Mar. 13, 1923. 1,448,376

R. G. BERGER

METHOD OF REPRESSING DISK SOUND RECORDS

Filed Jan. 7, 1922

FIG. 1.

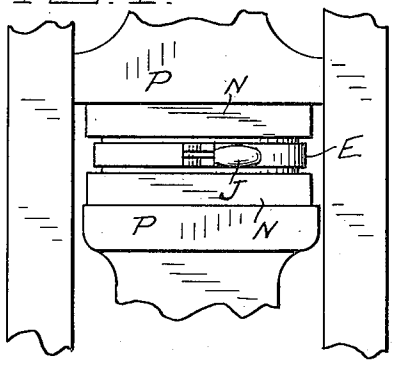


FIG. 2.

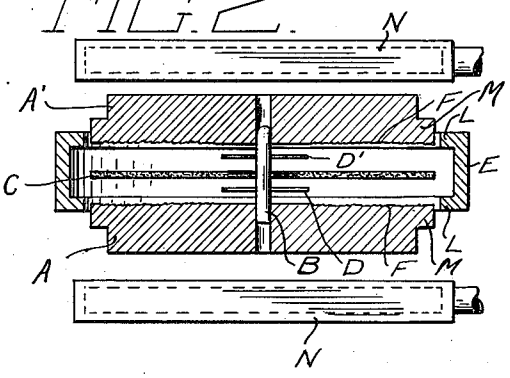


FIG. 3.

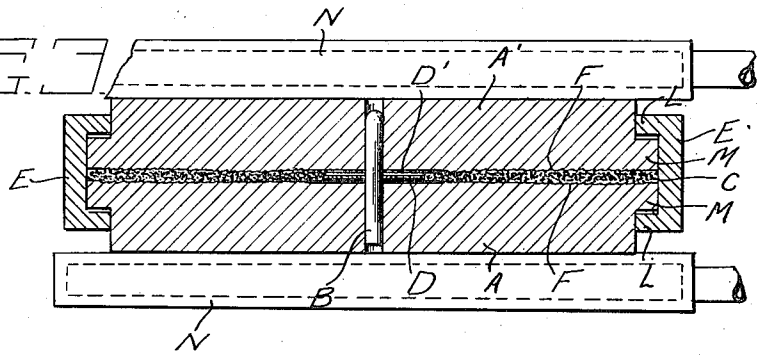


FIG. 4.

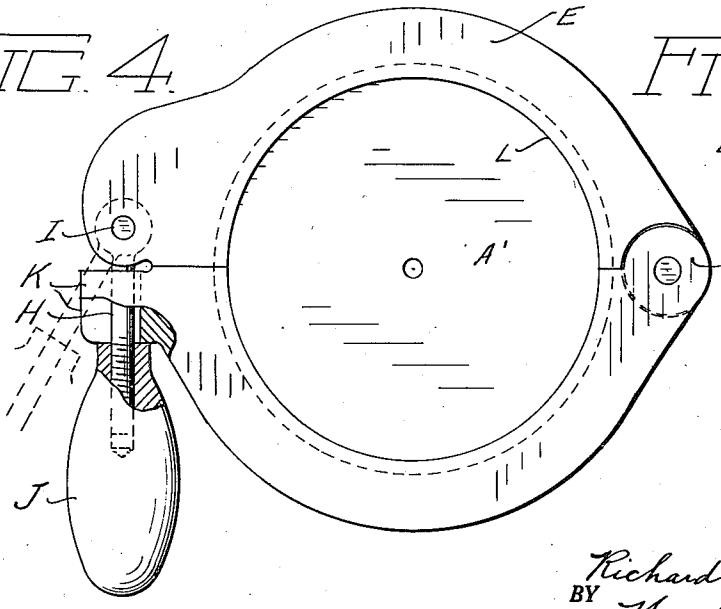
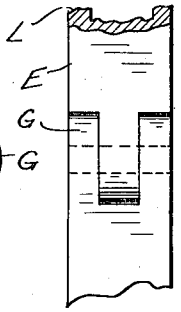


FIG. 5.



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Patented Mar. 13, 1923. 1,448,376

UNITED STATES PATENT OFFICE.

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METHOD OF REPRESSING DISK SOUND RECORDS.

Application filed January 7, 1922. Serial No. 527,744.

To all whom it may concern:

Be it known that I, RICHARD G. BERGER, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Methods of Repressing Disk Sound Records, of which the following is a specification.

This invention relates to disk sound-records and has for its object the utilization of old, worn, obsolete, cracked or broken disk sound-records, the same procedure being applicable and used regardless of the size of the record-diameter, thickness, and so forth, and regardless of the type of mechanical structure of the record whether of the usual "solid stock," that is, made of homogeneous thermoplastic material throughout, or of laminated sheet construction with one or two sheets of surface coated paper, or of surface treated cardboard records, or of any other type of composite disk record which has one or both surfaces of thermoplastic material. It results in new music of the disk sound-record type being producible at less cost than any other known method.

