To all whom it may concern:

Be it known that I, Victor H. Emerson, a citizen of the United States, and resident of New York city, in the county of New York, and State of New York, have invented certain new and useful Improvements in Laminated Talking-Machine Records, of which the following is a specification.

My invention relates to improvements in the construction and manufacture of talking machine records and similar articles, and is particularly applicable to records of the disk type.

Owing to the relatively high cost of the materials customarily employed in the manufacture of disk records out of solid homogeneous stock, it has heretofore been proposed to construct such records with a base of paper or other sheet material, surfaced with sufficient record stock to receive the record grooves. The fundamental difficulty with records of this type has been their tendency to warp or become distorted, either as the effect of heat, which readily induces the relatively thin surface of record stock, or from the influence upon the paper base of the fluids applied to the surface thereof in the pretreatment of the base or in the application of the record stock thereon. This tendency to distortion has seriously affected the practical and commercial value of composite records of this type heretofore manufactured.

A principal object of my invention is to provide a composite laminated record employing a base of sheet material in which the tendency to warp is greatly reduced and under proper conditions is practically eliminated. Heretofore the sheets of paper or similar material employed in laminated records have been of substantial thickness, ordinarily forming by far the major portion of the record outside of the surfacing layer of record stock. I have found that the tendency to warp is substantially reduced by employing a paper sheet which is relatively thin, and which will form only a small proportion of the completed record.

A further object of my invention is to produce a record in which a relatively thin sheet base is used, without forming the major portion of the record from the usually relatively expensive record stock. For this purpose I employ a filler preferably of fusible material of bituminous nature applied to the opposite sides of the base sheet to build up a record body of requisite thickness.

Another object is to devise a laminated record having a base of paper or similar material so constructed and arranged that practically any of the various common kinds of paper may be employed for the base sheet, thereby reducing the cost of such sheet and the difficulty of obtaining it in the market.

A further object accomplished in this general way is the prevention of warping by combining with the base sheet which produces such tendency a suitable overlying filler which counteracts and resists such tendency.

As has been stated, sheet fillers ordinarily of fibrous material have heretofore been employed largely to reduce the cost of record materials. When this object is to be attained the base sheet obviously must be of substantial thickness, and is therefore liable to warp. Furthermore, machinery has been developed by means of which a surfacing of record stock may be placed upon a suitably formed base rapidly and cheaply, without resorting to the use of presses as in the original method of molding records from solid stock.

A further important object of my invention is to employ a relatively cheap filler or body portion which is capable of being coated with record stock by a machine of the type indicated, without employing a fibrous material such as paper for the major part of such body portion.

Another object is to provide a filler or body for the record which is mainly composed of a relatively cheap substance which is readily rendered plastic as by heat, without employing special apparatus, such as presses, rolls and the like, for forming the body portion into suitable tablets.

A more specific object is to produce such a body portion which may readily be manufactured on machines of the type above indicated.
A further specific object is to devise a record in which the body portion may best be produced in the abovementioned machines, and the surface coating may thereafter be applied by the same type of machine without damage thereto or to the body portion.

Other objects and advantages of my invention will be apparent from the following description, taken in connection with the accompanying drawings, in which:

Fig. 1 is a view partly in median perspective, partly in median section, of a disk record embodying my invention, and

Fig. 2 is an enlarged fragmentary median sectional view.

The record consists of three elements: a base sheet 10, a filler 11 forming with the base sheet the body or base of the record, and a surfacing or surface layer 12.

The base sheet 10 may be composed of any one of a great variety of materials, one of the principal advantages of my invention being the range of material suitable for use as a base. The only substantial requisites are sufficient tenacity and stiffness to support the filler 11 during manufacture, although such base preferably should be made of a relatively light substance. Various forms of fibrous material are suitable for the purpose, such as asbestos, woven felvides and the like; but I prefer to employ material of the general nature of paper. It has been found that in a record of the type disclosed herein practically any of the cheap grades of paper may be used without affecting the quality of the record.

I apply to both sides of the sheet 10 a layer of filler 11 of sufficient thickness to build up the record body to the requisite size.

The filler 11 is preferably composed of a material which may be readily rendered plastic for ease in applying it to the sheet 10, and which preferably is fused at a temperature which will not damage the sheet 10. For this purpose I prefer to employ material of a bituminous nature, such as one which contains asphaltum; it being necessary in the preferred form of my invention that this material have a melting point substantially higher than that of the ordinary record stock and preferably above 250° F., for reasons which will hereinafter become apparent. Obviously a great variety of bituminous substances and compositions containing the same are applicable; and if asphaltum is employed, it may be mixed with other substances well known to those skilled in the art to render it suitable for record purposes. For instance I may produce a filler by substituting a relatively cheap asphaltum for the expensive shellac in any of the various compositions ordinarily employed for record stock, though I have found it practicable to use a higher percentage of asphaltum relative to the other ingredients than is desirable when shellac is used.

