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ARTICLE AND METHOD OF MAKING SAME

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This invention relates to compositions containing cellulose derivatives such as cellulose esters and cellulose ethers. This invention relates especially to the manufacture of sound records such as phonograph records and the like from such compositions. It also relates to compositions adapted for photographic films.

Heretofore, attempts have been made to make sound records from cellulose derivatives, but such records have not proven to be satisfactory due to the harshness of the tone, the tendency of the records to warp, the tendency of the cellulose compositions to peel from any base to which they are applied, and the tendency of the materials to dry out and deteriorate with age. Likewise with such records as heretofore made there has been an excessive number of rejects due to different causes including the presence of foreign materials that interfere with the quality of such records. It is one of the purposes of this invention to produce a sound record which has a highly desirable tone quality, has smoothness and uniformity of tone, does not warp, has a surface that does not peel from the base to which it is attached, and does not deteriorate substantially with age. As a result of our invention, records have been produced which not only satisfy the above requirements, but are remarkable for the improvement in the purity and naturalness of their tone as compared with records heretofore on the market. Likewise, the records which we have made according to our invention are extremely flexible and are substantially unbreakable. The records can likewise be made very inexpensively and can be made so as to be extremely light in weight, the latter feature being important in reducing shipping and packing costs. According to certain embodiments of this invention, sound records can be made which are substantially non-inflammable. Moreover, difficulties in manufacture due to sticking of the surfaces to stampers and the like has been overcome.

Features of this invention relate to sound records as a whole. Other features relate to the compositions forming the reproducing surface thereof. Such compositions while being of great value for use in phonograph records, also have distinct advantages for other uses as well. For example, the compositions that have been developed according to this invention may be utilized in films for photographic purposes, such as motion picture films, and the like.

Cellulosic compositions, such as the cellulose esters and ethers have, of course, been extensively used heretofore, for a variety of purposes and such compositions have been used with softeners, resins, plasticizers and the like in lacquers, fabric dopes and the like. From one point of view, this invention consists in the development of compositions having unique and valuable properties not only because of the ingredients used, but also because of the proportions in which the ingredients are used. Thus, in the making of phonograph records, for example, both the materials used and the proportions in which they are used, play an important part. In this connection, tone quality is, of course, of particular importance. Moreover, the record must not be too soft so that a needle will dig into it and it should not warp or tend to peel from the base to which it is applied. All of these attributes are of importance because failure in any one particular results in a record which is not marketable commercially.

Phonograph records are preferably made in the practice of this invention by coating a cellulose containing composition upon a suitable backing. While backing compositions such as shellac, or natural or artificial resins, or rubber material may be used, the cellulosic composition is preferably applied to a backing of fibrous material such as cardboard and preferably also the cardboard is relatively thin and flexible. The cellulosic composition is preferably applied by spraying, brushing, or dipping. Enough coats are added so that the thickness of the film is preferably about 5 to 10 thousandths of an inch and the coating should not be less than one thousandth of an inch in thickness.

According to one embodiment of this invention, the backing is made of balsa wood. Balsa wood is very light in weight and is coated very readily with cellulose compositions. Balsa wood is regarded herein as a fibrous material. When balsa wood is used a piece about one quarter inch thick is preferably made in two laminations held together by an adhesive and having the grains thereof at about right angles to each other. When such a piece of balsa wood is coated with the compositions below described and pressed with a matrix or stamper to impart a recording surface thereon, the balsa wood is compressed to about paper or cardboard thickness. Since the balsa wood is thus compressed it readily receives the impressions made by the matrix. Thus, with balsa wood even thinner coatings of cellulosic compositions can be used as the cellulosic material merely has to act as a lining for the grooves in the balsa wood, the lining preserv-

ing the sound track therein. With balsa wood the coating material may be as thin as one-thousandth of an inch at least in the grooves of the sound track.

