J. W. AYLSWORTH AND E. L. AIKEN.

ADELAIDE M. AYLSWORTH AND SAVINGS INVESTMENT AND TRUST COMPANY, EXECUTORS OF J. W. AYLSWORTH, DEC'D.

MATRIX FOR PRODUCING SOUND RECORDS.

APPLICATION FILED SEPT. 11, 1918.

1,345,115. Patented June 29, 1920.

Fig. 1

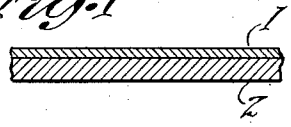


Fig. 2

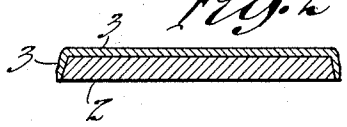


Fig. 3



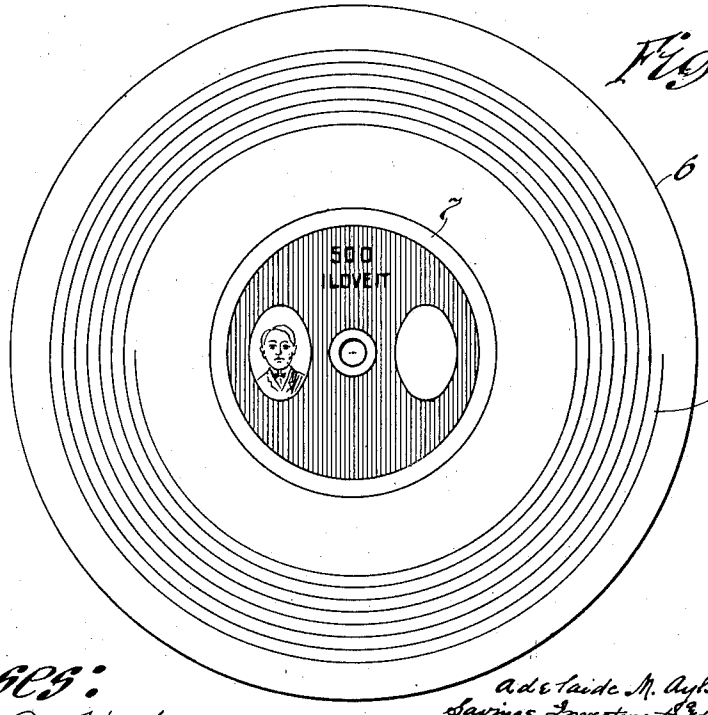
Fig. 4



Fig. 5



Fig. 6



Witnesses:
William A. Hardy
Jacob Unger

Adelaide M. Aylsworth and
Savings Investment & Trust Co.
of East Orange
Executors of the estate of
Jonas W. Aylsworth, deceased
Edward L. Aiken
By DeLos Holden
His Attorney

UNITED STATES PATENT OFFICE.

JONAS W. AYLSWORTH, DECEASED, LATE OF EAST ORANGE, NEW JERSEY, BY ADELAIDE M. AYLSWORTH AND SAVINGS INVESTMENT AND TRUST COMPANY, OF EAST ORANGE, NEW JERSEY, EXECUTORS, AND EDWARD L. AIKEN, OF EAST ORANGE, NEW JERSEY; SAID EXECUTORS AND SAID AIKEN ASSIGNORS, BY MESNE ASSIGNMENTS, TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MATRIX FOR PRODUCING SOUND-RECORDS.

1,345,115. Specification of Letters Patent. **Patented June 29, 1920.**

Original application filed June 19, 1912, Serial No. 704,517. Divided and this application filed September 11, 1918. Serial No. 253,653.

To all whom it may concern:

Be it known that we, ADELAIDE M. AYLSWORTH, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, and SAVINGS INVESTMENT & TRUST COMPANY OF EAST ORANGE, a corporation of the State of New Jersey, having its principal place of business at East Orange, in the county of Essex and State of New Jersey, the executors of the last will and testament of JONAS W. AYLSWORTH, deceased, late a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, and EDWARD L. AIKEN, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, state that the following is a description of certain new and useful Improvements in Matrices for Producing Sound-Records, invented by said JONAS W. AYLSWORTH and EDWARD L. AIKEN.