None of the known methods of pressing new disk sound-records will accomplish the object attained by the use of my invention. In the manufacture of new sound-records the dies and matrices are set and gauged to produce a record of standard size, diameter, thickness, and so forth, and a certain amount of overflow of the warm record material, generally about fifteen per cent is allowed. A commercial method of repressing records has to be flexible enough to accommodate records of all sizes, that is, having different diameters, thicknesses, and so forth. Also, the overflow of record material from the dies must be so slight that not only the thinnest type of disk record can be repressed without excessive loss either in weight or strength, but disk records of laminated sheet construction, that is, records having surface coated sheets of paper, can be repressed without breaking the paper sheets or exposing the paper of the record. In the procedure as outlined in the description of my invention, disk records of any size and type of construction, providing only that either the surface or the entire record is of thermoplastic material, may be repressed with a loss, because of overflow of record material, which averages less than one per cent of the original weight of the disk sound-record.

My method also differs radically from the known methods of repressing records involving the addition of new surface material, such as where either powdered record stock material is sprinkled upon the matrices, or new surface coated paper sheets are impressed into the old record as my invention does not involve the addition of any new record material which addition, it has been discovered, is an unnecessary, time-consuming and expensive procedure, inasmuch as the wear on the disk sound-record, during use, is of microscopic magnitude with in the sound lines of the record and of only slight magnitude upon the surface of the record, while the chemical composition of the sound-record has remained practically unchanged either by wear during use or by age. In order to repress sound-records successfully, without addition of new record stock material, loss of essential ingredients of the record composition must be avoided. This is accomplised by use of my invention, and new sound lines and a new surface are impressed upon the old disk sound-record without altering the chemical composition of the record material, as a result of which the addition of new record material is unnecessary.

An apparatus of any suitable construction, which satisfies the necessary conditions stated below, may be employed in carrying out my method of repressing records, the accompanying drawings showing in outline an apparatus I have found to be satisfactory.

The invention will be understood by reference to the drawings in which the parts shown are not in proportion as the thickness of the matrices and the height of the ring die particularly have been exaggerated for the sake of clearness.

Fig. 1 is a side elevation of a press showing a die for carrying out my method in position therein.

Fig. 2 is a central, cross sectional elevation through the die showing the relative positions of the elements for pressing, but separated for clearness and showing the heating elements in elevation.

Fig. 3 is a similar section through the die showing the elements in position for pressing.

Fig. 4 is a plan view of the die, and

Fig. 5 is an edge view of the hinge joint between the sections of the ring.

A represents the lower matrix and A^1 the upper matrix both of which have sound lines, indicated at F, on the side adjacent to the record to be repressed. The center pin B projects upwardly through the matrices and holds in position the record C, with the labels D and D^1 below and above the record. E is the ring die which fits closely around the periphery of the parts assembled. This ring comprises two sections hinged together at G and secured together on the opposite side by any suitable means which is capable of quick clamping and release such as a bolt H hinged to one section at I and on which is threaded a clamping handle J adapted to press against the rear sides of a pair of ears K on the other section of the ring between which the bolt H may be inserted, as is obvious. The ring is provided with annular flanges L adapted to embrace the flanges M on the matrices, the ring, when clamped about these flanges, tightly closing the space between the matrices, as shown in Fig. 3.

In carrying out my method, the ring die E and the two matrices A and A^1 are heated to the temperature approximately at which they are to be used. Into the lower matrix A, face upward upon a steam table or in an oven, is inserted the center pin B. A label D, the back of which has been treated so as to enable it to adhere to the paper label of the old record by means of a coating of varnish or shellac solution or else with an adherent coating of powdered shellac, powdered record stock or other thermoplastic material, is placed face downward over the center of the lower matrix. The record C, to be repressed, is placed over the lower label and matrix, and the label D^1, coated and prepared in the same manner as label D, is placed face upward upon the record. The upper matrix A^1 is now placed face downward over the label D^1 and record, and the ring die E is closed tightly around the periphery of the matrices and the interposed record so as to tightly enclose the record between the matrices. It is preferable that the record be hermetically sealed, but actual hermetical sealing under rapid operation is difficult to attain. It is sufficient, however, if it be so enclosed, that there is no substantial loss of water vapor or volatile constituents during the heating operation. If the record is not tightly enclosed within the die at this stage, then loss of water vapor in the form of steam and of volatile constituents of the binder material of the record will ensue when the parts assembled are heated, causing chemical changes in the thermoplastic composition of the record which will render the repressed record brittle and worthless.

