

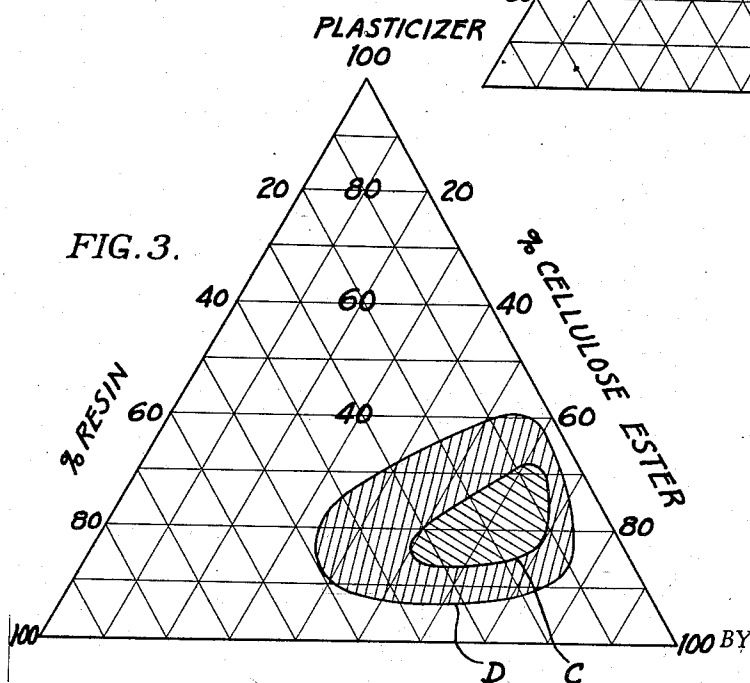
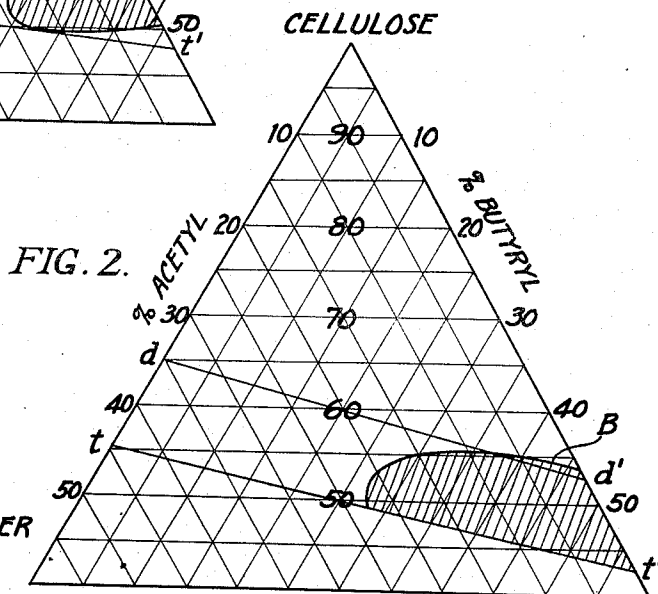
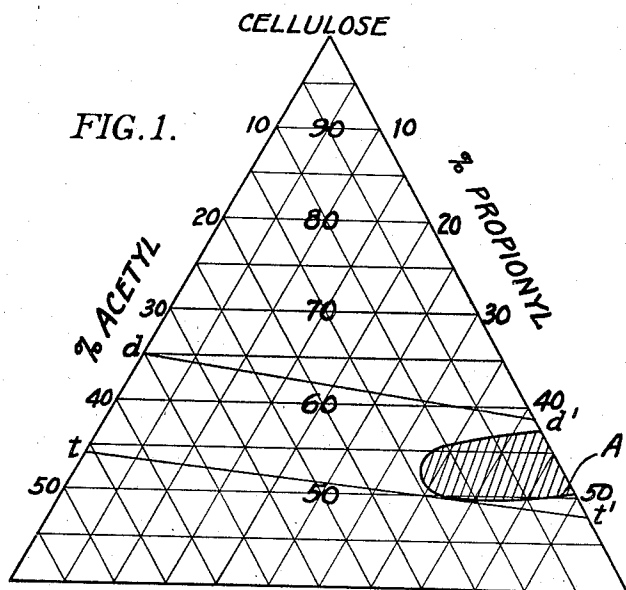
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DRY MOUNTING TISSUE

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DRY MOUNTING TISSUE

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This invention relates to dry mounting tissue and more particularly to improved adhesives for use on dry mounting tissue.

Dry mounting tissue is usually composed of a thin semi-transparent paper support coated on both sides with a thermoplastic adhesive. In mounting photographs or other articles on a suitable mounting such dry mounting tissue is placed between the photograph and the mount, and heat and pressure are applied to cause the adhesive to flow. On cooling, the photograph will remain firmly adhered to the mount.

