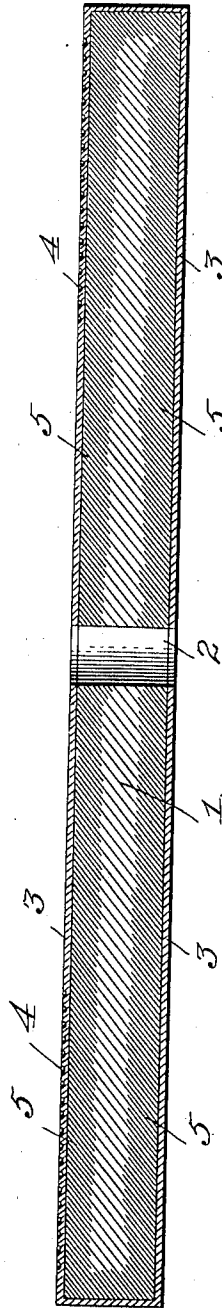


J. SANDERS.
PROCESS OF MAKING SOUND RECORD TABLETS.
APPLICATION FILED MAR. 30, 1905.

956,905.

Patented May 3, 1910.



Witnesses:

Edwin L. Yewell.
F. T. Chapman

By

Inventor:
Joseph Sanders,
Lyons & Bissing.

Attorneys.

UNITED STATES PATENT OFFICE.

JOSEPH SANDERS, OF WASHINGTON, DISTRICT OF COLUMBIA.

PROCESS OF MAKING SOUND-RECORD TABLETS.

956,905.

Specification of Letters Patent.

Patented May 3, 1910.

Original application filed April 20, 1904, Serial No. 204,024. Divided and this application filed March 30, 1905. Serial No. 252,840.

To all whom it may concern:

Be it known that I, JOSEPH SANDERS, a citizen of the United States, and resident of Washington, in the District of Columbia, have invented certain new and useful Improvements in Processes of Making Sound-Record Tablets, of which the following is a specification.

My invention has reference to improvements in the process of making sound record tablets particularly flat sound record tablets, such as are employed in the commercial gramophone, although the invention is also applicable for use in phonographs and graphophones.

The gramophone tablet which is used commercially, consists of a flat disk of hard rubber or of an imitation of hard rubber, having a sound record impressed on one or both surfaces in the shape of a spiral groove of even depth, the groove itself being laterally undulating, and these lateral undulations or sinuosities correspond to the recorded sound waves, which are reproduced from the tablet by causing the sinuosities to react upon a style and diaphragm, as is well known to those skilled in the art.

In a phonograph or graphophone record the groove is not of uniform depth, but of varying depth, and the variations of depth in that case correspond to the recorded sound waves, which are then reproduced from the tablet by causing these vertical undulations to react upon a style and diaphragm in the manner well known to those skilled in the art.

The material of the flat gramophone record tablets is now almost universally a composition of matter in which shellac is combined with infusorial earth or with baryta, or other like substances. The shellac serves as a binder for the powdery body of baryta or infusorial earth, and the mixture forms a mass, which, like hard rubber, is softened by heat, but is very hard when cold. The sound record is impressed upon such tablets by a metallic matrix on which the undulations corresponding to sound waves appear in raised lines. A lump or mass of the record material, which is thermoplastic, is heated until it is quite soft or in a doughy

condition, and then is placed upon the matrix and is pressed out into a disk, in intimate contact with the matrix, by the application of considerable force and this tablet of record material is kept in contact with the matrix until cool and hard. In order to serve its purpose the record material must, when cold, be so hard, that it will then not receive an impression from a matrix, will not elastically yield to and will not perceptibly wear under the action of a gramophone reproducing style; only to such materials do I apply the term "gramophone record material." In this process it is necessary that a considerable thickness or mass of the tablet material be used in order that the body of it form a yielding cushion for the impressed surface at the time when the pressure is exerted upon it by the matrix. The impression obtained, that is to say, the spiral groove, is, under all circumstances, very shallow, rarely exceeding a depth of 1/300 of an inch, so that it would seem to be sufficient to heat and soften the tablet only at its upper surface and leave the remainder quite hard. Experience, however, has shown that such practice will not yield a good impression and that it is necessary that the record material be yielding to a considerable depth and preferably throughout its whole mass in order that good impressions from the matrix be obtained. This is one of the reasons why the record tablets are made of considerable thickness. Another reason for this practice is that the resinous tablet is rather brittle, so that when dropped upon a hard table or upon a hard floor it will crack and break if made as thin as it might otherwise be made. The material employed, however, particularly the shellac, is quite expensive, and for this reason strength is frequently sacrificed to cheapness.