The compositions which we use in making phonograph records are preferably made from cellulose esters and cellulose ethers having a viscosity characteristic less than about five seconds. Those cellulose esters between about ¼ second and 2½ seconds viscosity are regarded as particularly desirable . Such materials give a softer tone than the cellulosic materials having higher viscosity. Moreover, they may be used with greater amounts of plasticizer, which fact is likewise helpful in securing increased purity of tone. Moreover, in coating a base material with a plurality of coatings, there is less tendency to redissolve the earlier coatings when subsequent coatings are applied, if low viscosity cellulosic derivatives are used. Of the cellulose esters, cellulose acetate is preferred. Thus, cellulose acetate having a viscosity of about 5 seconds or less and preferably having a viscosity of about ½ second and having an acetyl content less than about 39.4 has been found to answer the requirements of a base for making the compositions which are used by us in making sound records. When the acid content is kept low, excessive formation of gas is prevented when the heated stamper is applied to the composition. For photographic films a somewhat higher acetyl content is permissible, i. e. in the neighborhood of about 40.5 or less.

A base solution made with cellulose acetate of the type above mentioned may be made up in the following parts by weight:

	Parts
Cellulose acetate	6 to 10
Ethyl alcohol	8 to 12
Acetone	20 to 35
Benzol	8 to 12

When such basic solution is applied by itself to a suitable base and made up into a phonographic record, the record has a harsh and mechanical tone which is far from pleasing to the ear. Moreover, the records tend to warp and to peel at the edges from the backing to which the coating is applied. The coating is also excessively hard and does not receive the stamped impression well, with the result that the needle does not hold the groove well and has a tendency to glide.

The difficulties above mentioned can be remedied to a certain extent by adding plasticizers to the basic composition above mentioned. Thus ¼ to 1½ parts of plasticizers such as dibutyl phthalate, tricresyl phosphate, dimethyl phthallate, triacetin, and dibutyl tartrate or combinations thereof may be added to the base composition above mentioned. These plasticizers tend to impart tensile strength to the coatings, and plasticizers of this type are referred to herein as strengthening plasticizers. Such plasticizers tend, however, to make the composition somewhat too soft if added in sufficient amount to remedy certain other faults in cellulose acetate when used by itself. When the record is too soft, the needle accumulates shavings of the coating material, and the life of the record is short. In any event, the addition of such plasticizers does not produce entirely satisfactory tone qualities and does not entirely prevent undesirable warping. Moreover, the composition is not resistant to combustion and has a tendency to stick to the stampers under the influence of heat and pressure.

The addition of gums and resins such as camphor, phenol formaldehyde resins, etc., including several which are well known under names such as Rezyl, Bakelite, Amberol, Du-rez and Resinox may be added to the basic solution in preferred amounts such as 1½ parts to 16 parts, but such materials tend to produce a harsh tone and do not entirely remedy the defects above mentioned. If a gum or resin is used, the softer gums such as the Rezyl #14 are preferably employed and help to build up the body of the composition without unduly injuring the tone quality. Gums and resins while permissible in compositions embodying this invention are not necessary thereto and in the usual case are not employed, and many are even decidedly objectionable.

To the basic solution and/or the base solution containing the plasticizers and/or the resins and/or gums above mentioned, triphenyl phosphate may be added and preferably also furfural may be added. Thus about one-half to four parts of triphenyl phosphate may be used and/or two to ten parts of furfural may be used. The triphenyl phosphate is very instrumental in imparting non-inflammable characteristics to the composition, as the combinations of cellulose acetate and triphenyl phosphate are substantially non-inflammable and will not support combustion. It is preferable that the triphenyl phosphate be added to the extent of about 12½ per cent. to 25 per cent. on the weight of the cellulose acetate. Moreover, the triphenyl phosphate as combined with cellulose acetate results in a composition that gives very pleasing tone reproduction, being free from harsh and metallic sounds. The presence of triphenyl phosphate is also helpful in preventing gas in applying heated stampers in the manufacture of sound records. The triphenyl phosphate tends to leave the composition, however, to a certain extent so that it becomes brittle on aging. The furfural appears to have the property of making the composition more permanent as well as improving the tone of records made with the composition and of preventing warping. Likewise, the furfural helps to prevent the composition from peeling or otherwise separating from the base to which the composition is applied. Some of these features will be brought out more in detail below. Some of the strengthening plasticizers above referred to and notably dimethyl phthalate have the property of preventing the escape of triphenyl phosphate from the composition. The strengthening plasticizers above mentioned are of a permanent nature and impart permanency to other ingredients which might otherwise be lost from the composition.