One formula which is given for purely illustrative purposes includes the following ingredients:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphaltum</td>
<td>15 lbs.</td>
</tr>
<tr>
<td>China clay</td>
<td>5 &quot;</td>
</tr>
<tr>
<td>Kaolin</td>
<td>6 &quot;</td>
</tr>
<tr>
<td>Cotton flock</td>
<td>1/2 &quot;</td>
</tr>
<tr>
<td>Silica</td>
<td>5 &quot;</td>
</tr>
<tr>
<td>Rosin</td>
<td>1/2 &quot;</td>
</tr>
</tbody>
</table>

Obviously not only may these proportions be varied within wide limits, but a great variety of substitutions and omissions may be made, in accordance with the well-established practice in manufacturing record stock which is well-known to those skilled in the art.

The outer layer or surfacing 12 is composed of the usual record stock, and need only be sufficiently thick to take the record grooves with a slight wearing layer beneath the grooves. I have found that with a record thickness of eight to nine hundredths of an inch the surface of record stock need only be one hundredth of an inch thick, the balance of the record being composed of the filler and the base sheet. The latter may have the thickness of ordinary paper, sheets which are about four thousandths of an inch in thickness having been found suitable for the purpose; although thinner sheets may be used, the only limit being the power of the press to support the filler 11. Moreover, sheets considerably thicker than the ordinary paper may likewise be employed, it being necessary only that the filler layer 10 be sufficiently thick to counteract any warping tendency of the sheet 10. Under certain circumstances it may be necessary to treat the surface of sheet 10 with a suitable substance so that the filler 11 will adhere thereto. This has been found desirable where the sheet 10 is of paper and the material 11 contains a bituminous substance as its major component. Under such conditions it is desirable to apply to the surface of sheet 10 a solution of shellac or other similar material, as the bituminous filler will readily adhere to a shellac-treated base.

Various methods of manufacturing a record in accordance with my invention may be employed, and the particular characteristics of the various laminations will necessarily be adapted to the method used. In the preferred type disclosed herein I employ a filler rendered plastic by heat and record stock also softened by heat. For convenience in manufacturing this particular type I prefer to utilize a filler which remains substantially solid at the temperature at which the record stock is plastic.

I have found that this object is accom-
plished when the usual record stock is employed by selecting a filler becoming plastic above 250° F., as above described. This arrangement permits the filler to be applied to the base sheet in plastic form and then hardened, after which the record stock of any ordinary type may be deposited on the filler while the stock is heated to a point of sufficient plasticity without melting the filler. This is important, since the filler necessarily is inferior to the record stock in its ability to receive and retain the record grooves; and melting or fusing of the filler when the stock is applied thereto would result in an uneven outer layer, portions of the filler penetrating to or nearly to the outer surface. This would result in soft spots, rendering the record practically useless.

A highly convenient method of manufacturing records of this type is disclosed in my copending application Ser. No. 413,099, filed September 27, 1930. According to this method, the filler is applied to the base preferably in finely divided form and then fused by suitable heating means to produce a homogeneous layer of the filler in intimate engagement with one side of the base. The thin outer layer of record stock is then applied to the filler, preferably in the same manner, by dusting it on the exposed surface of the filler and then fusing the stock layer by heat properly regulated to prevent fusion of the hardened filler. However, by properly selecting the filler, it may be maintained at a temperature above the fusing point of the stock, so that the heat in the filler is employed to fuse and amalgamate the stock even though the filler remains hard. The other side of the base may be treated in the same way, and if desired the process may be made substantially continuous by the employment of suitable automatic machinery.

While I have disclosed the preferred form of my invention and indicated certain variations therein, it will be apparent that numerous other changes and substitutions of equivalents may be made without departing from the invention as defined in the following claims.

I claim:

1. A talking machine record, including a base of relatively thin sheet material, an intermediate layer of fusible bituminous material forming the principal bulk of the record, and a thin outer layer of record stock.

2. A talking machine record, including a base consisting of a relatively thin sheet of fibrous material, an intermediate layer of fusible bituminous material forming the principal bulk of the record, and a thin outer layer of record stock.

3. A talking machine record, including a base consisting of a relatively thin sheet of paper, an intermediate layer of fusible bituminous material forming the principal bulk of the record, and a thin outer layer of record stock.

4. A talking machine record, including a base of relatively thin sheet material, an intermediate layer of fusible material containing asphaltum and forming the principal bulk of the record, and a thin outer layer of record stock.

5. A talking machine record, including a base of relatively thin sheet material, an intermediate layer including a bituminous substance and forming the principal bulk of the record, and a thin outer layer of record stock.

6. A talking machine record, including a base of relatively thin sheet material, an intermediate layer including asphaltum and forming the principal bulk of the record, and a thin outer layer of record stock.

7. A talking machine record, including a base of relatively thin sheet material, a fusible intermediate layer containing asphaltum, and an outer layer of record stock fusible at a temperature below the fusing point of the intermediate layer.

8. A talking machine record, including a base of relatively thin sheet material, a relatively thin outer layer of fusible record stock, and an intermediate layer composed largely of a bituminous substance, said intermediate layer fusing at a temperature above the fusing point of said record stock.

9. A talking machine record, including a base of relatively thin paper, a fusible intermediate layer, including a bituminous substance, forming the main bulk of the record, and an outer layer of fusible record stock.


VICTOR H. EMERSON.