Dec. 20, 1927. 1,653,524

H. W. WEBB

METHOD FOR MAKING SOUND RECORDS

Filed Jan. 28. 1927

Fig. 1.

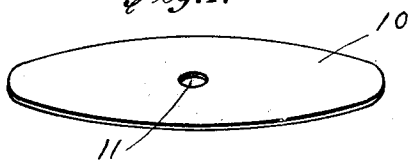


Fig. 2.

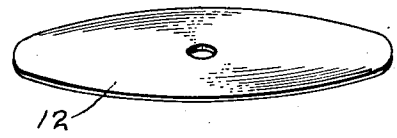


Fig. 3.

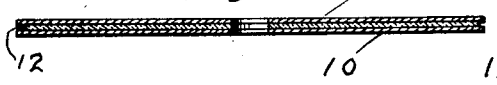


Fig. 4.

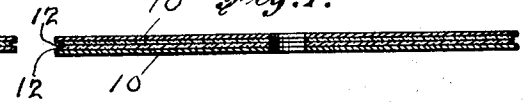


Fig. 5.

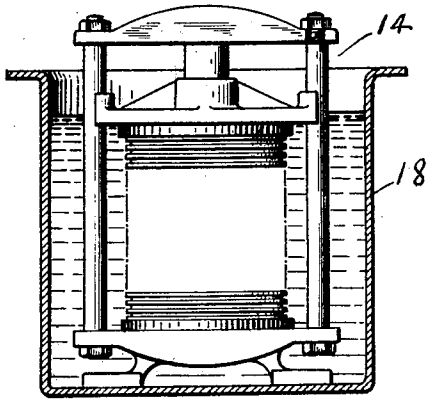


Fig. 6.

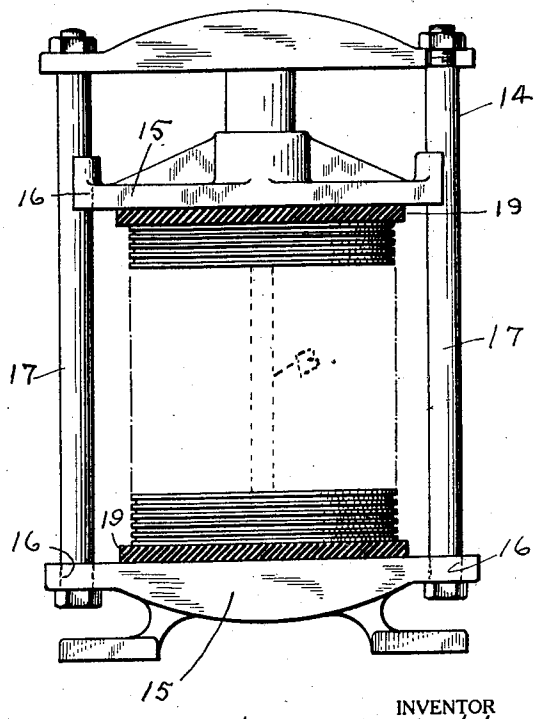
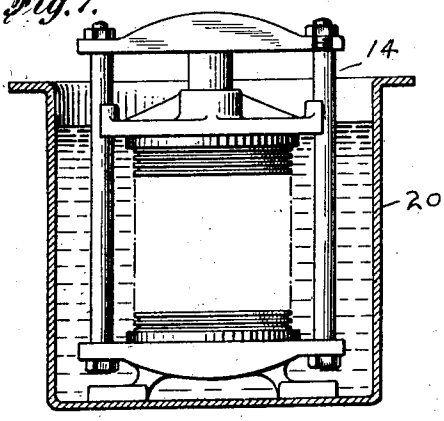


Fig. 7.



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UNITED STATES PATENT OFFICE.

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METHOD FOR MAKING SOUND RECORDS.

Application filed January 28, 1927. Serial No. 164,364.

This invention relates to a method for making phonograph records.

A general object of the invention is to provide a method for making phonograph records at a relatively high speed of production and also to produce records on thin material, such as sheet celluloid, which will be free from warping and twisting strains.

The invention includes the clamping together of any desired number of record blanks in contact with the forming matrices, and in immersing the clamped-together parts in hot water or other suitable heating medium to provide the necessary expansion of the members in contact to cause the matrices to impress in the record blanks the record-forming grooves. When the impression has been made, the assembly, still in its clamped-together condition, may be transferred to a cold-water bath to hasten the cooling and increase production as well as to set the outer portions of the records quickly and before the centers have become cool.

In the described process the application of the temperature-changing mediums to the periphery of the group of assembled parts functions in an effective manner through the instrumentality of the matrix members in acting as heat-conducting agencies in conducting the temperature of the bath radially inwardly from the peripheries to the centers of the record blanks with which they are in contact. It has been found that this method of applying heat or cold to the blanks so that it advances inwardly along the plane of the material, is effective in preventing the setting up of stress and strains in the material which tend to warp and twist the records.