The furfural is particularly advantageous when a resin or gum is used, as it appears to react therewith in some way to improve the quality of a record made from such a composition.

It is to be understood that the above-mentioned example of a base solution has been given merely for the purpose of illustration, for other solvents may be used in addition or in place of the solvents above mentioned. Examples of such additional solvents are methyl cellosolve acetate, ethyl-lactate, butyl lactate, toluol, diacetone alcohol, etc. While furfural has been mentioned herein, substituted furfurals may be used. Other furfural derivatives may also be used and especially those derivatives which contain an aldehyde group. Some furfural derivatives such as ethyl furoate

and butyl furoate may be advantageously used although they are not as effective as furfural in the formation of resins and gums as will be described below. Likewise other cellulose derivatives may be used, for example, the cellulose ester nitrocellulose and cellulose ethers such as ethyl cellulose and benzyl cellulose. As above stated, cellulose acetate is preferred in the practice of this invention, but nevertheless certain of the advantages of this invention may be realized by the utilization of other cellulose derivatives and in such case the compositions can be made up so that they will have as nearly as possible the properties of compositions illustrated herein in connection with cellulose acetate. When other esters than cellulose acetate are used, it is preferable that the viscosity be less than about 5. The viscosity of the cellulose esters including nitrocellulose (but excluding cellulose acetate) is measured by the Hercules method wherein the viscosity is taken as the time required for a steel ball $\frac{1}{8}$ inch in diameter and weighing 2.0385 grams to fall 10 inches in a tube .984 inch in diameter and 14 inches long in a solution at 25° C. containing nitrocellulose (dry) 12.2%; No. 1 denatured ethyl alcohol 22.0%; ethyl acetate 17.5% and toluol 48.3%. The viscosity of cellulose acetate is measured by the American Standard Testing Method using a $\frac{1}{8}$ inch falling ball and a 12.2% solution of cellulose acetate in acetone at 25° C.

Examples of compositions which may be employed in the practice of this invention are as follows, the relative proportions being given by weight (the cellulose acetate having an acetyl content less than about 39.4 and a viscosity of about ½ to 2½ seconds):

Example I

	Parts
Cellulose acetate	1¼
Triphenyl phosphate	¾
Ethyl alcohol	4
Benzol	4
Acetone	10

Example II

	Parts
Cellulose acetate	6
Triphenyl phosphate	¾
Ethyl alcohol	10
Acetone	25
Benzol	10

Example III

	Parts
Dibutyl tartrate	1½
Tricresyl phosphate	½
Dimethyl phthalate	½
Triacetone	½
Dibutyl phthalate	½
Benzol	40
Acetone	100
Ethyl alcohol	40
Cellulose acetate	24
Triphenyl phosphate	3

The compositions above mentioned can be greatly improved by adding about two to ten parts of furfural thereto, together with enough solvent to give the solution the proper consistency. Thus to the compositions of Examples I, II and III about ten parts of furfural may be added, together with twenty parts of acetone.

If to the composition of the foregoing mixtures about one part of a strengthening plasticizer is added, for example, dimethyl phthalate, the coatings have somewhat improved tensile strength and toughness and resistance to aging.

The foregoing compositions have been illustrated as containing non-volatile ingredients together with volatile solvents therefor which make them adapted to be applied by such methods as dipping, brushing, spraying and the like. After these compositions have been applied, the volatile solvents of course evaporate, leaving the non-volatile ingredients in approximately the relative proportions given above.

In the manufacture of phonograph records using the compositions above mentioned, it is preferable to utilize a base material with a size that is soluble in the solvents used in the composition. Thus, for example, cardboard or balsa wood may be used which has been treated with a rosin size or some resin which is soluble in the solvents used in the coating composition. When this is done, the sizing material bleeds into the coating composition and the coating composition impregnates the base material so that a very firm bond is created between the coating composition and the base material upon the evaporation of the solvents.

When furfural is used in the coating compositions illustrated above, the furfural has, among other valuable properties, the property of reacting or combining with the rosin or resin in the size to produce a composite gummy material which is formed in situ between the base material and the coating composition. This results in a very firm bond so that the coating composition has no tendency whatever to peel or crack away from the base material.