In making mounting tissue which has an adhesive coating on both sides the problem of packaging the mounting tissue so that it may be easily dispensed is a difficult one since the adjacent sheets tend to adhere together or "block" in the package. The sheets are thus difficult to separate and in some cases if stored at warm temperatures are inseparable.

The usual expedient is to interleave the adhesive coated sheets with waxed tissue paper before packaging. This of course adds to the cost of production both in materials and in operations.

An object of the present invention is, therefore, an improved non-blocking type of dry mounting tissue.

Another object is a dry mounting tissue which may be packaged without the need of interleaving sheets between adjacent dry mounting adhesive tissues.

A further object of the invention is an adhesive suitable for use on dry mounting tissue which makes possible instant adherence of materials at elevated temperatures and quick setting of the adhesive upon relatively slight cooling.

A still further object of the invention is an adhesive material which is substantially inert at ordinary temperatures and will not adhere to surfaces brought in contact with it at those temperatures.

In accordance with the invention these and other objects are attained by forming an adhesive composition containing a cellulose organic acid ester, and synthetic resin and, a plasticizer and coating it on both sides of thin tissue paper, or an equivalent support, to form the dry mounting tissue. The composition may be coated on the support from a solvent solution or by a melt coating process. The more desirable compositions contain a larger proportion of the cellulose ester and a smaller proportion of the resin.

We preferably employ a cellulose organic acid ester containing a relatively high percentage of propionyl, butyryl or higher acyl groups, or a

mixed organic acid ester in which the propionyl, butyryl or higher acyl groups predominate over the lower acyl groups, usually acetyl.

Very useful cellulose esters are those included on the shaded areas on the accompanying drawing, Figs. 1 and 2, of triangular graphs. The triangular graph identified as Fig. 1 shows the area of the most useful cellulose propionates and cellulose acetate propionates. The graph identified as Fig. 2 gives similar information on cellulose butyrates and cellulose acetate butyrates. The straight lines identified as *d-d'* and *t-t'* on these graphs represent the diester lines and the triester lines respectively. Lines A and B bound the ester compounds which may be employed in our novel adhesive. The graph identified as Fig. 3 shows the preferred and acceptable compositions of cellulose esters and "Petrex 21" resin which may be used in forming the adhesive especially when employing acetate butyrates of 36-41% butyryl and 8-14% acetyl. Curved line C encompasses the compositions particularly suitable for use as an adhesive, and curved line D encompasses substantially all the compositions which may be so employed. As above stated, it will be noted from this graph that the preferred compositions contain a larger proportion of ester to a smaller proportion of resin.

The viscosity of the ester should be preferably quite low since this permits coating from concentrated solutions and further lowers the melting or sealing temperature of the composition. This will be evident from the following table showing change in melting point with change in viscosity in a cellulose acetate butyrate of 38% butyryl and 12% acetyl content.

Cellulose ester	Viscosity 10% solids in acetone	Melting point
High viscosity	Cps.	°C.
Low viscosity	200	190
	8	170

It will be understood that the higher viscosity cellulose ester may be employed, if desired, but the lower viscosity esters as the base of the adhesive make a better product. These esters melt in general at or below 210° C. and are compatible with the resin employed. The compositions shown on the graphs heat seal below 250° F. and do not exhibit tackiness below 125° F. The ester should contain at least 43% total acyl of which a majority of the acyl consists of groups of 3 carbons or more.

The preferred resin is that sold on the market under the trade name "Petrex 21." The "Petrex 21" is a terpinene-maleic anhydride condensate which is subsequently reacted with a glycol to give a resin-like body. This particular "Petrex" resin seems to be rather unique in that it may be used in a fairly wide ternary system to yield acceptable heat sealing compositions. Other types of resins in mixtures with cellulose butyrate and plasticizer tend either to "block" or to require excessive sealing temperatures. This resin is relatively soft as compared to hard non-blocking resins.

We have found that suitable plasticizers for use with this type of cellulose ester and synthetic resin are diethyl phthalate, dibutyl phthalate, and dioctyl phthalate. Other useful plasticizers are dibutyl sebacate, diamyl phthalate, triethyl-ene glycol dipropionate.

The invention will be more clearly understood by reference to the following examples.

Example 1

An adhesive composition in solution is made by mixing 60 parts of cellulose acetatebutyrate, containing 38% butyryl and 12% acetyl, with 20 parts of dibutyl phthalate and 20 parts of "Petrex 21" resin in a 2:1 benzene-denatured alcohol solvent.

A dry mounting tissue is formed by coating this solution on glassine paper under conditions permitting the solvents to evaporate uniformly. The dope solution is coated on both sides of the glassine paper by feeding the paper into a pan of the dope. Curing is carried out by passing the paper slowly up through a heated tower. The solvent is thus removed, and the cured paper is gathered on a roll. The cured product is not tacky at room temperatures but will bind a photographic print securely to a mounting board at 200-220° F. The mounting operation may be conducted in the usual manner i. e. by placing the mounting tissue between the back of the photograph and the mounting and pressing with an electric iron maintained at the 200-220° F. temperature.

