T. A. EDISON.
PHONOGRAPh RECORD.
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1,111,999. Patented Sept. 29, 1914.

Fig. 1

Fig. 2

Witnesses:
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Inventor:
Thomas A. Edison
by Frank C. Spofford, his Hly.
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 Phonograph-Records, of which the following is a description.

My invention relates to phonograph records having a surface of wear resisting material, such as celluloid.

The object of my invention is to provide a record of this type permitting the reproduction of the sound record formed thereon with distinctiveness, 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, 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 recessed core does not form a part of the present invention.

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 formation 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.

5 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
10 which produce the harsh sounds referred to
above without causing such a flexing or
yielding of the surface veneer as to ap-
preciately decrease the volume of sound emitted
during the reproducing of the record. In
practice, I have found that a suitable thick-
ness 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', 2'
20 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 pre-
fer to provide a base not only of considerable
hardness but also of considerable toughness
and capable of adhering firmly to the inter-
mediate film. Suitable materials for such
a base are hard rubber or the phenolic con-
densation products which form the subject
matter of applications of Jonas W. Ayls-
worth, Serial Nos. 496,060, 543,288 and
604,983. With the disk record as with the
35 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
45 thickness as the corresponding film in the
cylindrical record, i.e. about .0015".

I have found in practice that the employ-
ment of the yielding intermediate film re-
ferred to above not only improves the
quality of the record but also decreases the
wear of the stylus on the record and there-
by materially increases the life thereof, the
hard unyielding base preserving the loud-
ness and distinctness of the record. Various
50 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 pro-
tect by Letters Patent is as follows:

1. As a new article of manufacture, a rec-
ord tablet having a yielding surface veneer
of hard material, and a backing therefor
comprising a hard substantially unyielding
65 base and a layer of resilient material located
intermediate said surface veneer and base,
said resilient material being yieldable but
not liable to permanent deformation under
the pressure of the reproducer stylus, sub-
stantially as described.

2. As a new article of manufacture, a rec-
tord tablet having a yielding celluloid sur-
face veneer, and a backing therefor compris-
ing a hard substantially unyielding base and
70 a layer of resilient material located interme-
diate said surface veneer and base, said re-
silient material being yieldable but not
liable to permanent deformation under the
pressure of the reproducer stylus, sub-
stantially as described.

3. As a new article of manufacture, a rec-
tord tablet having a yielding surface veneer
of hard material, and a backing therefor
comprising a hard unyielding base and a layer
of rubber located intermediate said surface
80 veneer and base, substantially as described.

4. As a new article of manufacture, a rec-
tord tablet having a yielding celluloid sur-
face veneer, and a backing therefor compris-
ing a hard unyielding base and a layer
85 of rubber located intermediate said surface
veneer and base, substantially as described.

5. As a new article of manufacture, a rec-
tord tablet having a yielding surface veneer
of hard material, and a backing therefor
comprising a plaster base and a layer of re-
silient material located intermediate said
90 surface veneer and base, said resilient ma-
terial being yieldable but not liable to per-
manent deformation under the pressure of
the reproducer stylus, substantially as de-
scribed.

6. As a new article of manufacture, a rec-
tord tablet having a yielding celluloid sur-
face veneer, and a backing therefor compris-
ing a plaster base and a layer of resilient
material located intermediate said surface
100 veneer and base, said resilient ma-
terial being yieldable but not liable to per-
manent deformation under the pressure of
the reproducer stylus, substantially as de-
scribed.

7. As a new article of manufacture, a rec-
tord tablet having a yielding celluloid sur-
face veneer, and a backing therefor compris-
ing a plaster base and a layer of rubber
located intermediate said surface veneer and
base, substantially as described.

8. As a new article of manufacture, a rec-
tord tablet having a yielding surface veneer
of hard material, and a backing therefor
comprising a plaster base and a layer of rub-
er located intermediate said surface veneer
and base, substantially as described.

9. As a new article of manufacture, a rec-
tord tablet having a yielding surface veneer
of hard material, and a backing therefor
comprising a hard unyielding base and a layer
of rubber located intermediate said surface
120 veneer and base, said veneer being
less than .025 inches and said layer less than .002 inches in thickness, substantially as described.

10. As a new article of manufacture, a record tablet having a yielding celluloid surface veneer, and a backing therefor comprising a hard unyielding base and a layer of rubber located intermediate said surface veneer and base, said veneer being less than .025 inches and said layer less than .002 inches in thickness, substantially as described.

11. As a new article of manufacture, a record tablet having a yielding celluloid surface veneer, and a backing therefor comprising a plaster base and a layer of rubber located intermediate said surface veneer and base, said veneer being less than .025 inches and said layer less than .002 inches in thickness, substantially as described.

12. As a new article of manufacture, a record tablet having a yielding surface veneer of hard material, and a backing therefor comprising a hard unyielding base and a layer of rubber located intermediate said surface veneer and base, the thickness of said veneer being approximately .018 inches and the thickness of said layer approximately .0015 inches, substantially as described.

13. As a new article of manufacture, a record tablet having a yielding celluloid surface veneer, and a backing therefor comprising a hard unyielding base and a layer of rubber located intermediate said surface veneer and base, the thickness of said veneer being approximately .018 inches and the thickness of said layer approximately .0015 inches, substantially as described.

14. As a new article of manufacture, a record tablet having a yielding celluloid surface veneer, and a backing therefor comprising a plaster base and a layer of rubber located intermediate said surface veneer and base, the thickness of said veneer being approximately .018 inches and the thickness of said layer approximately .0015 inches, substantially as described.

This specification signed and witnessed this 19th day of January 1912.

THOS. A. EDISON.

Witnesses:

FREDERICK BACHMANN,

ANNA R. KLEHM.