The parts assembled are then heated between two steam tables, indicated in the drawing at N, or between two electrically heated hot plates or between any other suitable heated apparatus so as not only to render the whole composition of the record thoroughly plastic but also, at the same time, to exert some pressure or weight upon the record during this heating operation. The preliminary pressure may be applied either by a press or the weight of the elements used. This operation of exerting a preliminary pressure upon or weighting the record to be repressed while it is being heated is to insure uniform heating all over its surface and throughout its composition, and contributes materially to the success of the operation as thereby perfect contact between the faces of the matrices and the record composition is obtained, and "cold press" spots, places where the new sound lines of the matrices have not been impressed owing to lack of flow of the record material, are thereby avoided. This preliminary pressing or weighting, which should be sufficient to bring all parts of the opposed surface of the record in contact with the heating element, is usually only of slight magnitude, but is very desirable in order to avoid the "cold press" spots mentioned, and is not to be confused with the final pressure in the hydraulic press which follows to form the sound grooves. This heating may be done before the die is placed in the press or it may be done in the press, as indicated in Fig. 1 of the drawing in which P indicates the plates of the press.

After heating, such time as required to render the record composition thoroughly plastic with the preliminary pressing or weighting at the same time, which insures perfect contact between the record material and the faces of the matrices, the parts assembled are subjected to the usual operating pressure in a hydraulic or other suitable type of press where the pressure required to completely repress the record is applied, followed by cooling in the usual manner.

The procedure, as given, is applicable in the same manner regardless of the type of groove being replaced or impressed; that is, the groove may be either lateral cut or vertical cut. Cracks in records are sealed up during the repressing operation, so that the places formerly cracked cannot be distinguished by the sound when the repressed record is played. Broken records likewise can be pieced together previous to the heating operation, as a result of which the pieces are molded together during the repressing process. Single faced disk records can be repressed into single faced records by the

use of a blank disk on one side in place of a matrix with music lines, without departing from the spirit of this invention. Also, single faced records can be repressed into double faced records and vice versa by use of the herein described process without departing from the spirit of this invention.

The article prepared in the described manner, as far as record qualities are concerned, is equally as good as the original record or may be better, depending largely on the quality of the matrices used. Wear of the repressed records in use has been found to be equal to and in some cases to surpass the wear of the original record.

Having thus set forth the nature of my invention, what I claim is:

1. The method of repressing disk sound records which consists in placing an old record in contact with a matrix, tightly enclosing the record to such a degree as to prevent loss of material, heating the record and at the same time pressing the matrix and record together with sufficient force to bring all the opposed surfaces of the matrix and record in contact, and then applying sufficient force to press the sound grooves into the record.

2. The method of repressing disk sound records which consists in enclosing an old record to such a degree as to prevent loss of material therefrom, softening the record material by application of heat, and pressing a matrix against a surface thereof to form the sound grooves.

3. The method of repressing disc sound records which consists in enclosing an old record to such a degree as to prevent loss of any considerable amount of material therefrom, softening the record material by application of heat, pressing the heating means against the record during the heating operation with sufficient force to bring the surface of the record in contact therewith at all points whereby a uniform heating is obtained, and pressing a matrix against the record with sufficient force to form the sound grooves therein.

4. The method of repressing disk sound records which consists in placing an old record in contact with a matrix, enclosing the record to such a degree as to prevent loss of material therefrom, applying heat to the record through the matrix and during the heating operation pressing the record and matrix together with sufficient force to bring them into contact throughout their opposed surfaces, and then pressing them together with sufficient force to press the sound grooves in the record.

5. The method of repressing disk sound records which consists in enclosing an old record to such a degree as to prevent loss of material therefrom, bringing the record in contact with a heating element and during the heating operation pressing the element and record together with sufficient force to bring their opposed surfaces in contact throughout whereby a uniform heating of the record is obtained, and then pressing the record and a matrix together with sufficient force to form the sound grooves.

6. The method of repressing disk sound records which consists in placing matrices in contact with the opposite sides of the record, enclosing an old record to such a degree as to prevent loss of material therefrom, softening the record by applying heat thereto through the matrices and during the heating operation pressing the record and matrices together with sufficient force to bring their opposed surfaces in contact throughout, and then pressing them together with sufficient force to form the sound grooves.

7. The method of repressing disk sound records which consists in placing a label the back of which has been coated with securing material between an old record and a matrix with its face toward the center of the matrix, tightly enclosing the record to such a degree as to prevent loss of material therefrom, heating the record and matrix and during the heating operation pressing them together with sufficient force to bring their opposed surfaces together throughout, and then pressing them together with sufficient force to form the sound grooves.

8. The method of repressing disk sound records which consists in placing a matrix face upward and fitting with a centre pin, placing on the center of the matrix face downward a label the back of which has been coated with securing material, placing an old record to be pressed over the label and matrix, placing face upward on the center of the record a label the back of which has been coated with securing material, placing a second matrix face downward upon the record and over the label, tightly enclosing the record to such a degree as to prevent loss of material therefrom, heating the record and matrices and at the same time pressing them together with sufficient force to bring their opposed surfaces in contact throughout, and then applying sufficient pressure to form the sound grooves.

In testimony whereof I affix my signature.

RICHARD G. BERGER.