April 9, 1935. S. WHYTE 1,997,398

FLEXIBLE SOUND RECORD

Filed Aug. 29, 1929

Fig. 1.

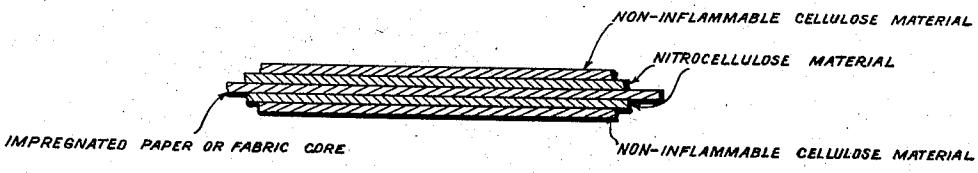
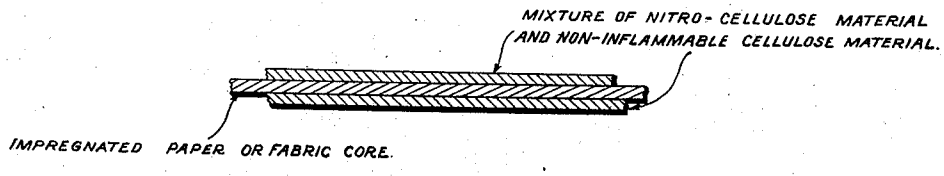


Fig. 2.



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FLEXIBLE SOUND RECORD

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2 Claims. (Cl. 154—43)

The present invention relates to laminated disc records of the type comprising a paper or fabric core, and the record surfaces of which consist of cellulose material, such as nitro-cellulose, cellulose acetate or the like.

The object of the present invention is to effect improvements in a record of this type whereby the surface noise is considerably reduced without the wearing qualities being adversely affected.

It has been found that this object is attained if both nitro-cellulose and cellulose acetate or other non-inflammable cellulose material are employed for the outer films of the sound record. Thus the improved record according to the present invention comprises a paper or fabric core to each side of which is attached firstly a layer of non-inflammable cellulose material and then a layer of nitrocellulose material or vice versa. Alternatively only one layer consisting of a mixture of non-inflammable cellulose material and nitro-cellulose is attached to each side of the core.

The core is preferably treated with a waterproofing or binding composition and the layers of non-inflammable cellulose material and nitro-cellulose material may both be applied in the form of a solution or of thin sheets or films, or one of the layers may be applied as a solution and the other as a sheet. It is also preferable that the various layers should have substantially the same coefficients of expansion.

The invention is illustrated diagrammatically in the accompanying drawing, Fig. 1 showing one form of record blank having separate layers of nitro-cellulose material and non-inflammable cellulose material, and Fig. 2 showing another form of record blank having a layer which is a mixture of these materials.

In one method of carrying out the invention, a paper core approximately .01 inches thick is impregnated with paraffin wax, metal stearates, rosin, bituminous compounds or other material which will leave the paper waterproof after the application of heat and pressure, and which should give to the core a similar coefficient of expansion to that of the surface material; otherwise the surface of the record will develop unevenness and suffer in appearance and quality of surface noise. Then a solution of nitro-cellulose containing rosin is applied to the core. When the core is dry, a sheet of cellulose acetate material approximately .003 to .005 inches thick is applied to each side of the core. The whole is then hot pressed between the matrices carrying the required records.

In another method, a paper core is first impregnated with either an aqueous or an alcoholic solution of urea or thiourea formaldehyde resins or phenol formaldehyde, or other synthetic resin mixed with or without colouring matter or filler the paper being squeezed thereafter between rollers to assist impregnation and to remove excess of solution. The impregnated paper is then dried at a suitably low temperature and spread with nitro-cellulose solution. The coating of nitro-cellulose solution is dried, and covered with the cellulose acetate material intended to form the playing surface of the record as in the first described method.

In a modification of the last method, the cellulose acetate material is applied in the form of a solution. The cellulose acetate may be dissolved in acetone or other ketones or mixtures of acetone with any of the known solvents for cellulose esters, together with a suitable proportion of dissolved plasticizer such as p-toluene sulphonamide, diethyl phthalate or the like and with or without pigment, dyes or filling materials such as zinc oxide, lithopone, barytes, carbon black, nigrosine or the like. Various resins may also be incorporated if desired. For example, a suitable solution is prepared by dissolving 1220 gms. of powdered cellulose acetate together with 260 gms. of para-toluene sulphonamide in 7 litres of a mixture of acetone (75%), alcohol (10%) and benzol (15%) to form a dope of suitable consistency for spreading and 480 gms. of lithopone incorporated therewith. After drying and seasoning the coated core, the whole is hot pressed between the matrices carrying the required records.

The nitro-cellulose solution used in the above examples preferably consists of the lower nitrates of cellulose dissolved in acetone or other ketones or esters such as ethyl acetate or butyl acetate, together with a plasticizer such as triphenyl phosphate. This solution may also contain various fillers or pigments such as zinc oxide, barytes or the like and various resins may be incorporated. For example, a nitrocellulose solution suitable either for the surface of the record or as an undercoating to the surface is prepared by dissolving 1300 gms. of nitrated cotton together with 200 gms. of triphenyl phosphate in 7 litres of a mixture of acetone (75%) alcohol (10%) and benzol (15%) to form a dope of suitable consistency for spreading and 500 gms. of zinc oxide are incorporated therein.

If the layer next to the paper core is applied in the form of a solution, then it may not be necessary to impregnate the core with any waterproof-

ing composition, although, especially in the case of the synthetic resins, the impregnating material causes the paper core, after the application of heat and pressure, to become a horny, structureless mass inseparable in itself.

When the outer layers of the record are applied in the form of solid layers or sheets, a paper core smaller in diameter than the finished discs may be used. For example, the core may be 9.75" in diameter for a 10" record. In this case, a secondary operation is necessary to press together the overhanging portions of the outer films of cellulose material. This pressing together of the overhanging edges forms a seal which prevents atmospheric or other moisture from reaching the core, and if paper with a suitable "finish" and "sizing" is used for the core, impregnating with a wax or resin is unnecessary.

The term fibrous material as employed in the claims includes paper or fabric and the like.

I claim:

1. A sound record blank comprising a core of fibrous material impregnated with a urea formaldehyde resin and having attached thereto a plurality of layers of material at least one of which constitutes the record surface and includes a non-inflammable cellulose ester, the coefficients of expansion of each of said layers being substantially equal.

2. A sound record blank comprising a core of fibrous material impregnated with a urea formaldehyde resin and having attached thereto a plurality of layers of material at least one of which constitutes the record surface and includes a non-inflammable cellulose ester.

SAMUEL WHYTE.