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F. H. KRANZ
PRESSURE SENSITIVE SHEET RECORD MATERIAL
AND METHOD OF MAKING
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3,079,271

FIG. 1.

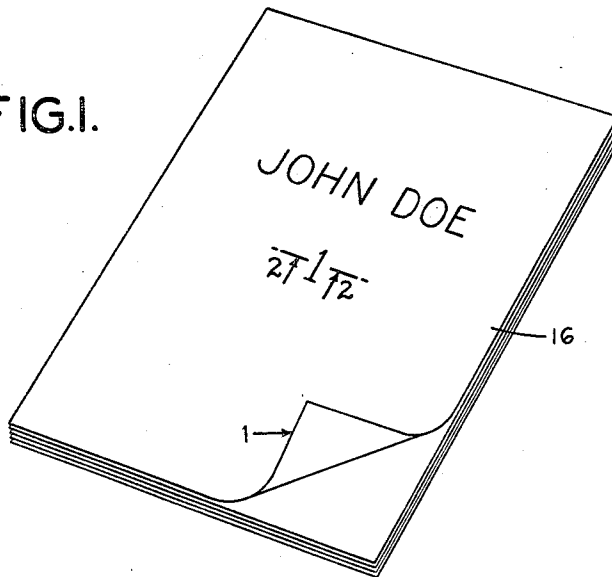
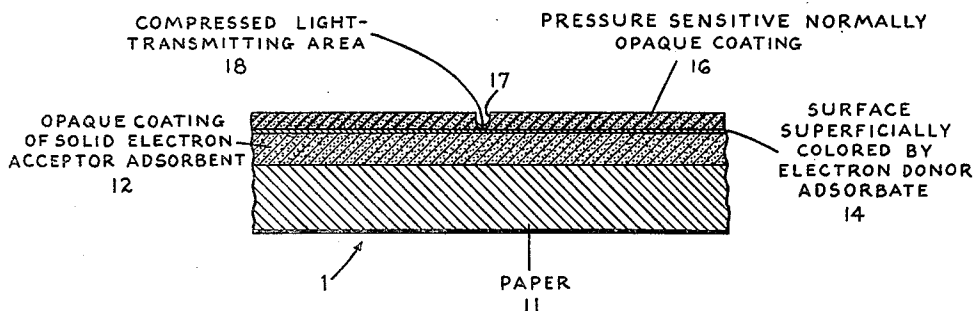


FIG. 2.



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PRESSURE SENSITIVE SHEET RECORD MATERIAL AND METHOD OF MAKING

Frederick H. Kranz, Buffalo, N.Y., assignor to Allied Chemical Corporation, New York, N.Y., a corporation of New York

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This invention relates to improvements in pressure-sensitive sheet record material and in color sheet material useful in the manufacture thereof, and to methods for manufacturing the same. It relates particularly to improvements in pressure-sensitive sheet record material of the type in which information is recorded on a sheet in the form of colored indicia by the application of pressure to a pressure-sensitive coating which is normally opaque but is rendered light-transmissible by the application of pressure and which is carried by a base sheet having a color contrasting to the pressure-sensitive coating; and to processes for the manufacture thereof.

In an attempt to overcome various objections to the use of so-called "carbon papers" and the like duplicating papers employed in making multiple copies of records, office forms, letters, and the like, it has heretofore been proposed to employ as the recording paper or sheet, a base sheet of colored paper which is coated with a normally opaque pressure-sensitive material. Such papers or sheets are produced by coating colored paper with various types of coating compositions, containing various solutions and/or emulsions or dispersions of components, which when dried produce a coating over the colored base sheet which is opaque but which is pressure-sensitive. When pressure is applied to the opaque coating, as by a stylus, impact of a typewriter key, or other instrument, the coating is compressed and rendered light-transmissible at the points of pressure, thus permitting the color of the paper base to show through.

Representative patents relating to such record material are, for example, U.S. Patents 1,783,442, 2,135,538, 2,313,808 and 2,299,991, and British Patent 788,087. Thus, U.S.P. 2,299,991 discloses coating dark-colored paper with a modified brushing lacquer which, upon drying, forms an opaque coating because of the light-scattering effect of the bluish components. When pressure is applied to the coated sheet, the coating is compressed at the points of pressure and light passes through the compressed coating, rendering the dark color of the paper visible.

