upon the strength of the spring 32 which operates the pads 26 and upon the material of which the pads are made. When the treatment has been effective this will be revealed by microscopic inspection which will show a continuous roughened area on either side of the sound groove.

The bristles of the brushes 27 engage the sound grooves immediately before the pads 26 and any particles of dirt in the grooves are thus ejected by the bristles and collected by the pads.

It is desirable to apply anti-static treatment at the same time as the treatment described and for this purpose an anti-static fluid is applied to the pads and brushes before they are brought into engagement with the record. A suitable fluid is polyethylene glycol 400 mono laurate and only a very small quantity should be used. It may be applied to the pads and bristles by means of a pad or mop saturated with the liquid.

In order to determine when the anti-static treatment has been effective, the record surface may be rubbed with silk and held near a tassel of fine silk, such as that shown at 39 in Figs. 1 and 2. Very little, if any, displacement of the tassel will occur when the treatment has been sufficient.

I claim:

1. In a machine for treating a record disc having a central disc hole, with each of the opposite disc surfaces having spiral record grooves separated by spiral ridges surrounding the disc hole, a support, a record-supporting structure revolvably mounted in said support and having a spigot member engaging the disc hole and also clamping elements releasably clamping opposite sides of the disc in the region adjacent the disc hole, two elongated, relatively stiff treating members extending generally radially to said spigot member and opposite to each other for engaging respectively the opposite major surfaces of the disc, at least one of said treating members having an exterior porous abrading layer holding therein an electrically conductive liquid substance for abrading the disc ridges and applying a coating of said liquid substance upon the abraded disc portions as they are abraded by relative movement between the disc and the treating member, an elongated brush carried by and extending radially along each of said treating members, each brush having bristles holding between them said liquid substance for removing dust from and applying a coating of said liquid substance to the disc grooves moving past said treating members, force means for releas-

ably and yieldingly forcing and pressing said two elongated treating members and their respective brushes with substantial pressure against facing opposite surface regions of the disc, and driving means for forcibly rotating said record-supporting structure and thereby rotating the clamped disc between said treating members and their respective brushes while the disc is held under pressure between them, whereby the ridges of the disc are abraded and roughened by the overlying pressed treating body and the disc is enabled to retain for a prolonged time the liquid coating which removes electric charges from the disc surface as the brushes remove dust from the record grooves.

2. In a machine as claimed in claim 1, at least one of said treating members being pivotally connected to spaced support portions of said support for swinging movement about an axis substantially parallel to itself.

3. In a machine as claimed in claim 1, an elongated relatively rigid mounting member extending generally parallel to one of said treating members and carrying said one treating member and its adjacent brush, one end region of said mounting member which is remote from said spigot member having a hinge connection to said support so that it may be moved away together with the treating member and its brush from the record surface along said hinge connection for removing the disc record from between said treating members and brushes and placing the disc record between them.

4. In a machine as claimed in claim 3, said mounting member carrying on a region thereof remote from said hinge connection at least one clamping element of said record-supporting structure arranged for detachable engagement with a cooperating clamping element thereof when the record disc is held clamped between the clamping elements of said record-supporting structure.

5. In a machine for treating a record disc having a central disc hole and spiral record grooves along one major grooved disc surface, which grooves are separated by spiral ridges surrounding the disc hole, a support, a record-supporting structure revolvably mounted in said support and having a spigot member engaging the disc hole and also clamping elements releasably clamping opposite sides of the disc in the region adjacent the disc hole, an elongated, relatively stiff treating member extending generally radially to said spigot member and engaging the grooved disc surface on one side of the disc, a relatively stiff elongated supporting member extending along and engaging the opposite side of the disc opposite said treating member, said treating member having an exterior, porous abrading layer holding therein an electrically conductive liquid substance for abrading the disc ridges and applying a coating of said liquid substance upon the abraded disc portions as they are abraded by relative movement between the disc and the treating member, an elongated brush carried by and extending radially along said treating member, which brush has bristles holding between them said liquid substance for removing dust from and applying a coating of said liquid substance to the disc grooves moving past said treating member, force means for releasably and yieldably forcing and pressing said elongated treating member together with its brush and said elongated support member with substantial pressure against facing opposite surface regions of the disc, and driving means for forcibly rotating said record-supporting structure and thereby rotating the clamped disc between said treating member together with its brush and said support member while the disc is held under pressure between them, whereby the ridges of the disc are abraded and roughened by the overlying pressed abrading body and the disc is enabled to retain for a prolonged time the liquid coating which removes electric charges from the disc surface as the brush removes dust from the record grooves.

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