The reaction or other union between an ingredient carried by the base material as by being included in the sizing and an ingredient included in the coating composition to produce a gummy substance which increases the adhesion between the base material and the coating composition, can be promoted by applying a material comprising a substance such as phenol to the base material and including a substance such as furfural in the coating composition. In such case, the furfural reacts with the phenol to form a resinous or gummy material in situ between the base material and the coating composition. This reaction is promoted in making sound records when the record is subjected to pressure under a heated die, as the heat and pressure aid the reaction between the phenol and the furfural. If desired, succeeding layers of coating composition containing furfural can be applied after having first applied a primer coating containing phenol. The phenol can be applied to advantage as a ten to fifty per cent. solution with benzol or toluol. Other materials may also be used which cause a reaction between a substance in or applied to the base material and a substance in the coating composition. Thus urea may be incorporated in or applied to the surface of the base material and a coating composition applied containing furfural or formaldehyde. When urea is used, the resulting resin is not as hard as the resin which results when phenol is used.

In the above cases, it is desirable but not essential to have the material in the coating composition react substantially completely with a substance coated or impregnated on the base material. Thus, if base material has been coated with about a ten per cent. solution of phenol, a coating composition containing about two per cent. to five per cent. of furfural may be applied thereto. Likewise, certain advantages have been

found to result when about one-half to two and one-half per cent. of furfural is incorporated in the coating composition and an external coating of phenol or urea is applied thereto. The phenol or urea appears to penetrate the film and react with the furfural. Formaldehyde may also be included in the coating composition to react with the phenol or urea. Its effectiveness may be increased in certain instances by the application of heat and pressure. The application of the external coating results in certain advantages in photographic films by increasing the adherence of photographic emulsions to cellulose materials.

Another feature of this invention resides in utilizing in a coating composition materials which are adapted to react with each other to form a gum or resin.

Thus, if the coating compositions are made up so as to contain phenol and furfural, the furfural and phenol will react together especially under the heat and pressure employed in the stamping operation. Thus, by way of illustration, a coating composition may be made up as follows:

	Parts
Solutions of Examples I, II or III	200
Phenol solution	20 to 40
Dimethyl phthalate	2
Acetone	20

The phenol solution referred to above may contain 1 part phenol, 1 part toluol, and ⅛ part acetone.

With a solution made up as above, distinct advantages result when the coating is applied as to a base treated with a rosin size or other size capable of reacting with furfural. In the first place, the furfural in the composition when it is applied to the base reacts with the rosin to produce a composition which cements the composition to the base. At the same time, solvents in the coating composition dissolve sizing in the base composition so that increased penetration of the base material by the coating composition is secured. After the coating composition has been applied to the base composition by dipping or spraying or by any other method and thoroughly dried to desired thickness, the coated base material is ready to be stamped with an impression of a phonograph record, for example. In the stamping operation which will be more fully described below, the coated material is pressed with the stamper which is heated to a temperature of about 150° F. to 350° F. The heat softens the composition and causes it to flow. While in the nascent state of flow, the furfural in the composition reacts with the phenol to produce a resin and, while the resin is also in a nascent state, it readily combines with the other ingredients of the coating composition including cellulose esters and plasticizers to form a free flowing mixture which fills the interstices in the stamper to make a perfect impression. The resulting composition when cooled under pressure gives a harder, denser, smoother, clearer and more positive impression than can be obtained by making the phenol-furfural resin first and then adding it to the coating composition.

While such composition can be made up and stored, it is preferable to add the furfural solution first and then mix in the phenol shortly before it is desired to use the composition.

While phenol and formaldehyde have been mentioned above as being capable of reacting to form a resin during the stamping operation, other substances can be used. Thus, in the illustration above given, formaldehyde can be substituted for the furfural and urea can be substituted for the phenol. When urea is used, a solution thereof can be used containing 15 parts of urea, 7½ parts of acetone and 10 parts of water. Such a solution may be combined with the compositions of Examples I, II and III in various ways of which the following are illustrations (proportions being given by weight).