British Patent 788,087 discloses coating colored paper with an aqueous mixture comprising extremely finely divided pigment particles, of a color contrasting with the colored paper, and a water-soluble fatty compound (e.g. soap) and then drying. Owing to the light-scattering effect of the coating components and entrained air, the color of the paper base is completely masked; but, when pressure is applied to the coating, the color becomes visible in the compressed areas.

It has also been proposed to produce a pressure-sensitive record sheet by coating a paper base sheet with an intermediate layer of carbon black on one side and then with an outer covering of a resin emulsion which, on drying, reticulates into a myriad of microscopic particles causing the coating to become opaque. On pressure the resin particles are fused together and become translucent so that the black becomes visible, providing a copy.

Pressure-sensitive record material of said type heretofore available has had a number of objections, especially in connection with uses requiring a plurality of duplicated record sheets. One use wherein such record material is especially objectionable is in connection with so-called "charge-plates," employed by various credit

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granting enterprises, which carry in raised relation the name, address and account number of a customer and which make a record thereof upon the sheet record material by the application of pressure to the plate as well as by a stylus.

In order to obtain clear and distinct duplicate record sheets with such "charge-plates," it is essential that the record material have a minimum thickness consistent with strength. For this reason, the record material is preferably made of paper having a thickness not exceeding 0.0035 inch, and preferably about 0.0002 inch to about 0.003 inch. To permit the color of the base sheet to be clearly discernible upon the application of pressure, it is essential that the color of the base sheet be intense and strong.

These conflicting requirements create a problem which is of real and practical importance. The necessary high concentration of color in combination with the relative transparency of the base sheet, as a consequence of the thinness required of the base sheet for use in multiple copying, results in record material which shows the color through the back of the base sheet. This is particularly objectionable where it is desired to employ a plurality of differently color-coded sheets in a series of multiple record sheets.

A further objection to the record material of the prior art is the requirement for the use of colored pigments in the coloring of the paper employed as the base sheet; either by addition of the pigment to the pulp prior to formation of the paper, or the application of colored pigments to the finished paper. Both of these procedures are wasteful of pigment and are objectionable because of the necessity of complete removal of one color from the apparatus before a different color can be employed, the contaminating effect of the presence of the pigment in the factory, and the objection to having finely divided pigment particles in the atmosphere and on the machinery in a paper mill.

According to the present invention, the above objections are overcome in a simple and highly effective manner.

Thus, according to one feature of the present invention, a sheet record material is provided which, even though formed of thin paper as base material, nevertheless does not show the record color through the base sheet, and permits the base sheet to be white, or colored in pastel colors, or any other desired color.

According to another feature of the present invention, an intensely colored sheet material is provided without requiring a high concentration of colored pigment. On the contrary, in accordance with the present invention, it is unnecessary to employ colored pigments at all in the manufacture of the pressure-sensitive record material and in the manufacture of colored sheet material. The present invention utilizes substantially colorless chromogenic organic compounds in the manufacture of the colored base sheet; so that no colored pigments are present in the atmosphere or on the machinery in the paper mill, thereby avoiding contamination and discoloration.

The present invention also makes possible the manufacture of the pressure-sensitive record material as a unitary step in the manufacture of paper in the usual paper-making machines, if desired, thereby simplifying the manufacture of said record material.

Other advantages of the present invention in part will be obvious and in part will appear hereinafter.

In the practice of the present invention, a base sheet or web of suitable material, such as paper, metal, cloth, plastic or other film material, is first coated with an aqueous suspension of bentonite or other opaque solid (that is, solid at ordinary temperatures) electron acceptor material, and the resulting coating is dried. Then a dilute

solution of p-methoxyphenyl-leucoauramine or other electron donor chromogenic material in a suitable solvent therefor is applied to the surface of said coating by means of a roller, brush, doctor blade, or the like. An intensely colored surface is produced upon the coating by an electron exchange reaction between the electron donor chromogenic material and the surface of the coating of opaque solid electron acceptor material. The concentration of the chromogenic material in the solvent and the quantity of solution applied are limited so as to color only the surface portion of the coating and leave a substantial subsurface layer free from such coloring, for example, by the use of dilute solutions of the chromogenic materials and wetting only the surface of the coating with the solution. Preferably, the concentration of the chromogenic material in the solvent and the quantity of solution applied are controlled so that the surface of the coating is colored only superficially.

