

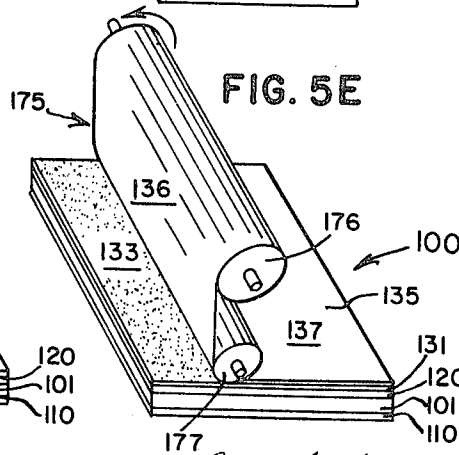
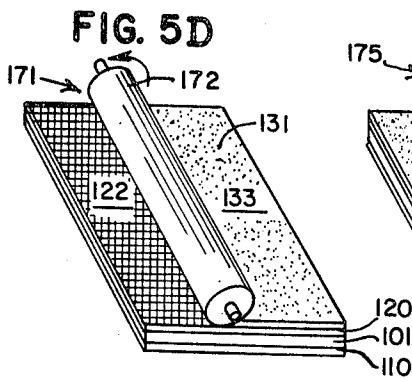
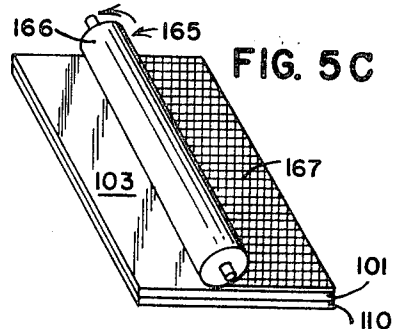
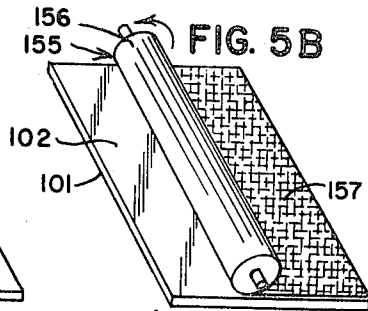
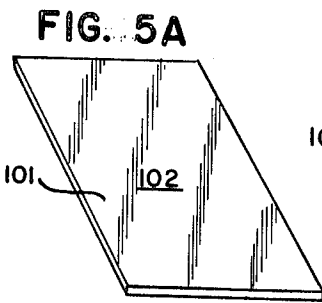
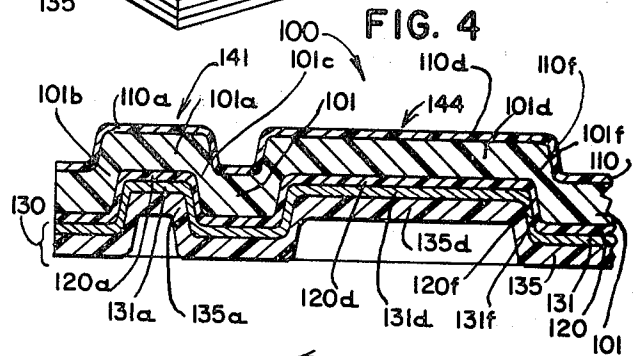
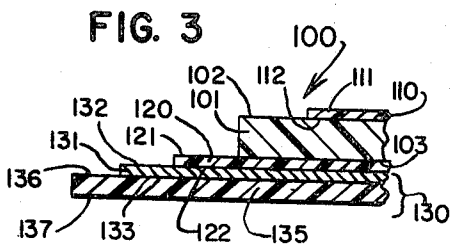
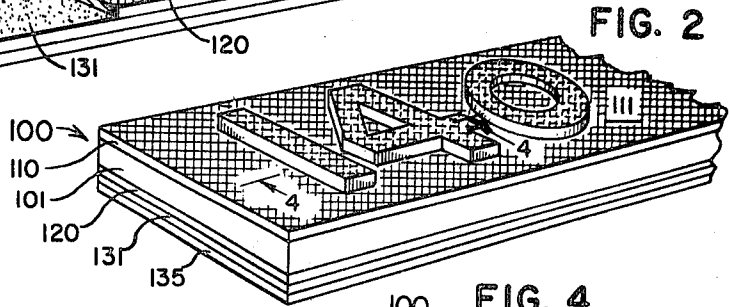
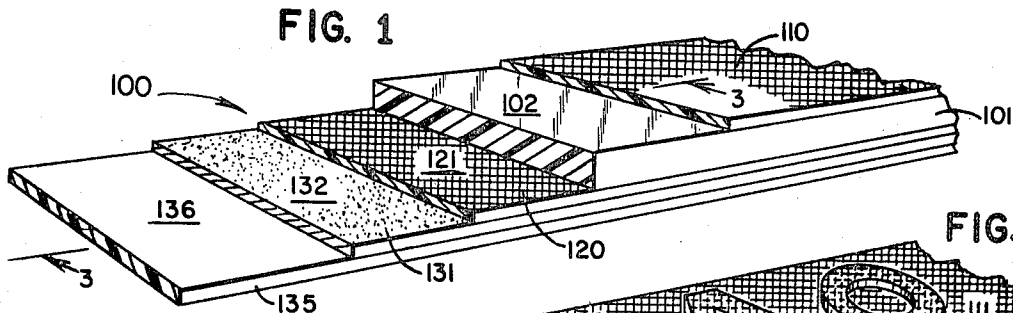
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3,734,808

