

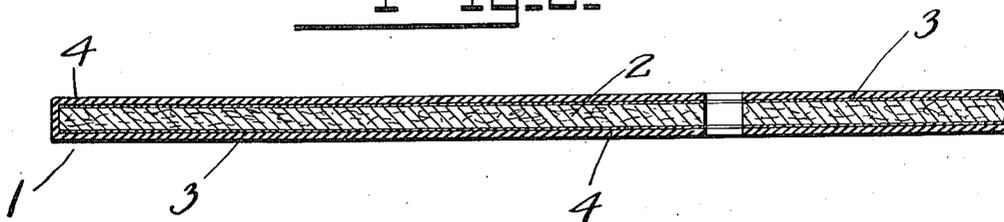
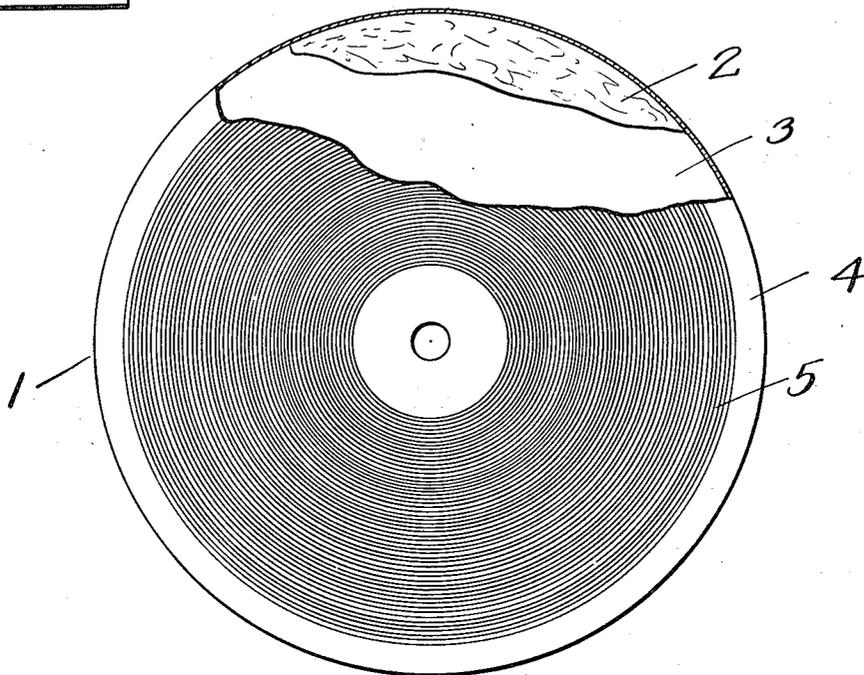
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V. H. EMERSON

LAMINATED PHONOGRAPH RECORD AND METHOD FOR PRODUCING SAME

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# UNITED STATES PATENT OFFICE.

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## LAMINATED PHONOGRAPH RECORD AND METHOD FOR PRODUCING SAME.

Application filed August 11, 1920. Serial No. 402,873.

*To all whom it may concern:*

Be it known that I, VICTOR H. EMERSON, a citizen of the United States, residing in the city, county, and State of New York, have invented new and useful Improvements in Laminated Phonograph Records and Methods for Producing Same, of which the following is a specification.

My invention relates to phonograph records and methods for their production and more particularly to records composed of materials having different properties and characteristics.

Generally described in connection with the disk type of record my invention comprises a medial body portion of suitable material having a layer of so-called record material upon its flat surface or surfaces.

It is well known that the portions of a phonograph record with which the reproducing point comes into frictional contact in order to be made durable and practicable are given certain wearing properties that need not be present in other portions of the record. Thus it has been sought in many ways to construct laminated disk records in which the wear resisting qualities are found at the surface and there only to a minimum of depth therein.

The record material as now almost universally employed in the record producing art, contains an indispensable ingredient, shellac varnish, which not only supplies the glassed surface that is required in successful record manufacture but also when in solution performs other important functions, among which is the binding together of the particles of gritty material that imparts to the record surface its greater durability.

I therefor contemplate using the so-called record material, containing shellac, in the manner and for the purposes above referred to, and for the broad idea of such use I am making no claim to novelty.

But in the use of the record material, however it may be put on, there have been found many problems and difficulties in obtaining a perfect record surface when a different material has been employed as a base for its reception. Thus, paper has been used with indifferent results irrespective of how it may have been treated and prepared for the purpose. The chief difficulty encountered when paper enters into the body portion of a record is due to its behavior under or following

the high pressure necessary to imprinting the sound grooves. Records thus formed after having been stamped with the imprint of the record groove frequently after a short period swell in places, producing contortions and disfigurements that affect the record groove injuriously for the reason that the irregularities of these grooves, in recording accurately all sound waves, are little short of the infinitesimal in their variations, and must be preserved in their minutest detail if the true vibratory reproduction is to follow. Not only are the sound undulations affected unfavorably if the body be not of a stable composition when submitted to pressure incident to stamping, but other irregularities will in the same manner and for the same reason appear in and upon the groove surfaces.

To eliminate these undesirable and objectionable features I employ as a base or body portion of a preferred form of my record and process a disk of prepared asbestos of suitable thickness and of the desired diameter, made from sheets which have previously been formed under high compression, relatively to the pressure incident to the record stamping operation, such sheets being known in the trade as asbestos wood.

