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T. H. MACDONALD.

PROCESS OF MANUFACTURING SOUND RECORDS.

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Fig. 1.

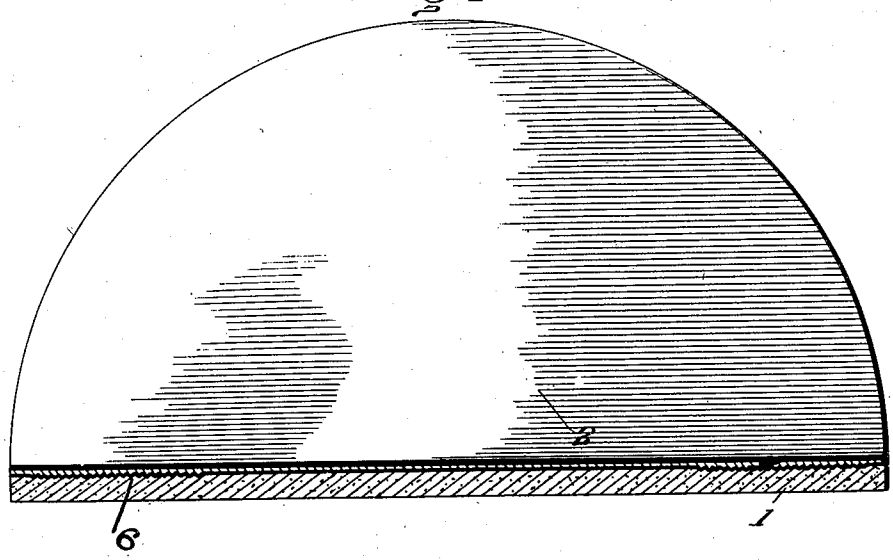
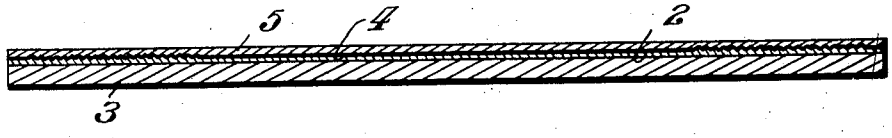


Fig. 2.



Witnesses

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PROCESS OF MANUFACTURING SOUND-RECORDS.

No. 836,646. Specification of Letters Patent. Patented Nov. 20, 1906.

Application filed February 29, 1904. Serial No. 195,917.

To all whom it may concern:

Be it known that I, THOMAS H. MACDONALD, a resident of Bridgeport, Connecticut, have invented a new and useful Improvement in Processes of Manufacturing Sound-Records, which invention is fully set forth in the following specification.

This invention relates to the production of sound-records in a metallic tablet, and more particularly to records of the disk form. Its object is to procure with commercial economy metallic sound-records of superior quality.

In carrying out the invention an original sound-record (preferably a record of varying depth) is made in the usual way—*i. e.*, by engraving upon a tablet of the ordinary wax-like material. From this original an electrotype master is made in the usual way—that is, by first coating the wax record with a coating of plumbago or other conducting material and then depositing thereon electrolytically a layer of suitable metal, such as copper. The copper master is separated from the wax original and after careful cleaning and polishing is plated with a plating of metal, such as silver, which is acted upon by a metalloid. This silver-plating is preferably applied by means of the "washing" method—*i. e.*, applied by a camel's-hair brush—rather than by electrodeposition. The copper plate is thoroughly cleaned and a silvering paste brushed over its surface. This paste is prepared by dissolving silver nitrate in water, precipitating the silver in the form of a chlorid by means of common salt, washing the precipitate, and dissolving it in potassium cyanid. The solution is filtered, if necessary, and mixed with enough whiting to make a thin paste. In practice it is found that twenty-two parts of silver nitrate to forty-two parts of cyanid of potassium give good results. The metallic negative is now used for obtaining duplicates by the direct electrodeposition of the metal upon the silver-plated master or negative. To make this operation commercially successful, it is necessary that a separating-film should intervene between the negative and the electrodeposited positive or duplicate, so that the two may be separated without injury to either. This film must be exceedingly thin, so as not to obliterate or modify the form of the sound-vibrations, and it should be uniform, continuous, and capable of being readily applied and renewed. These and all other conditions necessary to insure success are met by subjecting the silver-plated negative to the action of a chemical agent, such as the sulfid of an alkali or alkaline earth. Potassium sulfid has given the best results thus far obtained. Sulfur fumes have also been successfully used. In carrying out this part of the operation a weak solution of potassium sulfid prepared by dissolving one-half ounce of the sulfid in one gallon of water is flowed over the metal negative and at once poured off. This causes the formation of an exceedingly thin but uniform and continuous light-brown film of a sulfid of the metal acted upon, (in this case sulfid of silver.) The surface is then washed with clean water and placed in the plating-bath. A duplicate record of the desired thickness is now deposited electrolytically, copper being the metal preferred. The surfaces of the negative and positive can now be readily separated by introducing the blade of a knife between the edges at any point. The duplicates may be then polished and finished in any suitable way, as by nickel-plating. Duplicates made in this manner are not only very durable, but they have acoustical qualities of a very superior order, readily distinguishable by the ear from records made in wax or other plastic material. The noticeable characteristics are fidelity to the original sounds and a very rich and agreeable tone quality.

