

A. EICHENGRÜN.
GRAMOPHONE RECORD.
APPLICATION FILED JULY 20, 1912.

1,175,728.

Patented Mar. 14, 1916.

FIG. 1.

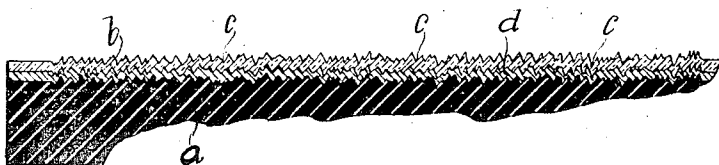
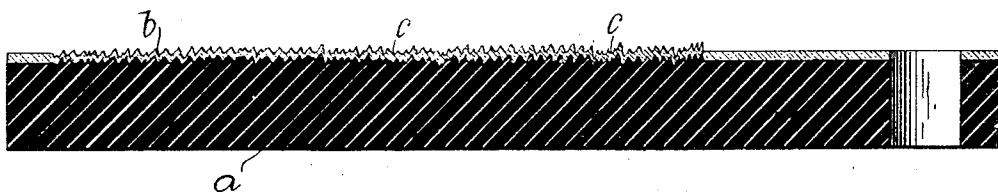


FIG. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

ARTHUR EICHENGRÜN, OF BERLIN, GERMANY.

GRAMOPHONE-RECORD.

1,175,728.

Specification of Letters Patent. Patented Mar. 14, 1916.

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To all whom it may concern:

Be it known that I, ARTHUR EICHENGRÜN, a subject of the German Emperor, residing at 87 Konstanzerstrasse, Berlin, Germany, have invented certain new and useful Improvements in and Relating to Gramophone-Records, of which the following is a specification.

This invention relates to sound records, tablets, disks or other bodies for use in sound recording and sound reproducing machines.

Sound records used for gramophones and the like apparatus give after a very short use indistinct and impure tone. This is caused by microscopically small injuries to the edges of the sound grooves or phonetic characters. This phenomenon is due to the brittleness of the foundation material containing shellac, colophonium, asphalt and the like that is generally used for making such sound records. Numerous attempts have been made to obviate this drawback by replacing the usual foundation material by elastic substances such as celluloid, xylonite, gallalite, hardened gelatin, ebonite and the like. These materials, however, have not proved altogether satisfactory for this purpose. Celluloid, which was particularly recommended, is liable gradually to settle down until its surface become level, the phonetic characters then becoming partially or entirely obliterated; moreover celluloid is liable to shrink and its tension then becomes so altered as to warp the record. Apart from this physical change of celluloid the material itself is too hard for the purpose in question and produces a shrill harsh tone, and it is inconvenient to employ.

The present invention aims at obviating these drawbacks and at imparting to the record body the requisite degree of toughness coupled with a sufficient but not undue degree of hardness, and also at very materially improving the tone and the details of the phonetic record and at simplifying the process of its manufacture. For this purpose according to the present invention the foundation layer or body of the record is coated with a layer of cellulose ester containing the acetyl group prior to receiving the sound record and said sound record is then impressed in the layer of the cellulose ester and preferably also in the layer of other material immediately below said cel-

lulose ester. Record bodies produced in this way retain the phonetic characters permanently because the layer of cellulose ester containing the acetyl group is not liable to level down like a celluloid layer. Such records are not liable to shrink and in consequence of the plasticity and non-elastic character of the layer a fine, soft, mellow tone is obtained.

Owing to the high concentration of the solutions which can be prepared with cellulose ester containing the acetyl group, they can be applied to the record disk in one operation without the necessity of successive coatings or applications. The plasticity of the cellulose ester containing the acetyl group can be modified or adapted to the material in conjunction with which it is to be used, that is to say to the material forming the underlayer or body. This is of vital importance to the production of a good tone because it will be obvious that the particular kind of sound obtained from a record body of one kind of material (say for example cardboard) will be very different from the one obtained from a record body of a widely different material such for instance as vulcanite.

A further advantage is that, where the film of the cellulose ester is so thin that the sound record is impressed not only in said film but in the under-layer the guiding of the needle is effected by said under-layer as well as by the cellulose ester layer while the cellulose ester will protect the walls of the sound record in the under-layer and prevent them from crumbling or being otherwise damaged or defaced.