The colored coating is dried and then a top coating is applied of a composition in the form of an emulsion, solution or suspension which is adapted to be converted to a normally opaque pressure-sensitive material which is rendered light-transmissible by the application of pressure thereto, and the latter coating is then converted to the normally opaque form, as by drying, heating, etc.

While various forms of base sheet material can be employed in making the sheet record material, as indicated above, the present invention is of especial advantage in the coating of paper stock which does not exceed 0.0035 inch in thickness, and preferably in the coating of paper stock having a weight ranging from about 10 to about 15 lbs. per ream of 500 sheets having a sheet size of 17 by 22 inches, which corresponds to a thickness of about 0.002 to about 0.003 inch, and which is known in the trade as Continuous Bond.

The intermediate coating of opaque solid electron acceptor material performs two functions: it serves to develop the color by an electron exchange reaction with the electron donor chromogenic material, and it further serves to provide an opaque barrier which substantially prevents the intense color of the surface layer from showing through the untreated side of the base sheet or web. Preferably the coating is sufficiently thick to prevent any of the surface color from showing through the base sheet or web. In general, the coating should be at least about 0.0005 inch thick and preferably 0.0008 to 0.0012 inch thick. The specific amount of electron acceptor material employed will vary with the individual materials employed, as will be apparent to those skilled in the paper-making art.

Various electron acceptor materials may be employed in preparing the colored coating, a number of which are well known in the art. Thus, the following may be employed, alone or in the form of mixtures of two or more:

Bentonite
Kaolin
Attapulgate
Talc
Felspar
Halloysite
Magnesium trisilicate
Silica gel
Pyrophyllite
Zinc sulfate
Zinc sulfide
Calcium sulfate
Calcium citrate
Calcium phosphate
Calcium fluoride
Barium sulfate
Tannic acid
Dichlorobenzoic acid
Saccharine
Beta naphthol
Resorcinol

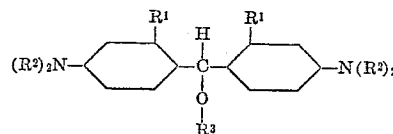
Preferably an opaque solid electron acceptor adsorbent, such as bentonite or other acid clay, is employed.

The electron acceptor is applied by conventional coating processes, preferably in the form of an aqueous suspension, with or without a suitable binder such as glue, as is well known in the paper-coating art.

As electron donor chromogenic material or adsorbates, various organic compounds can be employed, a number of which are known. Said compounds are characterized by a molecular structure which changes color with change in electron content; on contact with an electron acceptor, such as an acid clay or other material of the type referred to above, they combine therewith to form an intensely colored material. Preferably they are colorless, or substantially colorless, in the non-acid form.

Thus, the following electron donor chromogenic materials may be employed, alone or in the form of mixtures of two or more:

Victoria green carbinol
Crystal violet carbinol
Alkyl ethers of such carbinols (especially the lower alkyl ethers),
Benzoyl-leuco-methylene blue
Crystal violet lactone
The lactams of rhodamines
N-phenyl derivatives of leucoauramines
Michler's hydrol and ethers thereof and derivatives having the following formula



wherein:

R¹ stands for hydrogen or a methyl radical,
R² stands for the same or different alkyl, aryl, alkaryl or aralkyl radicals, and
R³ stands for hydrogen or an alkyl radical,

and the following derivatives of bis(p-di-lower alkyl-amino-mono-nuclear aryl)methane disclosed in my copending applications set out below:

- 50 Heterocyclic derivatives of bis(p-di-lower alkylamino-mono-nuclear aryl)methane in which a hetero nitrogen atom, of a nitrogen-containing unsaturated heterocyclic nucleus having at least 5 ring members and which is free from carbonyl and sulfonyl groups adjacent to the nitrogen atom, is linked to the methane carbon atom, the alkyl groups of the dialkylamino radicals each have 1 to 5 carbon atoms, and the aryl radicals are mono-nuclear aryl radicals, of my application Serial No. 734,428, filed May 12, 1958, now U.S. Patent No. 2,981,738;
- 55 Saturated heterocyclic derivatives of bis(p-dialkyl-aminoaryl)methane in which a hetero nitrogen atom of a nitrogen-containing heterocyclic nucleus having at least 5 ring members is linked to the methane carbon atom and to two adjacent saturated carbon atoms of the heterocyclic nucleus, the alkyl groups of the dialkylamino radicals each have 1 to 5 carbon atoms, and the aryl radicals are mononuclear aryl radicals, of my application Serial No. 734,418, filed May 12, 1958, now U.S. Patent No. 2,981,733;
- 60 N-bis(p-dialkylaminoaryl)methyl amines in which the amine nitrogen atom is linked to one or two aliphatic carbon atoms derived from a primary or secondary aliphatic amine, and in which the alkyl groups of the dialkylamino radicals each have 1 to 5 carbon atoms and the aryl radicals are mononuclear aryl radicals, of my application Serial No. 734,813, filed May 13, 1958, now U.S. Patent No. 2,983,756;
- 70 N - bis(p - dialkylaminoaryl)methyl sulfonamides in which the alkyl groups of the dialkylamino radicals each have 1 to 5 carbon atoms, and the aryl radicals are mono-

nuclear aryl radicals, of my application Serial No. 734,419, filed May 12, 1958, now U.S. Patent No. 2,948,753.

Preferably the electron donor chromogenic materials employed in the practice of the present invention are free from both chromophoric groups and from acidic groups containing a hydrogen cation, since such preferred compounds are lightly colored to colorless compounds.

Various solvents may be employed in preparing solutions of the chromogenic materials, a number of which are known. Thus they may be dissolved in non-polar solvents such as benzene, toluene, chlorinated biphenyl, dimethyl phthalate, propylene carbonate, dimethoxy tetraethylene glycol. Dilute solutions of the order of 1 to 5% by weight of the electron donor chromogenic material are preferably employed, although more concentrated solutions may be employed if desired. It is a feature of the present invention that the amount of dye required is minimal and that dilute solutions of the above order are rapidly absorbed by the surface of the electron acceptor materials, and especially the electron acceptor adsorbents, to form intense colors therewith.

The top coating can be any of those heretofore employed as pressure-sensitive normally opaque coatings, such as those referred to above. They can be applied in the form of an emulsion, solution or suspension, a number of which are well known (such as disclosed in the prior art referred to above), and then converted to the finished form, as by heating, drying etc.

The thickness of the top coating can be varied. For example, the coatings may vary in thickness from 0.0002 to 0.001 inch, and especially from 0.0004 to 0.0006 inch. Preferably a coating of minimum thickness is employed, for reasons of economy.

In carrying out the practice of the invention as a step in the manufacture of paper, a base web of paper fibers while still in wet condition and before removal from the paper-making supporting screen or shortly thereafter, as desired, is coated with the layer of electron acceptor material and the resulting web is preferably dried. The coated paper web is then contacted with a roller or other applicator containing a dilute solution of the electron donor chromogenic material which produces a superficially-colored coated web, as described above, and the colored coated web is then further treated to produce a pressure-sensitive normally opaque coating in the above manner.

The coated sheets prepared as described above have the unique advantage of being uniformly white until the treated surface is subjected to pressure such as those of a typewriter platen, a writing implement or a stylus. The base web, or backing, is not visually affected by the color forming process, and hence it is now possible to prepare white pressure-sensitive record material which has a white undersurface. Alternatively, if desired the upper and lower surfaces may be colored in the same or different shades, including pastel shades in pink, blue, yellow and the like, by the incorporation of suitable colored pigments instead of white pigments into the pressure-sensitive layer in the manner of British Patent 788,087, for example, and/or by employing suitably colored base sheet material. Further, if desired, the base sheet also can be coated on the bottom with an electron acceptor coating, followed by treatment with an electron donor chromogenic material, as described above, to produce differently colored top and bottom surfaces.