It is the object of my invention to produce a record tablet that contains only a minimum of resinous or similar record material, but which nevertheless yields under the pressure of the matrix to a considerable depth, and which is also very much stronger than the record tablets made altogether of the resinous compounds usually employed.

In the accompanying drawing I show a

cross section of a record tablet made in accordance with my invention.

In this drawing 1 represents a disk of card board, or other stiff, tough, fibrous material. This is made of the size usually given to gramophone tablets; it has a hole 2 at the center for mounting on a turn-table when sound reproduction is desired. This disk is coated with a thin layer 3 of the resinous record material, adapted to receive, when heated, the impression of a sound record matrix; such impression is indicated at 4. Since it is desirable to use no more of this material than is necessary, I preferably apply to the card board or other fibrous base, first a sizing 5 of rosin which will sink into the surface of the card board for a distance or may permeate the card board throughout, or any other kind of sizing that softens under heat, that is, it is thermoplastic, that well adheres to or sinks to a certain distance into the card board and to which the superimposed layer of record material also well adheres, may be used. This sizing, by closing the pores of the surface of the card board, prevents the absorption by the body of the card board of the superimposed layer of record material, and when the sizing permeates the card board it acts as a binder for the fibers, causing the tablet to retain its shape after pressing and making it more solid and compact, for, without the binding action of the sizing the card board fibers would tend to return to their original shape when the pressure is relieved.

When rosin, which I prefer as a sizing, is employed, I dissolve it in benzol, alcohol or other like solvent, and either dip the tablet into the solution and then withdraw it and allow the solvent to evaporate, or this sizing can be applied by a brush.

Upon the sized paste board or other fibrous disk the record material may be applied in any desired manner, but in order that the record material form a uniform and at the same time thin layer, I have found that it is best that it be applied in a fluid state. For this purpose the record material may be dissolved in a suitable solvent and the sized disk dipped into that mass or painted with the same, so that after the evaporation of the solvent there remains upon the surface of the disk a thin layer of the record material. I have found that the layer of record material need not be thicker, but may be thinner than 1/100 of an inch; it is thus a mere film.

The record material which is particularly adapted for the production of my improved sound record tablet consists of shellac as a binder and of an oxid of a metal preferably the natural oxid of iron as the powdery body. To prepare this material for application to the tablet, I dissolve the shellac in

alcohol and mix into this solution the requisite quantity of metal oxid, so that the whole mass forms a rather thin paint or emulsion. I have found the proportion of two parts of shellac to three parts of iron oxid, gives good results. This mode of preparing the record material by dissolving the shellac or other resin, or gum, or other binder, and then mixing the oxid of iron or other proper substance into it, gives an exceedingly intimate and uniform mixture, such as cannot be obtained by stirring the powdery body into the molten mass of the binder. Another important advantage results from this process of making the record material is that it avoids the necessity of fusing the shellac or other binder and thus the danger of deteriorating the same by the high temperature to which it must be subjected. The paint thus obtained is applied to the sized fibrous disk either by a brush, as in ordinary painting, or the disk is immersed in the paint. The alcohol evaporates readily and there is then upon the disk a hard thin film of record material. A sound record is impressed upon this disk, upon one or both surfaces, by heating the disk until the record material becomes plastic, and then pressing onto it a suitably prepared matrix of a sound record, and holding it in contact with the disk until the latter has cooled and the record material has become quite hard.

The record tablet constituted as above described is very much tougher and stronger than record tablets entirely composed of record material, and it receives and retains the impress of a matrix fully as well as if it were entirely composed of record material, since the card board or other fibrous base, particularly when impregnated throughout with sizing yields under the pressure of the matrix sufficiently for the purpose. At the same time my improved tablet is very much cheaper than tablets which are made entirely of record material such as the shellac mixture now used.

While it is practicable to coat only one surface of the fibrous disk with the record material, I have found it preferable to coat the disk on both sides and on the edges in order to prevent warping; and this I do whether a sound record is impressed only on one side or both.