This application is a division of a pending application of said Jonas W. Aylsworth and Edward L. Aiken, Serial No. 704,517, filed June 19, 1912 and entitled Improvements in the production of sound records.

This invention relates to the production of sound records, and the principal object thereof is to provide an improved matrix for sound records having an improved form of label or other means of identification. Other objects and features of the invention will be hereinafter more fully described and claimed.

A matrix embodying the invention contains a reversed facsimile of the design to be reproduced on the record, this design being in half-tone. Such a matrix is adapted to be pressed into or against the record composition, which is maintained in a plastic state during the pressing operation. The matrix preferably contains a reversed facsimile of the sound record impressions as well as of the label; so that the record and the label can be impressed upon the record tablet by a single operation. By means of a matrix in accordance with this invention, a label embodying the finest design may be satisfactorily impressed into the record tablet.

In order that the invention may be more clearly understood, reference is hereby made to the accompanying drawings, in which Figures 1 to 4 inclusive are cross-sectional views illustrating diagrammatically various steps performed in producing the improved matrix.

Fig. 5 is a central vertical sectional view of a sound record formed by the use of such matrix; and

Fig. 6 is a face view of the record shown in Fig. 5.

In all the views like parts are designated by the same reference characters.

In practising the invention, an engraved copper cut 1 containing a reversed facsimile of the label impression is first made. This cut may be made by any of the well known engraving processes, but is preferably formed in halftone by the process of photo-engraving, a very fine screen, having preferably about four hundred lines per inch, being employed for producing the half-tone effect. This cut will have the parts which correspond with the places where no light has passed through the half-tone screen, such as the letters in the label shown in the accompanying drawing, solid and smooth, while the other portions, such as the background of the label shown, will be covered with minute depressions corresponding to the light openings of the screen. The cut 1 should be left-handed.

When the cut 1 has been obtained, the same is pressed into or against a member 2 formed of plastic composition. The composition of which the member 2 is formed is of such a nature as to be plastic at the temperature at which the impression is to be made thereon and to admit of the same being subsequently hardened. The product which is preferably employed for this purpose is fully described in United States Patent No. 1,020,593 granted March

19, 1912 to Jonas W. Aylsworth, and entitled "Phenolic condensation product and method of preparing the same." It may consist of a mixture of fusible ingredients which are transformed by chemical action upon the application of sufficient heat to form an infusible product, or it may consist of a final infusible product containing a solid solvent or plasticity agent which imparts to the product the property of becoming sufficiently plastic when heated to take the desired impression and to harden again when it becomes cold. When the mixture of fusible ingredients above referred to is employed, the material, preferably in a powdered form, is placed in a mold, after which the mold with the cut 1 on top of the powdered composition is placed in a press where the composition is rendered plastic by heat, molded under pressure against the cut 1, and finally transformed by application of heat to its final hard, infusible, insoluble state. After this, the plate 2 and cut 1 may be cooled and separated from each other. When the composition of the plate 2 is one which becomes sufficiently plastic to take an impression when heated, a plate or slab of the same may be heated and pressed against the copper cut to take the impression and then cooled while in contact with the cut.

The plate 2 having been formed, the same is rendered electro-conductive as by coating the same with graphite or other suitable conductive material, and is then submerged in an electroplating bath and coated to a sufficient thickness with copper or other suitable metal to form the electrotype 3. The latter is then separated from the plate 2 and the flanges or edges 3′ removed therefrom. The electrotype 3 is made rather thin, preferably about .01 of an inch thick. The face of the electrotype 3 containing the label design is next coated with a thin film of adhesive material which may be softened by heat, such as a mixture of beeswax and rosin, and is then placed with the coated face in engagement with that portion of the face of a master or sub-master record 4 at which it is desired that the label impression appear. The electrotype 3 and through it the adhesive material are then warmed to a slight extent and subsequently allowed to cool whereby the electrotype and the record become firmly secured to each other. When a mixture of beeswax and rosin is used as the adhesive material, the electrotype should be heated to a temperature between 100 and 150° Fahr. to produce the necessary adhesion. The next steps consist in rendering the record electro-conductive, as by covering the same with graphite or other suitable electro-conductive material, and in then immersing the same in an electroplating bath and coating the same in said bath with a layer of copper or other suitable metal to from the matrix 5. The electrotype 3 will thus become integrally secured to the center of the record matrix; and upon pressing this matrix into a plastic record tablet, both the record and the label impressions will be simultaneously pressed into the said tablet. A record produced in this way is shown in Figs. 5 and 6, the label impression being shown at 7 and the impressed sound waves at 8 in both of these figures. In this impression, the characters, lines, and other parts corresponding to the solid portions of the cut 1 and electrotype 3 will appear smooth and depressed below the remaining parts, which latter will be covered with a large number of minute and contiguous elevations corresponding to the light openings in the screen used in making the cut 1. These elevations so reflect the light from the record as to cause the portions of the record covered with the same to appear of a different shade from the remainder of the record, giving a black record composition a steelish grey appearance. Furthermore there are in the label different shades varying in depth in accordance with the variations in depth of the shadows on the original drawing or print. The solid portions of the label, of course, have the true color of the composition; so that the label is clearly legible and the design including all of the shadows on the original drawing or print is clearly discernible on the label.