While I preferably employ compressed asbestos fibrous material for the body portion of my record, I do not wish to limit the scope of my invention to that mineral as the particular form thereof alluded to.

The asbestos sheets formed under a pressure of, say, 10,000 pounds to the square inch acquire in a most advantageous form the particular properties required in the making of a phonograph record of exceptionally high merits in view of the fact that the usual pressure required in making records is not more than one fifth as much as that employed in the preparation of the asbestos wood.

I shall therefore describe the invention as employing in a preferred form the asbestos body disk made in the manner specified.

In the accompanying drawings, illustrative of features of a preferred form of my improved record and the process of its production,

Figure 1 is a plan view of a disk form of a phonograph record with portions of the top surfaces removed.

Fig. 2 is a diametral section of the record shown in Fig. 1.

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Referring to the drawings, the numeral 1 represents a record produced by my improved process, of which 2 is a disk formed of the mineral asbestos under a pressure of approximately 10,000 pounds to the square inch, substantially, having upon its flat surfaces a thin coating of glue 3.

The asbestos sheets from which the disks 2 are made are commercially obtainable and known in the asbestos trade as asbestos wood, and may readily be die-ed out in the exact form employed. The disk of asbestos may be dipped into a pan containing glue in solution, or may be applied in the usual manner by brush, and then allowed to dry, which in drying adheres firmly and uniformly to the surfaces of the asbestos disk 2.

I then add a layer of thermo-plastic record material 4, preferably dusted on, in the usual manner to the required thickness, and apply the heated matrix in the ordinary way to one or both sides of the asbestos disk, forming thereon the groove 5.

The relatively incompressible asbestos body member 2 plays an important part in the process of laying on the smooth record surface 4, and forms a stiff, durable record body, having all the characteristics of commercial records as heretofore made. The asbestos layer is hard, firm and substantially incompressible, and thus in the process of fixing the film of record material because of its hard and unyielding structure enables the matrix plate to form a smooth and perfect record surface thereon.

This advantage may not on first consideration be entirely obvious. The record material, although it be prepared with unusual care, contains many minute particles which must be broken up or crushed if the surface be given the required degree of smoothness. Thus the hard asbestos layer furnishes the equivalent of an anvil surface between which and the metallic face of the matrix the thermo-plastic record material is ironed out into the desired high degree of smoothness for successful phonographic reproduction.

Furthermore it will be seen that by employing a medium similar to asbestos wood which is formed under a pressure many degrees higher than that under which the record is stamped out, there will be little or no yielding back of the material either immediately or eventually after the stamper has lifted.

Hence it will be seen that by using a substantially incompressible under layer or body portion, a record surface of exceptionally high reproducing qualities results.

It is of course evident that many other materials than asbestos wood would furnish in sufficient degree the rigidity required to obtain the smooth surface thus acquired, yet their number is greatly reduced when the

further requirements are added of furnishing a material which will retain the record material in permanent intimate contact upon its record surfaces.

All of these advantages I find to be supplied in a peculiarly advantageous manner by the sheet asbestos described and with no serious disadvantages or drawbacks.

If the surface of the asbestos wood be found to have a tendency to chip off in even minute particles which are carried in the flow of the thermo-plastic record material as it is spread over the surface in the stamping process, such objectionable features may be prevented by laying a thin sheet of paper over the surface of the asbestos disk which may be secured thereto by glue and also given upon its top surface a second layer of glue.

I have already referred to placing a film of glue upon the surface of the asbestos disk or core for reasons specified. This application of glue to the surface of the disk furthermore acts to prevent the alkali of the asbestos layer from disintegrating the record material.

The glue coat furnishes other important functions in the form used. It smooths down the fibres at the surface of the asbestos plate and thus provides a smooth glassy surface as a foundation for the record material to flow over as it softens under the heated matrix plate.

Another important purpose subserved by the coating of glue is to provide a more complete and intimate union between the record material and the asbestos core.

The record thus produced by my improved process not only has superior sound reproducing qualities, but also is durable and comparatively inexpensive to manufacture. Owing to the inordinate advance in recent years of the price of the ingredients of which records were formerly composed, it is prohibitive, at least at the present day, to make up phonograph records entirely of the so-called record material. As an alternative, many attempts have been made to find substitutes for the greater portion of the record body. This method, as has already been seen, has its limitations and difficulties and the present process and record formed in accordance with my invention has for its object the attainment of all the advantages of a homogeneous record construction with few or none of the disadvantages of the fabricated substitute therefor.

Having described my invention, what I claim is:

1. A sound record blank having a body portion formed from sheet asbestos and thermo-plastic material thereon.

2. A sound record blank having a body portion made from sheet asbestos formed under relatively high pressure and thermo-

plastic record material impressed thereon under pressure of less intensity than that under which the asbestos sheet has been formed.

5 3. A method for making sound records which consists in preparing a disk of asbestos under relatively high pressure, coating the disk with thermo-plastic record material and impressing a sound record  
10 groove in said material.

4. A method for making sound records which consists in preparing a disk of relatively incompressible asbestos material, coating the surfaces thereof with glue, applying a thermo-plastic layer of record material to the flat side or sides of said disk and im-  
15 printing therein a sound record groove.

In testimony whereof I have hereunto set my hand.

VICTOR H. EMERSON.