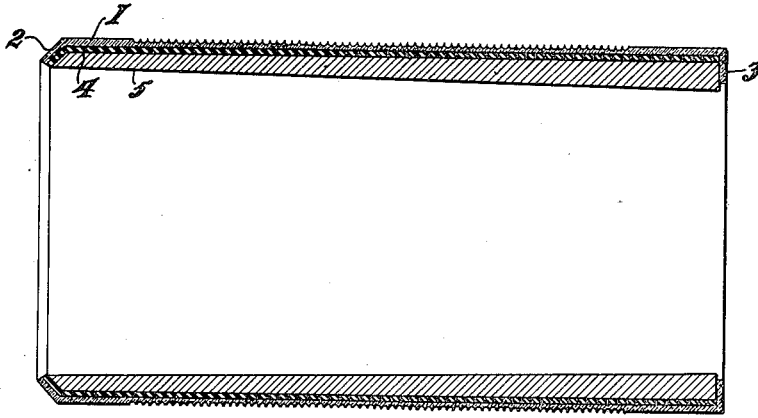


T. A. EDISON.  
METHOD OF MAKING PHONOGRAPH RECORDS.  
APPLICATION FILED AUG. 27, 1914.

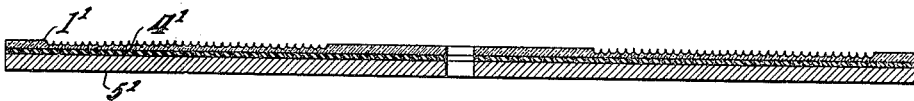
1,146,414.

Patented July 13, 1915.

*Fig. 1*



*Fig. 2*



*Witnesses:*

*Jacob Unger*  
*Frederick Bachmann*

*Inventor:*

*Thomas A. Edison*  
*by Dyer & Holden*

*his Atty.*

# UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, WEST ORANGE, NEW JERSEY, ASSIGNOR  
TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION  
OF NEW JERSEY.

## METHOD OF MAKING PHONOGRAPH-RECORDS.

1,146,414.

Specification of Letters Patent.

Patented July 13, 1915.

Original application filed January 20, 1912, Serial No. 672,397. Divided and this application filed August 27, 1914. Serial No. 858,799.

*To all whom it may concern:*

Be it known that I, THOMAS A. EDISON, a citizen of the United States, and a resident of Llewellyn Park, West Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Methods of Making Phonograph-Records, of which the following is a description.

My invention relates to methods of making phonograph records having a surface of wear resisting material, such as celluloid, this application being a division of my application Serial No. 672,397 filed January 20, 1912 and entitled Phonograph records.

The object of my invention is to provide a record of the type referred to permitting the reproduction of the sound record formed thereon with distinctness, loudness and purity. It has been common to provide records with surface films or veneers of hard materials such as celluloid; but the reproduction from these records has usually been accompanied by harsh unpleasant scratchy sounds which I have discovered to be due to the fact that the record surface is hard and unyielding so that the reproducer strikes the bottom of the record groove with a more or less sharp blow. In order to overcome this and other objections and at the same time provide a wear resisting surface for the record, I construct my improved record of a flexible or yielding surface film or veneer of hard material, such as a thin sheet of celluloid, and provide a resilient or yielding backing therefor, this backing being in my preferred construction formed of a base of hard material, such as plaster of Paris, and a thin film or layer of resilient material such as rubber, intermediate said surface veneer and base. The resilient material should be a substance, such, for example, as rubber, which yields but is not liable to permanent deformation under the pressure of the reproducer stylus. The resiliency of the intermediate film or layer permits a slight flexing or yielding of the surface film or veneer under the reproducer so that the sharp blows of the reproducer are cushioned and the harsh noises above referred to eliminated; while the rigidity of

the base prevents a diminution of the amplitude of the sound waves as reproduced, so that the sound waves on the record surface are transmitted with full amplitude to the reproducer diaphragm. It is understood that the intermediate film above referred to yields only sufficiently to permit the cushioning of the stylus so as to eliminate the harsh sounds referred to above.

Other objects of my invention will appear more fully in the following specification and appended claims.

In order that my invention may be more fully understood, attention is hereby directed to the accompanying drawings forming a part of this specification and in which—

Figure 1 represents a central vertical sectional view of a cylindrical sound record embodying my invention; and Fig. 2 represents a similar view of a disk sound record embodying my invention.