	Parts
Compositions of Examples I, II or III	200
Furfural	5
Urea solution	15
Compositions of Examples I, II or III	200
Urea solution	20
Formaldehyde	10

As has been pointed out above, the furfural and phenol react with each other to produce a resin which is particularly adapted as to hardness and other properties to result in most desirable phonographs records. The other alternate materials produce resins having slightly different properties. Thus urea resins are slightly softer than the phenol resins, but such softer resins may be utilized if other and somewhat harder ingredients are used in the compositions. However, urea has the property of stabilizing cellulose esters so that they have improved resistance to aging. When urea is used in films containing cellulose acetate, for example, urea is instrumental in preventing the film from turning brown and from becoming brittle. Moreover, in making the film urea can be used in combination with a substance which reacts therewith to form a resin, with the urea preferably occurring in excess so that the urea will be present along with a urea resin.

In such compositions, it is notable that, as a result of their preparation, they are very permanent. Thus the furfural and the phenol react with each other to form materials which are of a permanent character. The furfural also helps in preventing loss of plasticizers such as triphenyl phosphate as has been mentioned above.

Having described certain base materials and compositions for coating base material, the following is a disclosure of preferred methods of manufacture.

Mixtures of non-volatile substances including cellulose materials, plasticizers, resins, resin components, etc. and solvents therefor such as the mixtures in the coating compositions mentioned above are preferably made up and allowed to stand for from one to ten days until any heavy impurities and any undissolved cellulose fibers settle out. The solution is then decanted off and filtered. To the clear filtered solution sufficient water is added to precipitate the solid non-volatile substances, which are then separated from the liquid and dried. The resulting compound can be used in several ways, as it constitutes a molding compound of a very satisfactory character. Such molding compound is hard, flexible, tough, strong and gives a smooth surface. Heretofore difficulty has been encountered in securing a molding compound which has such properties that it can be made into articles that are very thin. With the compositions above mentioned, made in the way just mentioned, very thin films can be molded which are strong, flexible, hard, tough and have a smooth surface.

The molding compositions above described may be applied directly to a base material and sub-

jected to heat and pressure in the manufacture of sound records, for example. Preferably, however, the molding composition is taken up in solvents such as the solvents above mentioned to make a very fine coating composition which is applied preferably to sized paper, cardboard, or balsa wood base material by spraying, dipping, brushing or other suitable method, the coatings being repeated until the desired thickness of coating is obtained. The coating as thus built up in a plurality of layers is stronger than when the molding composition is pressed on a suitable base material from a granular mass or from a preformed sheet. The coating composition is preferably applied by passing a web of material through a bath of the coating composition and drying the coating thus applied. This operation may be repeated until the desired depth of coating is obtained. The coated base material may then be cut to desired sizes for blanks for sound records. The cut edges are preferably given a coating or other application of some suitable material, especially when fibrous base compositions are used, so that the edges may be sealed. The coating compositions above mentioned may be used for this purpose. The blanks are then subjected to stampers adapted to impress a suitable sound track on the blanks under a pressure of about 1000 to 2500 pounds per square inch and at temperatures of about 150° F. to 350° F. for from about five to twenty seconds. These figures are illustrative merely as considerable departure can be made therefrom while making satisfactory sound records. The blanks are then immediately chilled to hardness with the stamper pressed thereagainst. Normally, the matrix or stamper used in making the reproducing surface of the record produces impressions which are about two to five thousandths of an inch in depth. When the dried coating is substantially thicker than this and is preferably about ten thousandths of an inch in thickness, the reproducing track is only in the upper surface of the coating composition and the resulting record has more positive tone characteristics than when thinner coatings are applied to the base material. After cooling and after the stamper has been removed, it will be found that the record has a very accurate and natural tone quality which is superior to the tone quality of records at present on the market. Likewise, the records are free from flaws, are smooth and uniform, and are tough and flexible. The records are likewise non-inflammable, very durable, and light, as has been mentioned more in detail above. They are also waterproof and resistant to acids and alkalis. The phonograph record can be stamped with sound track impressions on both sides. Even in such case the records do not warp or peel or deteriorate in any way.

