Aug. 19, 1941. J. P. BURKE 2,253,014

PHONOGRAPH RECORD

Filed May 29, 1940

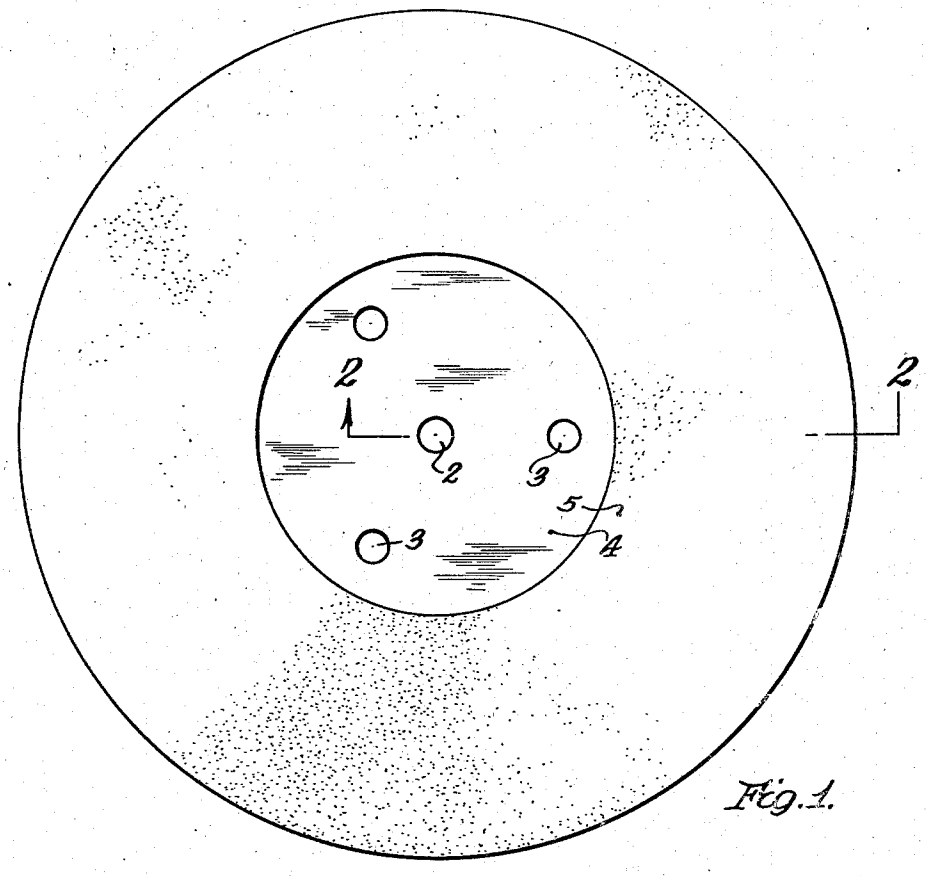



Fig. 1.

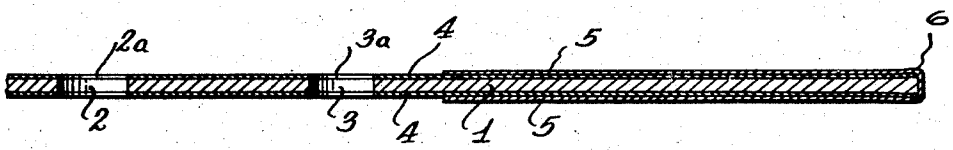



Fig. 2.

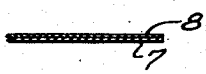



Fig. 3.

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## PHONOGRAPH RECORD

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Application May 29, 1940, Serial No. 337,780

4 Claims. (Cl. 274—42)

This invention relates to phonograph records and has for its primary object to provide an improved record blank adapted to have grooves cut in the surface thereof by the stylus of a sound recording apparatus, for sound recording purposes.

The invention, although of course adapted for recording purposes generally, is particularly concerned with the problem of providing record blanks for use with sound recording apparatus of the type used in the home, for recording radio programs, voices, etc. Such records must, of course, be capable of accurate or faithful reproduction, but the most important consideration is that they must be made available at extremely low cost. Records are at present available on the market which are satisfactory from the standpoint of low cost, but in attaining low cost accuracy or faithful reproduction standards have been sacrificed. The records referred to are made of paper coated with a layer of synthetic resin in which the recording stylus cuts the recording groove. The difficulty with such records is that during manufacture the synthetic resin is applied in liquid condition, and is subsequently dried by causing or allowing evaporation of its solvent. The synthetic resin dries at the outside first, of course, and when the paper, which becomes saturated or impregnated with the resin or its solvent, subsequently dries the record becomes warped. As is well known, faithful reproduction cannot be obtained if the record is warped.

The main object of this invention, more specifically stated is to provide a record of which the main or base portion is composed of paper, having a layer of a synthetic resin for recording purposes, said record having means incorporated therein for avoiding warping as a result of the application of the synthetic resin. To this end, a paper blank is provided, and on each side of the paper is provided a metallic layer. The metallic layer may, of course, be applied by several known methods, but it is preferred that it be in the form of a thin foil secured to the paper by an adhesive. The synthetic resin is applied to the surface of the metallic layer, which prevents saturation or impregnation of the paper with the synthetic resin or its solvent, and thus eliminates the cause of warping.

