

No. 783,176.

PATENTED FEB. 21, 1905.

G. K. CHENEY.
PROCESS OF DUPLICATING MATRICES.
APPLICATION FILED JUNE 6, 1903.

Fig. 1.

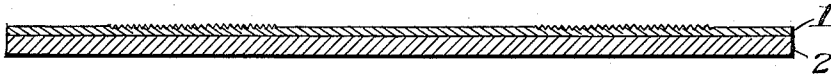


Fig. 2.

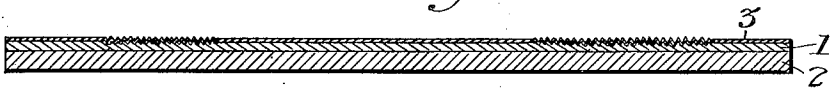


Fig. 3.

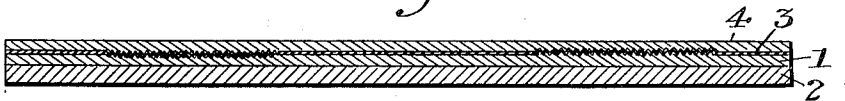


Fig. 4.

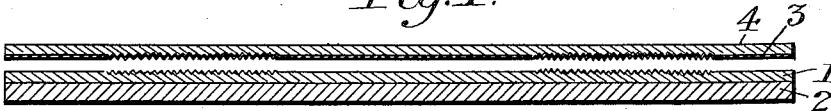


Fig. 5.

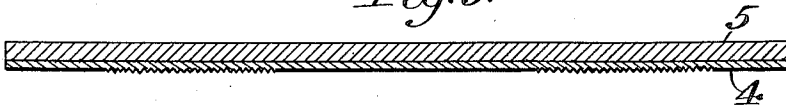
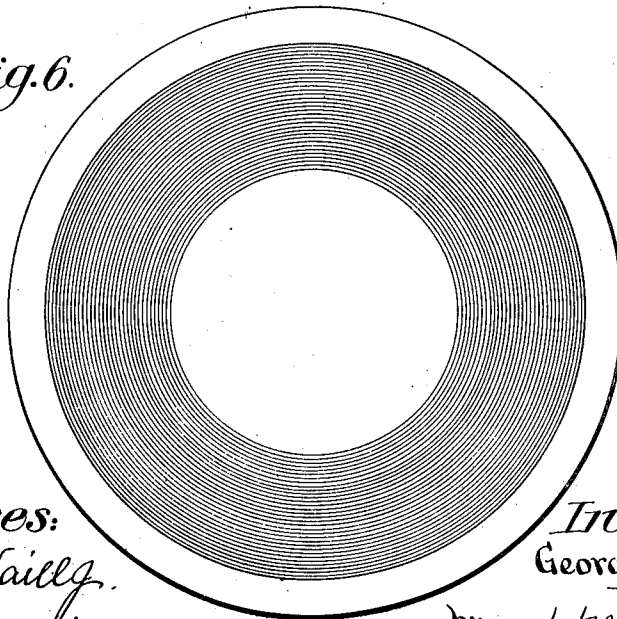


Fig. 6.



Witnesses:

Edw. W. Vaillg.
Samuel B. Kennedy.

Inventor:

George K. Cheney

by

John C. Bell,
Attorney.

UNITED STATES PATENT OFFICE.

GEORGE K. CHENEY, OF NEW YORK, N. Y.

PROCESS OF DUPLICATING MATRICES.

SPECIFICATION forming part of Letters Patent No. 783,176, dated February 21, 1905.

Application filed June 6, 1903. Serial No. 180,434.

To all whom it may concern:

Be it known that I, GEORGE K. CHENEY, a citizen of the United States of America, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Processes of Duplicating Matrices, of which the following is a specification.

My invention relates generally to sound-records for talking-machines and more particularly to a new and improved process for duplicating the matrices employed in stamping up such records.