The accompanying drawings illustrate diagrammatically a preferred embodiment of sheet record material of the present invention. FIG. 1 is an isometric view of a plurality of record sheets upon which information has been recorded by a "charge-plate" and stylus. FIG. 2 is a greatly enlarged section along the line 2-2 of FIG. 1 of a portion of the top sheet of FIG. 1.

As shown more clearly in FIG. 2, the record sheet 1 consists of a base sheet 11 of paper, an intermediate opaque coating 12 of particles of electron acceptor adsorb-

ent, the surface 14 of the coating being superficially colored by an electron donor adsorbate, and a pressure-sensitive normally opaque coating 16. The coating 16 has depressions 17 which have been formed by the action of pressure on said coating, forming a compressed light-transmitting area 18 through which the colored surface 14 is visible.

The colored sheet material employed for production of the pressure-sensitive record material in accordance with the present invention is itself new. While it is preferably employed in the manufacture of pressure-sensitive record material, its use is not limited thereto. Thus, it can be employed in other connections where colored sheet material, and especially colored paper, is desired, in the form of thin sheet material which is intensely colored on one side without the color showing through.

The invention will be illustrated by the following specific examples, but it is to be understood that it is not limited to the details thereof and that changes may be made without departing from the scope of the invention. The temperatures are in degrees centigrade and the parts and percentages are by weight.

Example 1

Unsize paper stock (Continuous Bond paper having a thickness of 0.0025 inch and a weight of 12 lbs. per ream of 500 sheets having a sheet size of 17 by 22 inches) was coated with a mixture consisting of

4 parts by weight of bentonite
10 parts of a 30% glue solution
24 parts of water.

The coating was spread with a doctor knife to obtain a layer weighing about 0.0025 pound per square foot of surface and having a thickness of about 0.001 inch. The coated paper was dried in a circulating air drier at 105°. The dried coated paper was passed through a roller wet with a solution of 0.5 part by weight of p-methoxyphenyl-leuco-auramine in 50 parts of chlorinated biphenyl (Arochlor 1248 of Monsanto Chemical Co.). A deep blue color developed immediately. Thereafter the colored surface was covered with a coating of a mixture consisting of

16 parts of stearic acid
1 part of aluminum palmitate
3 parts of aluminum oleate
½ part of clay
Alcohol sufficient to give a flowable mass.

The coating was spread with a doctor knife to obtain a layer weighing about 0.003 pound per square foot of surface. The coated paper was dried in the air.

The resultant sheet was a white paper which upon being marked with a stylus produced a clear blue record. The sheet was white when viewed from the uncoated side and the marking did not show through.

Example 2

Paper stock (Continuous Bond paper having a thickness of 0.0025-0.003 inch and a weight of 13 lbs. per ream of 500 sheets having a sheet size of 17 by 22 inches) was coated with an aqueous bentonite suspension and dried as described in Example 1. The dried coated paper was passed through a roller wet with a solution of 0.5 part by weight of p-nitrophenyl-leucoauramine in 50 parts of chlorinated biphenyl ("Arochlor 1248"). A deep bluish red color developed immediately. Thereafter the colored surface was covered with a coating of a mixture consisting of

10 parts of sodium stearate
10 parts of sulfonated red oil (50% solids)
20 parts of magnesium carbonate (less than 1 micron in size)
5 parts of acrylic resin (50% solids emulsion)
Water sufficient to give a liquid flowable mixture (containing about 25% solids)

The coating was spread with a doctor knife to obtain a layer weighing about 0.003 lb. per square foot of surface. The coated paper was air-dried.

The sheet thus produced was a white paper, which on being marked with a stylus gave a bluish red color. The sheet was white when viewed from the uncoated side and the marking did not show through.

It will be evident that the invention is not limited to the details of the foregoing illustrative examples and that changes can be made without departing from the scope of the invention.

Thus, others of the above opaque solid electron acceptor materials can be employed instead of the bentonite used in the above specific examples, and especially kaolin and attapulgite.