The formation of the separating-film (in the form of a salt or compound of the metal constituting the surface of the negative) may be accomplished in other ways. For example, the silver surface may be oxidized by heat or other method of oxidation and fair results obtained; but the best mode now contemplated of applying the principle of said invention is that stated above.

Other modifications will readily suggest themselves to persons skilled in the art to which the invention relates.

The negative can be used for the production of a large number of duplicates; but the separating-film must be renewed after every two or three duplicates.

For the purpose of graphically illustrating the invention reference is made to Figures 1 and 2 of the accompanying drawings, in which—

Fig. 1 is an isometric sectional perspective view showing a tablet with a record formed thereon having an electrodeposition superimposed upon the record-face of the

tablet, and Fig. 2 is a cross-sectional view showing the negative formed by the electrodeposition properly backed and a record electrically deposited thereon with a separating-film between the metallic negative and the record thus deposited.

Referring to Fig. 1 of the drawings, 1 represents a record-tablet of any suitable material, preferably wax or wax-like materials, having a sound-record formed thereon, which record in the drawings is indicated by the irregular line 6. This record-tablet having been suitably treated with some proper electrical conductor—as, for example, fine plumbago—is then placed in an electroplating-bath and a suitable metal 2—as, for example, copper—is then electrically deposited thereon in the usual way. The copper negative 2 thus formed having been removed from the wax tablet 1 is then preferably backed up by any suitable strengthening metal 3, Fig. 2—as, for example, type-metal—and the separating-film 4 (indicated by the dark line in Fig. 2) is then applied to the surface of the negative. The negative 2 thus backed up and provided with the separating-film 4 constitutes a metallic negative from which duplicates are obtained by the direct electrical deposition of metal 5 thereon in the usual way. The duplicate having thus been deposited upon the metallic negative is then readily separable from the metallic negative, this being rendered possible by the presence of the separating-film hereinbefore described.

By "separating-film" as herein used is meant a film which permits the actual bodily separation of the negative and the positive metallic record as distinguished from a layer of some substance which acts merely as a partition between the two bodies. By "separating the negative and positive" is not meant the destruction of the former, but the true bodily separation of the two intact.

What is claimed is—

1. The process of making metallic copies of sound-records by forming upon a metallic record-bearing surface a thin film by chemical treatment of said surface, electrodepositing a metallic plate on said film, and separating the two metallic bodies.

2. The process of making metallic sound-records by forming on a metallic record-bearing surface a thin separating-film of a metallic oxid or compound, depositing thereon by electrolysis a plate of suitable metal, and separating the two metallic bodies.

3. The process of making metallic duplicate sound-records by forming upon a metallic negative of disk form by acting chemically upon the surface thereof, a separating-film, electrodepositing thereon a plate of suitable metal, and bodily separating the negative and positive.

4. The process of making metallic duplicate sound-records by acting upon the surface of a metallic record-bearing surface with an agent such as potassium sulfid, thereby forming a film so thin as not to impair the form of the recorded vibrations, depositing electrolytically a layer of metal thereon, and bodily separating the two metallic bodies.

5. The process of making duplicate sound-records by forming a silver-plated negative, treating the surface thereof to form a thin coating of a compound of silver, then electrodepositing a layer of metal on said film, and separating the duplicate from said negative.

6. The process of duplicating sound-records by forming a metallic negative, forming thereon a sulfid of the metal whereof the surface of said negative is formed, electrodepositing a positive thereon, and separating the negative and positive.

7. The process of making sound-records by forming a metallic negative, treating the same with a solution of an alkali or alkaline-earth sulfid, depositing a positive thereon, and separating the negative and positive.

8. The process of making sound-records by forming a silver-plated metallic negative, treating the same with a solution of an alkali or alkaline-earth sulfid, depositing a positive thereon, and separating the negative and positive.

9. The process of making sound-records by forming a silver-plated metallic negative, treating the same with a solution of potassium sulfid, depositing a positive thereon, and separating the negative and positive.

10. The process of making sound-records by forming a silver-plated record-surface, forming thereon a thin coating of a compound of silver, depositing a metallic layer thereon, and separating the two layers.

11. The process of making metallic sound-records by forming a metallic record-bearing surface, forming thereon a sulfid of the metal whereof said surface is composed, electrodepositing a metallic layer thereon, and separating the two metallic bodies.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOMAS H. MACDONALD.

Witnesses:
C. B. INGALLS,
A. B. KEOUGH.