With certain designs it may be desirable to rub suitable coloring matter over the molded label surface of the record to fill in the depressed portions of the impression. In this case, however, the matrix described above would not be entirely suitable; as the elevations produced on the sound record tablet by impressing such matrix into the same and above referred to, have rounded tops and would, therefore, not be clearly visible through the coloring matter. To obviate this objection, the member 2 may be omitted, and the electrotype 3 formed on the cut 1, a thin non-adhesive film of a suitable material being first coated on the cut to permit ready separation of the electrotype from the same. The copper cut 1 instead of being left-handed, as in the form of the invention first described would, of course, be right-handed. A record impressed from the matrix 5 containing the electrotype 3 produced in this way would contain a number of depressions in place of the elevations described above, there being sharp lines of division between the depressions and the adjacent surface of the label; so that the colored portions may be made to stand out clearly from the other portions. The depressions having been filled in with the coloring matter, the surface of the record is preferably ground slightly to remove the coloring matter from the high parts and

then varnished with any desired protecting varnish such as collodion, cellulose acetate, or copal, or a solution of phenol resin in alcohol. Obviously, the matrix 5 may be employed for the production of other working matrices to be used in pressing the records.

It is preferable to employ a record tablet 6 having a surface layer or veneer of a hardened infusible insoluble phenolic condensation product containing plasticity ingredients such that the veneer becomes plastic on being reheated to take an impression, (see Patent No. 1,020,593, hereinbefore mentioned, granted March 19, 1912 to Jonas W. Aylsworth); but this tablet may obviously be formed of any material capable of being rendered plastic so as to take a clear impression from the matrix.

While the preferred forms of sound record matrices in accordance with the invention are described herein, numerous changes may be made therein without departing from the spirit of the invention and the scope of the appended claims.

What is claimed as new and which it is desired to protect by Letters Patent is as follows:

1. As an article of manufacture, a sound record matrix provided with negative or reversed facsimiles of the sound vibrations and of a design in half tone, substantially as described.

2. As an article of manufacture, a sound record matrix provided with negative or reversed facsimiles of the sound vibrations and of a half-tone label in relief, substantially as described.

3. As an article of manufacture, a sound record matrix provided with negative or reversed facsimiles of the sound vibrations and of a design in half-tone with at least one hundred and fifty lines per inch, substantially as described.

4. As an article of manufacture, a sound record matrix provided with negative or reversed facsimiles of the sound vibrations and of a design in half-tone with approximately four hundred lines per inch, substantially as described.

5. As an article of manufacture, a sound record matrix provided with negative or reversed facsimiles of the sound vibrations and of a half-tone design in relief, said design having at least one hundred and fifty lines per inch, substantially as described.

6. As an article of manufacture, a sound record matrix provided with negative or reversed facsimiles of the sound vibrations and of a half-tone design in relief, said design having approximately four hundred lines per inch, substantially as described.

This specification signed this 6th day of September, 1918.

ADELAIDE M. AYLSWORTH,
SAVINGS INVESTMENT & TRUST COMPANY OF EAST ORANGE,
By DAVID BINGHAM,
President,
Executors of the estate of Jonas W. Aylsworth, deceased.
EDWARD L. AIKEN.