Instead of the p-methoxyphenyl-leucoauramine and p-nitrophenyl-leucoauramine used in the specific examples, any of the other electron donor chromogenic materials referred to above can be substituted, in the form of solutions in others of the above solvents, and especially morpholino-leucoauramine, piperidino-leucoauramine, benzimidazolyl-leucoauramine (i.e. N-bis(p - dimethylamino-phenyl)methyl benzimidazole), and crystal violet carbinol, in toluene or chloro-biphenyl.

I claim:

1. Pressure-sensitive sheet record material comprising a base sheet, an intermediate coating of opaque solid electron acceptor material having its surface colored by reaction with an electron donor chromogenic material and a substantial subsurface layer free from such coloring, said subsurface layer preventing the color of the colored surface from showing through the base sheet, and an outer coating formed of normally opaque pressure-sensitive material which is rendered light-transmissible by the application of pressure thereto.

2. Pressure-sensitive sheet record material comprising a base sheet, an intermediate coating of acid clay having its surface colored by reaction with an electron donor chromogenic material and a substantial subsurface layer free from such coloring, said subsurface layer preventing the color of the colored surface from showing through the base sheet, and an outer coating formed of normally opaque pressure-sensitive material which is rendered light-transmissible by the application of pressure thereto.

3. A pressure-sensitive record sheet comprising a base sheet, an intermediate coating of opaque solid electron acceptor adsorbent material colored on the surface remote from the base sheet by reaction with a substantially colorless electron donor chromogenic adsorbate and having a subsurface layer free from such coloring, said subsurface layer preventing the color of the colored surface from showing through the base sheet, and an outer coating in contact with the colored surface of the intermediate coating, said outer coating being formed of normally opaque pressure-sensitive material which is rendered light-transmissible by the application of pressure thereto.

4. A pressure-sensitive record sheet comprising a base sheet of paper having a thickness not exceeding .0035 inch, an intermediate coating of opaque solid electron acceptor adsorbent material, said intermediate coating being at least .0005 inch thick and colored on the surface remote from the base sheet by reaction with an electron donor chromogenic adsorbate and having a subsurface layer free from such coloring, said subsurface layer preventing the color of the colored surface from showing through the base sheet, an outer coating in contact with the colored surface of the intermediate coating, said outer coating being formed of normally opaque pressure-sensitive material which is rendered light-transmissible by the application of pressure thereto.

5. A pressure-sensitive record sheet comprising a base sheet of paper having a thickness not exceeding .0035 inch, an intermediate coating of opaque solid electron acceptor adsorbent material, said intermediate coating being at least .0005 inch thick and colored on the surface

remote from the base sheet by reaction with a substantially colorless electron donor chromogenic adsorbate and having a subsurface layer free from such coloring, said subsurface layer preventing the color of the colored surface from showing through the base sheet, and an outer coating in contact with the colored surface of the intermediate coating, said outer coating being formed of normally opaque pressure-sensitive material which is rendered light-transmissible by the application of pressure thereto.

6. A pressure-sensitive record sheet comprising a base sheet of paper having a thickness not exceeding .0035 inch, an intermediate coating of acid clay, said intermediate coating being .0008 to .0012 inch thick and colored on the surface remote from the base sheet by reaction with a substantially colorless electron donor chromogenic adsorbate and having a subsurface layer free from such coloring, said subsurface layer preventing the color of the colored surface from showing through the base sheet, and an outer coating in contact with the colored surface of the intermediate coating, said outer coating being formed of normally opaque pressure-sensitive material which is rendered light-transmissible by the application of pressure thereto.

7. A method of manufacturing pressure-sensitive record material which comprises coating a base sheet with a layer of opaque solid electron acceptor material, applying to the surface of the resulting coating a solution of an electron donor chromogenic material in a solvent therefor and limiting penetration of said chromogenic material to maintain a layer of said acceptor material free of said chromogenic material, said electron donor chromogenic material being adapted to react with the opaque solid electron acceptor material to color the surface of said coating, applying to the resulting colored coating a coating of a composition which is adapted to be converted to a normally opaque coating capable of being rendered light-transmissible by the application of pressure thereto, and converting the latter coating to the normally opaque form, whereby a pressure-sensitive record material is obtained which does not show said color through the base sheet.