Example 2

An adhesive composition in solution is made by mixing 12.6 parts of cellulose acetate butyrate of 14.4% acetyl and 36.4% butyryl content, 3.7 parts of "Petrex 21" resin, and 4.6 parts of diethyl phthalate in 116 parts of 3:1 benzene-denatured alcohol solvent. This solution is coated on tissue paper by dipping the paper in the solution. The paper is then dried to expel the solvent mixture. It was found that this coating was not tacky at room temperatures but at 200-250° F. would form an excellent adhesive and the coated-sheet was suitable for use as a dry mounting tissue.

In the previous examples the adhesive is applied to the tissue from a solvent solution. However, as described in the following example the adhesive composition may be made without the use of a solvent and may be applied from a melted mixture directly onto the dry mounting tissue.

Example 3

A thin, homogeneous melt is made of 60 parts of a cellulose acetate butyrate containing 38% butyryl and 12% acetyl, 30 parts of dioctyl phthalate and 10 parts "Petrex 21" resin by stirring at 180° C. The melt was applied in a thin layer to glassine paper by the use of an applicator roll and a doctor blade. The melted surface quickly sets so that the coated paper may be

wound up on a roll. The resulting mounting tissue was found to satisfactorily bind photographs to mounts at a temperature of 200-220° F.

Example 4

A cellulose acetate propionate analyzing 1.3% acetyl and 44.5% propionyl may be made into a heat sealing composition with "Petrex 21" resin and diethyl phthalate. The ratio of cellulose ester: resin: plasticizer is 60:14:26. This composition when coated on glassine paper seals well at 240° F. and is not tacky at 125° F.

While the graphs shown in Figs. 1 and 2 relate to cellulose esters containing propionyl and butyryl radicals, as above suggested, higher fatty esters, for example, the acetate stearates may be employed as shown in the following example.

Example 5

A cellulose acetate stearate analyzing 17.9% acetyl and 43.9% stearyl and melting at 145° C. was employed in a heat sealing composition also containing "Petrex 21" resin and diethyl phthalate. The ratio of cellulose ester: resin: plasticizer is 60:14:26. This composition when coated on glassine paper gives good bonding at 220° F. but shows no tack at 125° F.

In addition to making satisfactory seals within a practical temperature range these adhesive compositions do not "block" when packaged without interleaving waxed paper.

The storage characteristics of these sheets were tested by placing a plurality of the coated sheets in layers and subjecting them to a pressure of 1½ lbs. per square inch at 125° F. for 12 hours. It has been found that if the sheets do not stick together or "block" after this treatment they can be safely packaged without interleaving wax paper.

The above described cellulose ester "Petrex 21" resin adhesive compositions for dry mounting tissues have several advantages not found in previous dry mounting tissue adhesives. They are non-tacky and non-blocking so that interleaving with paper is not necessary. While having the improved adhesiveness of a soft resin, they do not have the tackiness of a soft resin adhesive at lower temperatures. The incorporation of the plasticizer permits close adjustment of the elevated temperature at which the adhesive becomes tacky for dry mounting purposes. The use of low viscosity cellulose esters as the base of the adhesive permits flow only at elevated temperatures. In addition these compositions show good strength above their melting temperature so that the photographic print is held firmly to the mount even though the composition is in a fluid state. This allows the mounting iron to be removed without the print curling from the mounting board.

In the following claims where reference is made to compositions described by the curves of the attached drawing, it will be understood that these compositions are those within the shaded areas demarked by the respective curves.

We claim:

1. A dry mounting tissue comprising a sheet of thin tissue-like supporting material having on each side thereof a coating of an adhesive composition containing as essential elements of the adhesive composition a cellulose acetate butyrate, a compatible plasticizer, and an alkyl resin constituting a terpinene-maleic anhydride condensate reacted with a glycol, the proportions of the three components of the said adhesive composition

tion being those represented by any point falling within the area designated as D in Fig. 3 of the accompanying drawing and the cellulose acetate butyrate having an acetyl and a butyryl content represented by any point falling within the area designated as B in Fig. 2 of the accompanying drawing, said composition being characterized in that it heat seals at a temperature between 125° F. and 250° F. and is free from tackiness at a temperature below 125° F.

2. A dry mounting tissue comprising a sheet of thin tissue-like supporting material having on each side thereof a coating of an adhesive composition containing as essential elements of the adhesive composition a cellulose acetate butyrate, a compatible plasticizer, and an alkyd resin con-

stituting a terpinene-maleic anhydride condensate reacted with a glycol, the proportions of the three components of the said adhesive composition being those represented by any point falling within the area designated as C in Fig. 3 of the accompanying drawing and the cellulose acetate butyrate having an acetyl and a butyryl content represented by any point falling within the area designated as B in Fig. 2 of the accompanying drawing, said composition being characterized in that it heat seals at a temperature between 125° F. and 250° F. and is free from tackiness at a temperature below 125° F.

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