Heretofore it has been the practice in recording sound for reproduction to first make a master-record in the form a soft-wax tablet and produce a metallic negative therefrom by a process of electrodeposition, the negative being subsequently backed and faced to serve as a die or matrix for use in stamping up commercial records, such as may be purchased in the open market. As the sale of these records is continually increasing and as the average life of a matrix is ordinarily limited to the production of a thousand or less clean sharp impressions, it is found necessary in meeting the demand to renew the matrix by providing a second, third, and oftentimes a fourth and fifth duplicate. The duplication of the matrix is attended with more or less difficulty and involves considerable time, labor, and expense, as the soft-wax master deteriorates rapidly and becomes hopelessly worn and unfit for further use after a second or possibly a third electrotype has been made therefrom. It also requires great care in handling and storage to protect it from mutilation and atmospheric changes, &c. The life of the master-record being thus limited, as above stated, it must sooner or later be reproduced if additional duplicates of the matrix are required, and it therefore becomes necessary to recall vocalists, musicians, or other artists to repeat the song, &c. Ordinarily considerable delay is experienced in securing the attendance of these artists, as they are usually traveling from place to place, and in addition to the expense for such services the second master may lack the spirit, tone quality, and merit of the original to such

an extent as to prove wholly unattractive to the buying public.

In view of the foregoing the present invention is designed to dispense with further use of the soft-wax master after the first electrotype is made therefrom and to employ such electrotype or negative in making a positive electrotype or permanent record, from which any number of negative matrices may be subsequently produced in a manner to be hereinafter more fully explained. The advantages of this method will be apparent, as in making a duplicate matrix from an electrotype, which latter I shall hereinafter term the "positive," such electrotype is not subjected to appreciable or, in fact, any wear, as it serves merely for use as a form on which metal is deposited electrolytically—that is to say, for the production of negative electrotypes in any desired number, which after being separated from the positive and properly backed and faced, are employed as dies or matrices for stamping up commercial records. For a detailed description of one application of this method reference may be had to the following paragraphs and to the accompanying drawings, forming a part of the specification, in which—

Figure 1 is a sectional view of a matrix or duplicate original record with its backing; Fig. 2, a similar sectional view showing the conductive film or coating applied thereto; Fig. 3 is a similar sectional view to Fig. 2, but showing the electrodeposit thereon; Fig. 4 is a similar sectional view of the same parts as in Fig. 3, but showing the electrotype or the last deposit separated from the duplicate original or matrix; Fig. 5, a similar sectional view showing the last electrotype backed in the usual manner; and Fig. 6, a plan view of the duplicate original or matrix, said plan view also serving to indicate the lower surface of the electrotype taken from the duplicate original or matrix.

The duplication of a negative matrix by my improved process is as follows: A master sound-record is produced in any suitable or well-known manner—as, for example, by recording directly upon the surface of a tablet of wax-like or other material—and a negative

electrotype 1 is made therefrom in the usual manner by a process of electrodeposition. I wish it understood, however, that I do not limit myself to a particular method of producing the original negative, as it may be molded, stamped up, or otherwise formed and will serve the purpose of the present invention. Such a negative 1 is employed to obtain a positive electrotype 1 by having the record-surface thereof first thoroughly washed with alcohol, benzin, or the like and then coated with a solution suitable for forming a conducting-surface 3, on which metal may be deposited electrolytically and which at the same time will serve as a protective covering by preventing the metal 4 thus deposited from adhering directly to the record-surface of the negative. By coating the surface of the negative or matrix with a solution of a material which is conductive and which also has the property of being easily separated from the negative without requiring the destruction of the negative by eating the same away with acids or by electrolytic decomposition or removal the process of making the duplicate original is much simplified and the cost of time and material greatly reduced. My method of duplicating an original record also has many advantages and material differences over those methods in which the matrix is formed of gelatin or layers of gelatin and other substances from which original wax record is removed and its place taken by a celluloid coating or layers of celluloid and gelatin to form the duplicate. The use of gelatin involves a great expense of time and extreme care, while at the same time the records duplicated are liable to be untrue, uneven, and warped, owing to the unequal expansion or contraction during the drying or hardening process. My process also allows the original negative or matrix to be preserved and used repeatedly.