8. A method of manufacturing pressure-sensitive record material which comprises coating a base sheet of paper of a thickness not exceeding .0035 inch with an intermediate layer of opaque solid electron acceptor adsorbent material, said coating being at least .0008 inch thick, applying to the surface of the resulting coating a solution of a substantially colorless electron donor chromogenic adsorbate in a solvent therefor, said electron donor adsorbate being adapted to react with the electron acceptor adsorbent material to color said coating and the amount and concentration of said solution being so limited as to color only the surface portion of said coating, applying to the resulting colored coating a coating of a composition which is adapted to be converted to a normally opaque coating capable of being rendered light-transmissible by the application of pressure thereto and converting the latter coating to the normally opaque form, whereby a pressure-sensitive record material is obtained which does not show said color through the paper base sheet.

9. A method of manufacturing pressure-sensitive record material which comprises coating a base sheet of paper of a thickness not exceeding .0035 inch with an intermediate layer of opaque solid electron acceptor adsorbent material, said coating being .0008 to .0012 inch thick, applying to the surface of the resulting coating a solution of a substantially colorless electron donor chromogenic adsorbate in a solvent therefor, said electron donor adsorbate being adapted to react with the electron acceptor adsorbent material to color said coating and the amount and concentration of said solution being so limited as to color only the surface portion of said coating, applying to the resulting colored coating a coating of a

composition which is adapted to be converted to a normally opaque coating capable of being rendered light-transmissible by the application of pressure thereto, and converting the latter coating to the normally opaque form, whereby a pressure-sensitive record material is obtained which does not show said color through the paper base sheet.

10. A method of manufacturing pressure-sensitive record material which comprises coating a base web of paper fibers, while in a moist condition resulting from the manufacture of paper, with an intermediate layer of opaque solid electron acceptor material, applying to the surface of the resulting intermediate layer a solution of a substantially colorless electron donor chromogenic material in a solvent therefor and limiting penetration of said chromogenic material to maintain a layer of said acceptor material free of said chromogenic material, said electron donor chromogenic material being adapted to react with the opaque solid electron acceptor material to color the surface of said layer, applying to the resulting colored coated paper web an outer coating of a composition which upon drying is adapted to form a normally opaque coating capable of being rendered light-transmissible by the application of pressure thereto, and drying the resulting coated paper, whereby a pressure-sensitive record material is obtained which does not show said color through the paper base sheet.

11. A method of manufacturing pressure-sensitive record material which comprises coating a base web of paper fibers of a thickness not exceeding .003 inch, while in a moist condition resulting from the manufacture of paper, with an intermediate layer of opaque solid electron-acceptor adsorbent material said layer being at least .001 inch thick, applying to the surface of the resulting intermediate layer a solution of a substantially colorless electron donor chromogenic adsorbate material in a solvent therefor, said electron donor adsorbate material being adapted to react with the electron acceptor adsorbent material to color said layer and the amount and concentration of said solution being so limited as to color only the surface portion of said layer, applying to the resulting

colored coated paper web an outer coating of a composition which is adapted to be converted to a normally opaque coating capable of being rendered light-transmissible by the application of pressure thereto, converting the latter coating to the normally opaque form and drying the paper web, whereby a pressure-sensitive record material is obtained which does not show said color through the paper base.

12. A method of manufacturing pressure-sensitive record material which comprises coating a base web of paper fibers of a thickness not exceeding 0.0035 inch, while in a moist condition resulting from the manufacture of paper, with an intermediate layer of acid clay, said layer being 0.0008 to 0.0012 inch thick, applying to the surface of the resulting intermediate layer a solution of a substantially colorless electron donor chromogenic adsorbate material in a solvent therefor, said electron donor adsorbate material being adapted to react with the electron acceptor adsorbent material to color said layer and the amount and concentration of said solution being so limited as to color only the surface portion of said layer, applying to the resulting colored paper web an outer coating of a composition which upon drying is adapted to form a normally opaque coating capable of being rendered light-transmissible by the application of pressure thereto, and drying the resulting coated paper, whereby a pressure-sensitive record material is obtained which does not show said color through the paper base.

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