In order to prevent access of heat or cold to the ends of the series of record blanks, insulating material is provided at the extremities so that the application of heat or cold is invariably made along radial planes and not axially of the assembly, the application of heat from one face to the other of the sheet having been found unsatisfactory because of the strains thereby set up in the discs.

Other features of the invention will be hereinafter referred to.

In the drawings, in which a preferred embodiment of the invention has been selected for illustration,

Figure 1 is a perspective view of a record blank.

Figure 2 is a perspective view of a record matrix.

Figure 3 is a sectional view of a matrix and blank assembly for single face records.

Figure 4 is a view similar to Figure 3 of an assembly of matrices and blanks for a double faced record.

Figure 5 is a sectional view showing the heating or forming operation.

Figure 6 is a side view of a forming device ready for operation.

Figure 7 is a view similar to Figure 5 showing a cooling operation.

Referring to the drawings for a more detailed description of the invention, record blanks 10, formed of celluloid, phenolic condensation product or like material, are provided with centrally disposed openings 11 for assembly with the matrices or masters 12 on the axially disposed rod 13 of a clamping device 14.

The clamping device 14 is made up of the two head members 15 adapted to receive between them a group or series of record blanks and masters arranged in alternation for single-faced records, and with two masters placed back-to-back alternating with single blanks when it is desired to produce double-faced records. The two head members 15 are provided with slots or openings 16 in which to receive the opposite ends of holding rods 17 when the heads have been forced toward each other in compressing relation to the intervening series of blanks and masters. The compression of the parts between the head members and securing them under compression by the use of the rods 17 may be brought about in any desired manner, the placing of the parts between the head and platen of a press having been utilized in practice.

When the series of record blanks 10 and matrix or master members 12 have been thus placed under compression and in intimate contact, the assembly is placed in a receptacle 18 of hot water, heat from which is conducted through the matrices, because of the good heating conducting qualities there-

of, from the outer peripheral portions to the central portions so that the engaged record blank is correspondingly heated and softened to a degree of plasticity which enables it to take the impression of the sound record zone on the face of the master.

I have found that not only is the heat carried quickly to the whole area of the record blank, but the progressive spread or advance of the heat radially inward and the corresponding expansion of the peripheral portions in advance of the inner portions prevents the formation of buckling and warping strains and thereby facilitates the pressing operation.

When the assembly has been immersed in the hot water for the requisite time to soften the blanks to the required extent to receive the impression of the master or die members, the clamped-together parts are removed and plunged into cold water. The action of the cold water hastens the cooling of the parts and thereby facilitates speed of production. In addition, the relatively rapid cooling of the outer portions first serves to set the outer parts to thereby control and hold the inner parts in position during the cooling action thereon.

When the clamping device, with its contents, is removed from the cooling receptacle and disassembled the record blanks that were placed in position between the die members will be found to have been provided with record groove zones that are faithful complements of the die faces of the matrices with which they were in engagement. In addition no tendency to warp or twist is present and the records have a permanently flat or disc formation.

Between the head members 15 and the adjacent members of the interposed pile a plate 19 of heat-insulating material such as hard rubber or the like is placed. The provision of the heat insulating material at these points prevents the flow of heat into the pile in an axial direction or across the planes of the discs. I find that this feature of the invention prevents the setting up of warping strains in the thin material.

What I claim is:—

1. That method for making disc sound records which consists in clamping together a record blank and a heat-conducting matrix, and in applying heat to the periphery of the matrix.

2. That method for making sound records which consists in clamping together a record blank formed of material capable of being rendered plastic by the application of heat, and a die formed of heat-conducting material, and in immersing the parts in a hot liquid.

3. That method for making sound records which consists in clamping together a plurality of record blanks in individual contacting engagement with a like number of die members, and in immersing the clamped-together assembly in a hot liquid.

4. That method for making disc sound records which consists in clamping together a plurality of record blanks in individual contacting engagement with a like number of die members, in immersing the clamped-together assembly in a hot liquid to thereby cause heat to flow radially inward to soften the blanks, and in cooling and disassembling the parts when the impressions have been made.

5. That method of making disc sound records which consists in clamping together a plurality of record blanks in individual contacting engagement with a like number of die members formed of heat-conducting material, in immersing the clamped-together assembly in a hot liquid to thereby cause heat to flow radially inward in the die members to soften the blanks, and in immersing the clamped-together assembly in a cold liquid when the impressions have been made.

6. That method of making disc sound records which consists in clamping together a plurality of record blanks in individual contacting engagement with a like number of die members formed of heat conducting material, in mounting heat-insulating members at the ends of the series of parts, in immersing the clamped-together parts in hot water to thereby cause heat to flow radially inward in the die members to soften the blanks, and in removing the assembly from hot water and immersing it in cold water when the impressions have been made.

7. That method of making disc records which consists in clamping together a plurality of discs formed of sheet celluloid and a like number of alternately arranged die members formed of heat-conducting material, in immersing the assembly in hot water to soften the celluloid and produce the impressions, and in cooling and disassembling the parts when the impressions have been made.

HARTWELL W. WEBB.