

J. W. AYLSWORTH.
 PROCESS OF MAKING DUPLICATE SOUND RECORDS.
 APPLICATION FILED JAN. 29, 1908.

1,002,482.

Patented Sept. 5, 1911.

Fig. 1

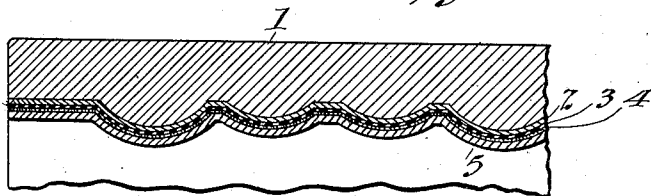


Fig. 2

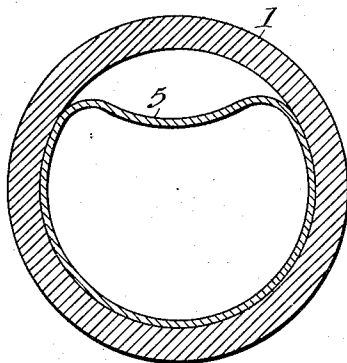


Fig. 3

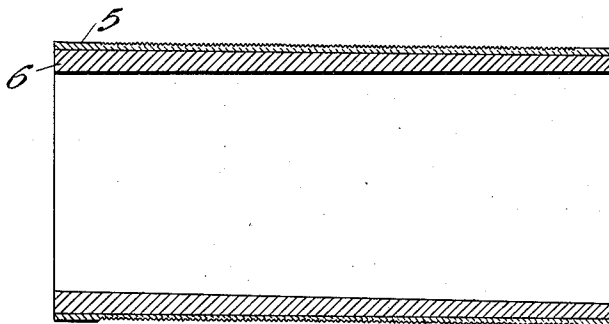
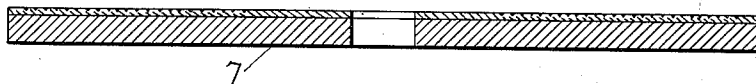


Fig. 4



Witnesses:

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UNITED STATES PATENT OFFICE.

JONAS W. AYLSWORTH, OF EAST ORANGE, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THOMAS A. EDISON, INCORPORATED, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PROCESS OF MAKING DUPLICATE SOUND-RECORDS.

1,002,482.

Specification of Letters Patent.

Patented Sept. 5, 1911.

Application filed January 29, 1908. Serial No. 413,168.

To all whom it may concern:

Be it known that I, JONAS W. AYLSWORTH, a citizen of the United States, residing at 223 Midland avenue, East Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Processes of Making Duplicate Sound-Records, of which the following is a description.

My invention relates to an improved duplicate sound record made of metal, or provided with a metallic wearing surface, and to an improved process of making the same, the object of the invention being to provide such a metallic record which shall be a very close copy of an original master, and to provide a process or method of producing them, which shall be capable of being carried out commercially in an effective way. Cylindrical sound records at the present time are generally made of a wax-like material molded or cast within a hollow matrix, and disk records are formed of a somewhat harder material employing considerable quantities of shellac, the impression being secured from a flat matrix. In either case, the records are subject to wear which would be very largely increased if the attempt were made to materially diminish the size of the record groove. Cylindrical and disk records have also been made of a tough material, like celluloid, but such records are generally of poorer quality than those formed of a wax-like material, and they also appear to deteriorate with time. Moreover, a celluloid record would be subjected to objectionable wear if the attempt were made to materially diminish the size of the record groove. The making of duplicate copies of sound records in metal has also been suggested, but in every case so far as I am aware, when this has been done, the matrix has been destroyed so that the process would be obviously unsuited for use for the commercial manufacture of metallic duplicates.

In order that the invention may be better understood, attention is directed to the ac-

companying drawing, forming part of this specification, and in which—

Figure 1, is a section of a cylindrical mold many times enlarged and illustrating the duplication from a master having a record groove only three-thousandths of an inch in width, a portion of a metallic film being illustrated as being formed in the mold; Fig. 2 a cross-sectional view of a matrix or mold illustrating the manner of removing the duplicate record therefrom; Fig. 3 a longitudinal sectional view showing a complete cylindrical record with a metallic wearing surface; and Fig. 4 a corresponding view showing a disk record with a metallic wearing surface.

In all of the above views, corresponding parts are represented by the same numerals of reference.