In addition to the manufacture of sound records, the redissolved molding compound is excellent for the manufacture of films. Films can be made of the compositions above described, which are of high tensile strength, are non-inflammable, and are free from cloudy, milky or hazy effects. Such films can be made either by molding a molding composition under heat and pressure or by evaporating volatile solvents from solutions spread in thin layers. In such case the temperature and moisture in the atmosphere is controlled so as to be favorable to film formations and pressure may be applied as by rollers as is well known. Films may be made using compositions above described which are substantially non-inflammable.

Moreover, the molding compound has a very wide field of uses wherever a hard, flexible, smooth, and strongly adherent composition is desired. For example, the composition may be used as impregnation or coating composition for metal, wood, leather, fabrics and the like and may be used with or without pigments and dyes. Solid material can be molded under heat and pressure to form goggles, window panes, and the like. The composition can also be formed into threads by passing the same through suitable nozzles, spinnerettes and the like so that fabrics and the like can be made therefrom.

While it is preferable to make up a solution, filter it and coagulate the solid ingredients, this is not absolutely essential and for uses where a high degree of purity is not required, any one or more of the steps of purification may be dispensed with. Thus sound records can be made merely by dissolving the ingredients above mentioned in suitable solvents to form a solution which is applied to suitable base materials with or without filtration. When, however, the purification steps are employed, the record is normally more uniform and free from foreign substances which would tend to detract from the tone of the sound records.

While this invention has been described in connection with certain specific illustrations thereof, it is to be understood that this has been done merely for the purpose of illustration and that the scope of this invention is to be governed by the following claims.

We claim:

1. A sound record which comprises a base material and a coating for the base material, said coating having a sound track therein and comprising a substance selected from the group consisting of cellulose esters and cellulose ethers together with triphenyl phosphate and a substance selected from the group consisting of furfural and furfural derivatives having an aldehyde group.

2. A sound record having a reproducing surface which comprises in major proportion cellulose acetate having a viscosity less than about five seconds and an acetyl content less than about 39.4.

3. A sound record having a reproducing surface which comprises in major proportion cellulose acetate having a viscosity less than about five seconds and an acetyl content less than about 39.4, and triphenyl phosphate, the triphenyl phosphate being about 12½ to 25% by weight in proportion to the cellulose acetate.

4. A sound record formed by stamping under heat and pressure having a fibrous base material carrying a rosin size and coated with a composition with a sound reproducing surface thereon, said composition comprising furfural and a substance selected from the group consisting of cellulose esters and cellulose ethers.

5. A sound record which comprises a base of balsa wood and a coating containing cellulosic material and having a sound reproducing surface impressed in said cellulosic material and at least partially impressed in said balso wood base underlying said cellulosic material.

6. A sound record which has a sound reproducing surface containing a substance selected from the group consisting of cellulose esters and cellulose ethers, furfural and a substance selected from the group consisting of resins and gums.

7. A method of making a coated article in which the coating is firmly bonded to a base material which comprises preparing a base material and coating the base material with a coating composition, said base material carrying a first substance, and said coating material including a second substance and a cellulose derivative selected from cellulose esters and cellulose ethers, said first and second substances being adapted to react with each other to produce a resinous material and subjecting said base material and said coating applied to said base to heat to cause said first and second substances to react to form a resin.

8. A method of making a sound record which comprises applying to a fibrous base material carrying a size a coating composition dissolved in a solvent for the size and containing a first substance adapted to react with said size to produce a resinous material and a second substance adapted to react with said first substance to produce a resinous material, and subjecting the base material as coated with said composition to heat and pressure while said composition is subjected to a matrix for making a sound track, thereby causing said first and second substances to react in situ and causing said first substance to react with said size.

9. In a method of making a sound record the steps comprising dissolving a cellulosic material selected from cellulose esters and ethers and a plasticizer together with a first substance and a second substance in a volatile solvent to form a homogeneous liquid composition, said first and second substances being adapted to react with each other under heat to form a resin, disposing the liquid composition in a film, evaporating the volatile solvent from the film and pressing the resulting film with a matrix for a sound track while subjecting the film to heat, thereby causing said first and second substances to react with each other to form in situ a resinous material which is dispersed in the cellulosic material, the heat and pressure being discontinued before complete resinification, and thereby impressing a sound track in the resulting homogeneous mass.