While I have found the record material composed of shellac and metallic oxid to be the best for the purpose of my invention, I am by no means confined to the use of these materials. Other compounds may be used although not with like advantage.

I do not herein claim the improved tablet since it is claimed in my application Serial Number 204,024, filed April 20, 1904, of which this application is a division.

Having now fully described my inven-

tion I claim and desire to secure by Letters Patent:

1. The process of making sound record tablet blanks, which consists in impregnating an absorbent base with a material that softens under heat, and then producing upon such base a layer of gramophone record material.
2. The process of making sound record tablet blanks, which consists in impregnating a fibrous base with a material that softens under heat, and then producing upon such base a layer of gramophone record material.
3. The process of making sound record tablet blanks, which consists in impregnating a disk of fibrous material with thermoplastic material and then producing upon such disk a layer of gramophone record material.
4. The process of making sound record tablet blanks, which consists in producing a thermoplastic fibrous base and then covering the same with thermoplastic record material.
5. The process of making sound record tablet blanks, which consists in impregnating a fibrous base with thermoplastic material, and then producing upon such base a layer of gramophone record material containing shellac.
6. The process of making sound record tablet blanks, which consists in producing a thermoplastic base of sufficient rigidity when cold to resist distorting forces, and then producing upon such base a layer of gramophone record material containing shellac and a hardening material.
7. The process of making sound record tablets, which consists in producing a thermoplastic base with sufficient rigidity when cold to resist distorting forces, then producing upon such base a layer of gramophone record material containing shellac and a hardening agent and then heating the tablet and impressing a sound record groove therein.
8. The process of making sound record tablets, which consists in producing a fibrous base yieldable to the action of heat and pressure and capable of maintaining when cold the shape so imparted to it, and provided with a surface layer of gramophone record material, and then heating the same and impressing a sound record groove therein.
9. The process of making a gramophone record tablet blank which consists in sizing a fibrous base with a material which softens under heat, then covering such sized base with a film of gramophone record material, and then allowing the film to harden.
10. The process of making a gramophone record tablet blank which consists in first

sizing a fibrous base, then covering the sized base with a film of an emulsion of gramophone record material, and then allowing the film to solidify.

11. The process of making a gramophone record tablet which consists in sizing a fibrous base with a material which softens under heat, then covering the sized base with a film of fluid gramophone record material, then allowing the film to harden, then heating the film and base until both the film and sizing are softened, and then impressing a sound record groove into the heated and thereby softened film.

12. The process of making a gramophone record tablet which consists in first sizing a fibrous base with a material which softens under heat, then covering the sized base with a film of gramophone record material, then allowing the film to harden, then heating the film and sized base to soften both the film and sizing, then impressing a sound record groove into the heated and thereby softened film, and then cooling both the film and sizing while under pressure.

13. The method of making sound record tablets, which consists in producing a layer of gramophone material upon a basic structure of thermoplastic material and fibrous material, the latter being in disk form, and impressing a sound record groove into the layer of gramophone material while the said layer and the thermoplastic material of the base are both softened by heat.

14. The method of making sound record tablets, which consists in producing a layer of gramophone material containing shellac upon a basic structure of thermoplastic material and fibrous material, the latter being in disk form, and impressing a sound record groove into the layer of gramophone material while the said layer and the thermoplastic material of the base are both softened by heat.

15. The method of making disk-shaped sound record tablets, which consists in producing spaced layers of gramophone material separated by fibrous material in disk form and by thermoplastic material, and impressing a sound record groove into the gramophone material while the latter and the intermediate thermoplastic material are softened by heat.

16. The method of making disk-shaped sound record tablets which consists in producing spaced layers of gramophone material separated by fibrous material in disk form and by thermoplastic material, and impressing a sound record groove into both layers of gramophone material while the latter and the intermediate thermoplastic material are softened by heat.

17. The method of making disk-shaped sound record tablets which consists in pro-

ducing spaced layers of gramophone material
containing shellac, separated by fibrous ma-
terial in disk form and by thermoplastic
material, and impressing sound record
5 grooves into both layers of gramophone ma-
terial while the latter and the intermediate
thermoplastic material are softened by heat.

In testimony whereof I have signed my
name to this specification in the presence of
two subscribing witnesses.

JOSEPH SANDERS.

Witnesses:

F. T. CHAPMAN,
EDWIN S. CLARKSON.