I have sometimes found it convenient not to make layers of cellulose ester containing the acetyl group alone but to employ mixtures of the same with softening agents such as di-chlorhydrin or with liquid or solid bodies adapted to impart increased plastic properties to the layers of cellulose ester such for example as camphor substitutes, and it will be obvious that if desired organic and inorganic filling materials, especially in a finely powdered state may be admixed therewith. Of inorganic filling materials I have found mineral powders presenting a certain resistance to the needle especially convenient, such for example as gypsum, kieselguhr, or the like.

The invention is diagrammatically illus-

110

trated in the accompanying drawings, in which:—

Figure 1 represents in section one form of the disk; and Fig. 2 another form thereof.

In the said drawings, *a* represents the foundation plate of resinous or other foundation material, and *b* the covering or layer of cellulose ester containing the acetyl group.

c represents the phonetic characters which it will be observed are impressed into both the cellulose ester coating and into the foundation plate.

The covering film is produced upon the shellac or other foundation plate either by coating the latter with a solution of cellulose ester containing the acetyl group with or without other substances, or by dipping the plates in said liquid or by injecting the liquid thereupon in which case the operation can be effected repeatedly, either by several treatments with the same solution or by alternate treatments with solutions of different composition or viscosity, and capable of producing different degrees of hardness. Suitable solvents for this purpose are such solvents of cellulose ester containing the acetyl group as will not, in this mode of employment, exert a dissolving action on the shellac or other foundation plate such as for example mixtures of alcohol and benzene (C_6H_6). Or if desired the layers of cellulose ester can be made beforehand by allowing the solution to dry in thin sheets or films upon any suitable supporting surfaces, or by cutting such thin sheets or films from thicker plates or peeling them from blocks, and then combining them with the shellac foundation in a suitable manner such as by joining them together with a solvent or by warming, in some cases under pressure.

If desired the layer of cellulose ester may be provided with a backing *d* (Fig. 2) formed of thin paper, silk, tin foil or the like which can be effected in machines adapted to produce large rolls of such a layer with its backing. Said layer with its backing is then merely laid upon the hot shellac mass, or other foundation and a perfect impression can be made since the characters can readily be impressed into the shellac or other foundation. An easy way of affixing said layer with its backing may be by means of a suitable adhesive material such as glue.

The disks thus obtained from the shellac or like plate of foundation material with two layers or coatings of cellulose ester con-

taining the acetyl group can be easily impressed while hot in the known manner and the surface will take the phonetic writing with ease and at the same time with greater sharpness than a mere shellac or the like disk without the coating.

It should be remarked that while it is old to make records for sound recording and sound reproducing instruments from celluloid or to provide them with a coating of celluloid or nitro-cellulose ester or to coat phonographic records with an extremely thin film of cellulose ester subsequent to the impression of the phonetic writing by applying a very thin solution which on evaporation leaves a film that adapts itself to the contours of the preëxisting impression, the novel feature of the present invention is that the blank record plate is provided with a layer or film of cellulose ester containing the acetyl group before the phonetic writing is impressed on the plate, which layer is plastic and non-elastic and quite distinct from the elastic non-plastic layer of celluloid; and moreover retains the phonetic characters imparted thereto more permanently than is the case with celluloid or the like.

It will be obvious that if desired in place of shellac or colophonium or the like resins or other plastic masses as foundation material there may be employed fibrous or other suitable materials such as cardboard or the like; also that in place of cellulose ester containing the acetyl group for the coating mixtures of other cellulose esters may be employed.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A record blank comprising a backing or foundation and a facing layer of a composition of cellulose ester containing the acetyl group and a suitable softening agent.

2. A record blank comprising a backing or foundation and a facing layer comprising cellulose ester containing the acetyl group, a suitable plasticity ingredient, and a filling material.

3. A record blank comprising a foundation, a facing layer of a composition of cellulose ester containing the acetyl group and a suitable softening agent, and a spacing or backing layer for said facing layer.

In testimony whereof, I affix my signature in presence of two witnesses.

ARTHUR EICHENGRÜN.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.