10. In a method of making a sound record the steps comprising dissolving a cellulose ester, a strengthening plasticizer and triphenyl phosphate together with the unreacted components of a synthetic resin of the phenolformaldehyde type in a volatile solvent, evaporating the volatile solvent, and pressing the resulting composition with a matrix for a sound track while subjecting the composition to heat, thereby causing said components to react with each other to form in situ a resinous material which is dispersed in the cellulose ester, strengthening plasticizer and triphenyl phosphate and thereby impressing a sound track in the resulting homogeneous mass.

11. In a method of making a sound record the steps comprising making a solution of cellulose acetate having a viscosity less than about 5 seconds and an acetyl content less than about 39.4 and a plasticizer for the cellulose acetate together with a first substance and a second substance dissolved in a solvent, said first and second substances being adapted to react with each other to form a resin, evaporating the solvent, and before said first and second substances have reacted to form a substantial amount of resin, pressing the composition with a matrix for the sound track while subjecting the composition to heat, thereby causing said first and second substances to react with each other to form in situ a resinous material which is homogeneously dispersed in the cellulosic material and plasticizer and thereby impressing a sound track in the surface of the resulting mass.

12. In a method of making a sound record the steps comprising making a solution of a cellulosic material selected from the group consisting of cellulose esters and cellulose ethers together with a first substance dissolved in a solvent and a second substance, said first and second substances being adapted to react under heat to form a synthetic resinous material, evaporating the solvent, and causing said first and second substances to incompletely react to form in situ a resinous material by subjecting the mixture to heat, a sound track being impressed in the surface of the resulting mass.

13. In a method of making a sound record, the steps comprising dissolving a cellulosic material selected from cellulose esters and ethers and a plasticizer together with a first substance and a second substance in a volatile solvent to form a homogeneous liquid composition, said first and second substances being adapted to react with each other under heat to form a resin selected from resins of the phenol-aldehyde type and the phenol-urea type, disposing the liquid composition in a film, evaporating the volatile solvent from the film and pressing the resulting film with a matrix for a sound track while subjecting the film to heat, thereby causing said first and second substances to react with each other to form in situ a resinous material which is dispersed in the cellulosic material, the heat and pressure being discontinued before complete resinification, and thereby impressing a sound track in the resulting homogeneous mass.

14. In a method of making a sound record, the steps comprising making a solution of cellulose acetate having a viscosity less than about five seconds and an acetyl content less than about 39.4 and a plasticizer for the cellulose acetate together with a first substance and a second substance dissolved in a solvent, said first and second substances being adapted to react with each other to form a resin selected from resins of the phenol-aldehyde type and the phenol-urea type, evaporating the solvent, and before said first and second substances have reacted to form a substantial amount of resin pressing the composition with a matrix for the sound track while subjecting the composition to heat, thereby causing said first and second substances to react with each other to form in situ a resinous material which is homogeneously dispersed in the cellulosic material and plasticizer and thereby impressing a sound track in the surface of the resulting mass.

15. In a method of making a sound record the steps comprising dissolving a cellulosic material selected from the group consisting of cellulose esters and cellulose ethers together with a first substance and a second substance in a volatile solvent, the first and second substances being adapted to react under heat to form a synthetic resinous material selected from resinous materials of the phenol-aldehyde type and the phenol-urea type, evaporating the volatile solvent, and then subjecting the resulting material to heat thereby causing the said first and second substances to react to form in situ a resinous material dispersed in the cellulosic material, and a sound track being impressed in the surface of the resulting mass.

16. In a method of making a sound record the steps comprising making a solution of a cellulosic

material selected from the group consisting of cellulose esters and cellulose ethers together with a first substance and a second substance dissolved in a solvent, said first and second substances being adapted to react under heat to form a synthetic resinous material selected from resinous materials of the phenol-aldehyde type and phenol-urea type, disposing the solution as a coating on a base, evaporating the solvent, and causing said first and second substances to incompletely react to form in situ a resinous material by subjecting the mixture to heat, a sound track being impressed in the surface of the resulting coating.

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