In the use of record discs of the conventional type above referred to, wherein the discs are composed entirely of material incapable of acting as an electrical conductor, crackling noises are frequently observed. These noises result from the discharge of accumulations of static electricity in the record, which are due to its rotation, its cutting and friction, and when the accumulations reach a certain point they discharge, accompanied by the noise referred to.

Another object of the invention is to provide a record in which charges of static electricity do not accumulate in the manner above referred to. This object is attained by the same means which eliminates warping or, in other words, by the presence of the metallic layer. The metallic layer is extended to the center of the disc so that it contacts the center pin of the table which rotates the disc during the recording operation, and the static electricity rather than accumulating in the disc, constantly discharges through the center pin, through the driving mechanism and hence to ground.

The disc composed of laminations of fibrous material and metal function as an electrical condenser in cases where the center pin is not grounded, and the static electricity is stored therein. The storage capacity of the disc is such that in most cases it will store all the electricity accumulated during cutting or playing of a record will be stored until the record has been completely cut or completely played, before any discharge thereof will take place. The fact that the disc acts as a condenser results in an advantage in connection with larger records in that the discharges take place much less frequently than otherwise would be the case.

Other objects and advantages will become more fully apparent as reference is had to the accompanying drawing wherein my invention is illustrated, and in which—

Fig. 1 is a plan of a record disc,

Fig. 2 is an enlarged fragmental section, taken on the line 2—2 of Fig. 1, and

Fig. 3 is a fragmental section of a detail.

More specifically, 1 designates a paper disc having a central opening 2 and a multiplicity of openings 3 radially spaced therefrom. The paper is the equivalent of say six ply Bristol board, the opening 2 is for the purpose of receiving a centering pin on a rotatable table of a recording apparatus, and the openings 3 are for the purpose of receiving studs carried by the table for causing rotation of the disc with the table.

On each side of the disc 1 is a metallic layer 4, preferably composed of aluminum foil secured to the disc 1 by any of the several adhesives available on the market for such purposes. The metallic layer has openings 2a and 3a coinciding with the openings 2 and 3 respectively.

A layer 5 of synthetic resin is applied to the

surface of the metal foil. Synthetic resin is preferred over a natural resin solely in the interest of economy. The synthetic resin is held in solution by a solvent, and the method of applying it consists in placing a rotatable support in the opening 2 and dipping and rotating the disc in a tank containing the resin. The inner or central portion of the disc need not be coated, and therefore it is unnecessary to completely submerge the disc in the resin. After being coated, the solvent which maintained the resin in solution is caused or allowed to dry.

The peripheral edge of the paper disc is shown as uncovered by metal. In this respect it is to be noted that the resin or its solvent may permeate a short distance, actually amounting to but a few thousandths of an inch inwardly from this peripheral edge. Such permeation is not sufficient to cause warping, but actually results in a slight bulging and stiffening at the peripheral edge, and acts somewhat in the nature of a reinforcing rib as indicated at 6.

Although application of foil as above described is preferred it will be understood that there are other methods of applying the metal to the fiber. For example, an aluminum paint such as is available on the market may be applied by printing rollers, by painting methods, spraying or dipping.

There are well known manufacturing processes which make available on the market a laminated product composed of aluminum foil with paper attached thereto. This product is used for many purposes, such as printing, wrapping, etc. and the purpose of the paper is to make handling of the foil more easily possible. It is contemplated that such a product may be used in forming the present record disc because in the case of certain types of synthetic resins it has advantages over the arrangement above described. For example, it is difficult to bond some plastics to metal, and in such a case paper coated foil is adhered to the disc 4 with the foil in contact with the disc, so that the paper thereon is exposed for coating with plastic as above described. This material is illustrated in Fig. 3, wherein 7 designates the foil and 8 a layer of paper permanently secured thereto.

Although a specific embodiment of the invention has been illustrated and described, it will be understood that various changes may be made within the scope of the appended claims without departing from the spirit of the invention and such changes are contemplated.

What is claimed is:

1. A phonograph record comprising a fibrous disc, a thin layer of metal on each side of said disc and together with the disc forming an electrical condenser, and a layer of resin on said metal and separated from the fibrous disc thereby, said resin being of a thickness such that it is adapted to have a recording groove cut therein by the stylus of a recording apparatus.

2. A phonograph record comprising a fibrous disc, a thin layer of metal on each side of said disc, and a layer of resin on each layer of metal, the two layers of resin being connected around the peripheral edge of the disc with the peripheral connecting portion of the two layers of resin permeating the edge of the fibrous disc to cause a bulged rib-like formation, said resin layers being of a thickness such that they are adapted to have recording grooves cut therein by the stylus of a recording apparatus.

3. A phonograph record comprising a fibrous disc, a metal foil secured to each face of said disc and together therewith constituting an electrical condenser, and a layer of resin on the surface of said foil and of such thickness that it is adapted to have recording grooves cut therein by the stylus of a recording apparatus.

4. A record disc having opposed surface layers formed of a material adapted to have sound recording grooves cut therein by the stylus of a sound recording apparatus, and a main body portion supporting said surface layers, said main body portions being composed of dielectric and metallic laminations and constituting an electrical condenser.

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