Referring to the drawings and more particularly to Fig. 1, the reference numeral 1 indicates a cylinder of hard material such as celluloid, this cylinder being formed at its ends with inwardly directed flanges 2 and 3. The cylinder 1 is covered on the interior thereof with a thin coating 4 of resilient material, such as rubber, this coating being preferably applied by rotating the cylinder 1 and applying a solution of the resilient material, as with a brush, to the interior or bore of the cylinder. When rubber is used, I prefer to employ a solution of the same in benzol. After the layer or film 4 has been allowed to dry, I form on the interior thereof, as by casting, a backing 5 of hard unyielding material, such as plaster of Paris. In carrying out the casting operation in practice, I place within the coated cylinder 1 a core having a recess or groove opening at one end and in the lateral surface of the core, and pour the material to be cast into this recess or groove, from which it is led into the annular space between the core and the film 4. The base 5 is dried by placing the record within an oven, after which the record may be reamed and otherwise suitably finished. In practice, the core is preferably slightly withdrawn before the base 5 is dried so as to prevent the forma-

tion of an objectionable projection within the bore of the record at the place where the recess in the mold is located. The flanges 2 and 3 are preferably of slightly greater diameter than the corresponding ends of the bore of the base 5, the record being supported when in place on the phonograph mandrel entirely by the base 5. The record impression is preferably formed on the surface of the celluloid film 1 prior to the application of the yielding film and the base thereto.

In order to produce best results, the film or veneer 1 should be sufficiently thin to be flexible or yielding and the film 4 should be of such a thickness as to cushion the sharp sudden movements of the reproducer stylus which produce the harsh sounds referred to above without causing such a flexing or yielding of the surface veneer as to appreciably decrease the volume of sound emitted during the reproducing of the record. In practice, I have found that a suitable thickness for the celluloid surface film is about .018" and that a suitable thickness for the intermediate film of rubber is about .0015".

Referring to Fig. 2, the numerals 1', 4' and 5' indicate respectively the hard surface film or veneer, yielding intermediate film, and hard base of a disk record constructed in accordance with my invention. The veneer 1 and film 2, as in the form of my invention described above are preferably formed respectively of celluloid and rubber. For the disk sound records, however, I prefer to provide a base not only of considerable hardness but also of considerable toughness and capable of adhering firmly to the intermediate film. Suitable materials for such a base are hard rubber or the phenolic condensation products which form the subject matter of applications of Jonas W. Aylsworth, Serial Nos. 496,060, 543,238 and 604,982. With the disk record as with the cylindrical record, the record impression should be formed in the surface veneer prior to the application of the flexible film and base thereto. The celluloid for the disk record may be of less thickness than that for the cylindrical record preferably about .005 of an inch in thickness, the yielding film 4' being preferably of substantially the same thickness as the corresponding film in the cylindrical record, *i. e.* about .0015".

I have found in practice that the employment of the yielding intermediate film referred to above not only improves the quality of the record but also decreases the wear of the stylus on the record and thereby materially increases the life thereof, the hard unyielding base preserving the loudness and distinctness of the record.

Various materials other than those specified above may be used by me and numerous

other modifications may be made within the scope of my invention.

What I claim as new and desire to protect by Letters Patent is as follows:

1. The process of making record tablets which comprises forming a surface veneer of hard material, applying to the back of said veneer a coating of resilient material, and allowing the same to dry, substantially as described.

2. The process of making record tablets which comprises forming a celluloid surface veneer, applying to the back of said veneer a coating of resilient material, and allowing the same to dry, substantially as described.

3. The process of making record tablets which comprises forming a thin surface veneer of hard material, applying to the back of said veneer a coating of rubber, and allowing the same to dry, substantially as described.

4. The process of making record tablets which comprises forming a thin celluloid surface veneer, applying to the back of said veneer a coating of rubber, and allowing the same to dry, substantially as described.

5. The process of making record tablets which consists in forming a thin surface veneer of hard material, applying to the back of said veneer a coating of resilient material, allowing the said coating to dry, and providing the coated veneer with a base of hard unyielding material, substantially as described.

6. The process of making record tablets which consists in forming a thin surface veneer of hard material, applying to the back of said veneer a film of resilient material, and casting a hard unyielding base within the said film, substantially as described.

7. The process of making record tablets which consists in forming a thin surface veneer of hard material, applying to the back of said veneer a coating of resilient material, allowing the said coating to dry, and casting a hard unyielding base within the coated veneer, substantially as described.

8. The process of making record tablets which consists in forming a thin tube of hard material, applying to the bore of said tube a coating of resilient material, allowing the said coating to dry, and casting a hard unyielding base within the coated tube, substantially as described.

9. The process of making record tablets which consists in forming a thin tube of hard material having inwardly directed flanges, applying to the base of said tube a coating of resilient material, allowing the said coating to dry, and casting a hard unyielding base within the coated tube, substantially as described.

10. The process of making record tablets

which consists in forming a thin tube of celluloid, applying to the base of said tube a coating of resilient material, allowing the said coating to dry, and casting a hard un-  
5 yielding base within the coated tube, substantially as described.

This specification signed and witnessed  
this 26th day of August, 1914.

THOS. A. EDISON.

Witnesses:

FREDERICK BACHMANN,  
MARY J. LAIDLAW.