The matrix 1 shown in Fig. 1, is of the usual construction, being formed on its interior with a negative representation of a master record, and being produced by electroplating in any ordinary or suitable way. When the record to be duplicated is of disk form, the usual matrix for the purpose will be employed. I propose to electroplate a metallic film on the negative record surface of a matrix, whether of disk or cylindrical form, and in order to prevent the electrodeposited coating from adhering intimately to the matrix, I first coat the latter with an excessively thin non-metallic film, which while it will adhere sufficiently to permit the electrodeposit to be made, will, with relative facility, permit the electrodeposit to be stripped free of the record surface. Preferably, for this purpose I form upon the record surface of the matrix, an excessively thin non-metallic film produced by exposing the surface for a short time to the smoke or vapor of a highly heated resin gum, resulting in the deposit on the record surface of a microscopically thin layer thereof, substantially coherent and uniform throughout and of such relative thinness as not to interfere with the minute details of the record surface. The matrix, while it is

being thus exposed to the vapor of a highly heated hydrocarbon, may advantageously be connected to a source of static electricity which attracts the smoke or vapor and facilitates the formation of a more uniform film on the record surface thereof. When an excessively thin non-metallic film has been applied in this way to the record surface, I apply to the same a thin film of very finely divided graphite which is lightly burnished with a soft brush so as to thereby remove all particles which do not adhere to the non-metallic film.

In the drawing, 2 represents the usual nickel or gold deposit which is electroplated on the matrix so as to reduce oxidation, 3 the non-metallic film, and 4 the conducting film of graphite, all of these films, however, being somewhat exaggerated in thickness for the purpose of clearness. Having treated the matrix in this way, it is now placed in an electroplating bath and connected as a cathode, and a sufficiently thick layer of nickel or cobalt, or other relatively non-oxidizable metal is plated on the graphite film, so as to thereby form the layer 5, which constitutes the metallic surface of my improved record. This deposit may be given any desired thickness, say from one-hundredth to one-tenth of an inch, or more. During this plating the ends of the matrix as well as its outer surface, may be protected by a coating of varnish, paraffin, or other suitable material, so as to prevent the electrodeposition of the metal on any part of the matrix, except its record surface. Having obtained a metallic shell carrying on its surface the positive representation of the record to be duplicated, I remove the same from the matrix in any suitable way. When the matrix is flat, obviously the deposited record may be simply lifted off or stripped off by prying a sharp instrument between it and the matrix, but when the deposit is made in a tubular matrix, it is collapsed inwardly, as shown in Fig. 2, and, in this way, removed. After the electrodeposited shell or disk has been obtained in this way, it is mounted on a suitable cylindrical backing 6 (Fig. 3) or flat backing 7, (Fig. 4).

In constructing cylindrical records, the backing may be conveniently formed of plaster of Paris, which is cast within the shell in any suitable way, or the backing may be formed of papier-mâché, or other very cheap material, over which the electrodeposited material may be slipped, so as to be held in place by friction. In the manufacture of disk records the electrodeposit may be cemented or otherwise secured to a disk of paper or other cheap material. In every case, the material comprising the sup-

port or backing should have a relatively low coefficient of expansion, in order that any expansion or contraction to which it may be subjected will be within the elastic limits of the metallic film.

Records made as I have described can be manufactured with relative facility and are able to withstand enormously greater wear than is possible with duplicate records as now made, and this is so even when the record groove is of as fine a width as three-thousandths of an inch.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is as follows:—

1. The process of making metallic duplicates of sound records, consisting in first applying to the negative record surface of a matrix or mold, a thin film of a non-metallic relatively non-adherent material, in applying a conducting material to said film, and in electroplating a metal on the conducting material, and in finally separating the electrodeposited metal from the matrix, substantially as set forth.

2. The process of making metallic duplicates of sound records, which consists in applying to the negative record surface of a suitable matrix an excessively thin deposit of a hydrocarbon in finely divided condition, then in applying a conducting material to such a deposit, then in electroplating a metal on the conducting material and in finally removing the electrodeposited metal from the matrix, substantially as and for the purposes set forth.

3. The process of making metallic duplicates of sound records, which consists in subjecting the record surface of a suitable matrix to the vapor or smoke of a highly heated hydrocarbon, so as to produce an extremely thin coating of hydrocarbon on the record surface, then in applying thereto a conducting material, then in electroplating a metal on the conducting material, and in finally separating the electrodeposited metal from the matrix, substantially as and for the purposes set forth.

4. The process of making metallic duplicates of sound records, which consists in applying an excessively thin film of hydrocarbon in extremely finely divided condition on the record surface of a suitable matrix, then in applying a suitable conducting material thereto, then in lightly burnishing the conducting material, then in electrodepositing a metal on the conducting material, and finally in separating the electrodeposited metal from the matrix, substantially as set forth.

5. The process of making metallic duplicates of sound records, which consists in

connecting a suitable metallic matrix to a
source of static electricity, then in subject-
ing the record surface to the effect of a
hydrocarbon vapor, so as to deposit a thin
5 film of excessively finely divided hydrocar-
bon particles on the record surface, then in
applying a conducting material to said film,
then in electroplating a metal on said con-
ducting material, and in finally separating

the electrodeposited metal from the matrix, 10
substantially as and for the purposes set
forth.

This specification signed and witnessed
this 21 day of Jan. 1908.

JONAS W. AYLSWORTH.

Witnesses:

FRANK D. LEWIS,
ANNA R. KLEHM.