Any solution which has the properties above described of giving a conductive coating to the matrix without adhering too closely to the same may be used; but I preferably employ the following ingredients in about the proportions stated: bisulfid of carbon, seven ounces; phosphorus, one-half ounce; beeswax, one-half ounce; spirits of turpentine, six ounces; asphaltum, one-half ounce. Such a solution in addition to forming a conducting-surface and protecting the negative from direct deposition of metal permits the positive electrotype 4 to be readily separated from the negative 1 with little effort and without marring or endangering either record-surface. After the solution of conductive material has spread upon the surface of the metallic matrix and allowed to dry or harden copper or other metal is electrolytically deposited upon the same. The matrix and copper positive or duplicate record thus formed are then separated manually or in any convenient manner. The copper positive thus produced after being

backed with metal 5 is identical in all respects to the ordinary commercial record and is preserved as a permanent record from which duplicate negative matrices may be made in any number desired without appreciable wear or deterioration of the same. To now produce such a duplicate negative, the positive after being washed with alcohol or benzin is given a film-coating of the solution above referred to and electroplated. When a sufficient depth of metal has deposited, it is removed from the tank, and owing to the presence of the interposed film between the positive and negative electrotypes they may be readily separated. The negative after being backed and faced in the usual manner is ready for use in the press as a matrix in stamping up commercial records. This part of the process it is not necessary to separately illustrate by drawings, as the present figures of the drawings clearly indicate the steps, which are similar to that of producing the duplicate original. Thus it will be seen that the number of matrices which may be thus produced from the positive is unlimited. The time, labor, and expense over the present methods are greatly reduced and the necessity for recalling artists is obviated. The positive or original from which such duplicates are made will last indefinitely with ordinary care, as it is not appreciably affected by changes in atmosphere or temperature and will not deteriorate or wear in use.

Having therefore described my invention, I claim—

1. The method of obtaining a reverse metallic copy of a metallic record or matrix which comprises, first, coating the record or matrix with a film of electrically-conductive but detachable material; second, electroplating said film, and, third, separating the metallic layers.

2. The method of obtaining a reverse metallic copy of a metallic record or matrix which comprises the following steps: first, coating the record or matrix with a film of electrically-conductive but detachable material; second, electroplating said film; third, separating the metallic layers, and, fourth, backing up the last-named electroplate.

3. The method of duplicating metallic sound-record matrices, which comprises, first, duplicating the master-record in metal; second, applying a film of conductive, separable material to the duplicate master, and, third, forming an electrotype upon said film-covered surface.

4. The method of duplicating metallic sound-record matrices, which comprises, first, duplicating the master-record in metal; second, applying a film of conductive separable material to the duplicate master; third, forming an electrotype upon said film-covered surface, and, fourth, backing the electrotype or matrix thus formed.

5. The method of duplicating sound-record

matrices, comprising, first, applying a solution of a conductive separable material to a negative matrix to form a protective film; second, electroplating the film-covered surface to form a positive electrotype; third, applying a solution of conductive separable material to the positive electrotype; fourth, electroplating the latter film-covered surface to form a negative electrotype.

10 6. The method of duplicating sound-record matrices, comprising, first, applying a solution of a conductive separable material to a negative matrix; second, electroplating the film-covered surface to form a positive electrotype; 15 third, applying a solution of said material to the positive electrotype; fourth, electroplating the latter film-covered surface to form a negative electrotype, and, fifth, backing the latter negative electrotype to form a matrix.

20 7. The method of obtaining a reverse metallic copy of a metallic record or matrix which comprises, first, coating the record or matrix with a solution of wax, a conductive liquid, and a volatile liquid, and, second, electroplating the film so formed.

8. The method of obtaining a reverse metallic copy of a metallic record or matrix, which comprises, first, coating the record or matrix with a solution of wax, bisulfid of carbon, and a volatile liquid, and, second, electroplating 30 the film-covered surface so prepared.

9. The method of obtaining a reverse metallic copy of a metallic record or matrix, which comprises, first, coating the record or matrix with a solution of wax, bisulfid of carbon and 35 spirits of turpentine, and, second, electroplating the film-covered surface so prepared.

10. The method of obtaining a reverse metallic copy of a metallic record or matrix which comprises, first, coating the record or matrix 40 with a solution of beeswax, bisulfid of carbon, spirits of turpentine, asphaltum and phosphorus, and, second, electroplating the film-covered surface so prepared.

Signed at New York, N. Y., this 4th day of 45 June, 1903.

GEORGE K. CHENEY

Witnesses:

J. E. PEARSON,
W. H. PUMPHREY.