

UNITED STATES PATENT OFFICE

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SOUND RECORD AND COMPOSITION OF SAME

No Drawing.

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The present invention relates to sound reproducing records and the composition for making the same.

The present invention comprises a sound reproducing record with the body portion formed of sheet paper of the thickness usually referred to as cardboard and preferably a paper of ragstock. The paper is coated with a material, the basis of which is a resorcinol formaldehyde condensation product, which is applied to the surface of the paper in such manner as to form an intimate bond with the surface of the paper and then heated record dies are applied under pressure to the coated paper to emboss the tone ridges on the dies into the coated surface to form tone grooves in the finished record. The materials specified are of such nature as to permit the embossing operations to be carried out on a printing press, preferably of the embossing type, carrying a plurality of record dies whereby a plurality of records may be embossed at one impression of the press. When the embossing operation is completed, the records are, as soon as they are cooled, ready to be separated for use although it may be desirable to varnish the back of the paper opposite the record surface thereof to prevent the records from curling. This preferably is done on the entire sheet before the individual records are separated.

It is recognized that the disclosure herewith is illustrative and is not to be understood in the limiting sense for the reason that the present invention may be carried out by variations from the present disclosure without departing from the spirit of the invention.

The coating composition may be made up of different amounts of materials and by varying procedures. A preferred procedure and one proportion of materials is as follows: A metal container provided with heating and cooling means (either a jacket or coils,) and also provided with mechanism for rapidly stirring or mixing, receives 1000 cc. of commercial 40% formaldehyde to which is added as a batch 1000 grams of commercial resorcinol (meta dihydroxy benzene)

preferably ground to pass a ten mesh to the inch screen. This is stirred until solution is effected. The solution is heated slowly with continued stirring until the temperature rises to a point between 70° to 75° C. The stirring is continued with the temperature held within these limits until the viscosity increases to a proper consistency for use. In coating the paper stock, this viscosity may be determined by applying samples of the material from time to time to the paper stock until the material forms a coating which lies largely on the surface of the paper. The period of time at which the material is held between the temperatures specified until it reaches the proper viscosity is usually approximately one half hour. When the proper viscosity has been attained, approximately 1,000 cc. of either ethyl or methyl alcohol or mixtures thereof are added. The amount of alcohol may be varied to increase or decrease the fluidity, depending upon the method of applying the coating to the paper. The mixture is now rapidly cooled to ordinary room temperature. An abrasive, for example, 200 grams of rouge is ground, in the manner of grinding paint, into 600 grams of glycerine, and this is added to the solution at this point. The glycerine in the example given constitutes a plasticizer, and in this specific example it constitutes 30% of the non-volatile constituents entering into the reaction. The percentage of plasticizer may vary according to the plasticizer employed, but to obtain commercial results the plasticizer should be of a type which forms a homogeneous solid solution with the other ingredients, and should form not less than 10% of the record receiving layer. The material is now ready for use and should be applied to the paper, preferably, immediately. This material forms an intimate bond with the surface of the paper. The coated sheet of paper is then dried until the surface thereof presents a slightly tacky surface. The coated sheet is now ready for use. The record impression dies are heated, preferably, to about 160° C. and forcibly impressed against the coated face of the paper sufficiently to embed or emboss the tone grooves

into the coating material. The dies and material are held together a sufficient length of time to permit the necessary hardening or polymerization of the material. Ordinarily this would be approximately a one minute interval. The die is removed and the embossed sheet may be separated into the individual records. If the dies tend to stick to the material, this may be overcome by applying a light coating of paraffine to the surface of the dies. Preferably, the surface of the paper opposite the record surface is coated with some varnish-like material, for example, a lacquer varnish in order to prevent curling of the records. One material which is very satisfactory for this purpose is the record surface coating material with the abrasive omitted. This coating material is substantially water-proof and it is desirable that the coatings on both sides shall have substantially the same expansion and contraction.

The purpose of the rouge specified is to provide a mild abrasive which is recognized in the phonograph or sound reproducing art as being desirable. The addition of the glycerine is to provide a suitable plasticizing agent to render the resorcinol formaldehyde condensation product flexible and pliable and prevent its becoming so hardened as to be brittle and break away from the surface of the paper.

During the embossing operation with the heated dies the coating material first softens under the influence of pressure and heat, and during this short interval, the material flows fully and completely into the recesses of the die face and the tone ribs on the die are perfectly embossed into the coating. Then the continued application of heat and pressure hardens the coating into a hard dense substance.

Records made in accordance with the present invention are thin flexible discs having a record surface of sufficient hardness to withstand the action of the ordinary playing needle for a large number of times without the needle cutting through the record surface, or without the walls between adjacent grooves breaking down. The material penetrates into the surface of the paper a sufficient depth to securely interlock the material and the paper stock so that the surface material may not be stripped from the paper without destroying the upper surface of the paper. The normal color of the records is a dark red but coloring agents which do not affect the material may be added to produce black or other colors.

Having described my invention, I claim:

A flexible sound record comprising a cardboard body with a layer thereon of a heat hardened resorcinol condensation product and a plasticizer, said plasticizer forming a homogeneous solid solution with said prod-

uct, and constituting not less than 10% of the layer, the under portion of said layer infiltrated into said body and with an upper part or surface portion of a depth greater than the tone grooves of the record so that the tone grooves lie entirely in the heat hardened condensation product and are above the zone of infiltration with paper, said layer being of sufficient hardness to withstand a phonograph needle when in use and of sufficient flexibility to permit ready bending of said record without cracking or breaking said layer.

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