TWO COLORED TAPE

Filed April 23, 1965



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3,734,808

**TWO COLORED TAPE**

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 U.S. Cl. 161—6

3 Claims

**ABSTRACT OF THE DISCLOSURE**

There is disclosed an embossable sheet material including an embossable base sheet of plastic, a transparent top coat of plastic firmly bonded to the front surface of the base sheet and a transparent background coat of plastic firmly bonded to the rear surface of the base sheet, the transparent top coat having a first coloring agent uniformly distributed therethrough and the background coat having a second coloring agent uniformly distributed therethrough, whereby the sheet material is embossable to provide opaque embossments having the color of the first coloring agent on a field having a color that is a combination of the first and second coloring agents, a layer of pressure sensitive adhesive on the rear surface of the background coat, and a backing sheet covering the exposed surface of the adhesive.

This invention relates to embossable sheet material, and specifically to an embossable tape.

It is an important object of the present invention to provide an improved embossable sheet material of the type including a base sheet formed of a transparent rigid synthetic organic resin having a structure and composition such that permanent cold flow deformation thereof to form embossments thereon renders the resin opaque in the areas of deformation of the embossments, the base sheet carrying on the front surface thereof a transparent top coat having a first coloring agent uniformly distributed therethrough and carrying on the back surface thereof a background coat having a second coloring agent uniformly distributed therethrough, whereby the sheet material is embossable to provide opaque embossments having the color of the first coloring agent on a field having a color that is a combination of the color of the first coloring agent and the color of the background coat.

Another object of the invention is to provide an improved embossable tape of the type set forth wherein the first coloring agent is of a relatively lighter color, such as yellow, and the second coloring agent is a relative darker color, such as black, whereby when the sheet material is embossed, yellow embossments are provided on a generally black field or background.

In connection with the foregoing object, it is another object of the invention to provide improved embossable sheet material of the type set forth wherein the first coloring agent is a dye which does not materially alter the color of the background coat prior to embossment of the sheet material.

Yet another object of the invention is to provide an improved embossable sheet material of the type set forth wherein the top coat is of a synthetic organic resin and the background coat is also of a synthetic organic resin.

Still another object of the invention is to provide an improved embossable sheet material of the type set forth wherein the transparent top coat also carries an ultraviolet screening agent to protect the sheet material from deterioration when exposed to sunlight and ultraviolet light during use thereof.

Yet another object of the invention is to provide an improved embossable sheet material of the type set forth wherein the background coat carries a flattening agent to improve adherence of other materials thereto and to provide a deep rich colored appearance thereof when

viewed through the transparent base sheet and the transparent top coat.

A further object of the invention is to provide improved embossable sheet materials of the type set forth carrying on the back surface thereof a layer of pressure sensitive adhesive and an overlying detachable protective backing sheet removably adhered to the exposed surface of the adhesive layer, whereby the embossable sheet material can be adhesively adhered to an underlying support surface upon removal of the backing sheet therefrom.

Further features of the invention pertain to the particular arrangement of the component parts of the embossable sheet material and to the particular arrangement of the steps of the method whereby the above-outlined and additional operating features thereof are attained.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification taken in connection with the accompanying drawing, in which:

FIG. 1 is a perspective view on an enlarged scale of a short length of a piece of embossable sheet material in the form of a tape constructed in accordance with and embodying the principles of the present invention, the various layers of the tape being cut away to the right to illustrate the construction thereof;

FIG. 2 is a perspective view on an enlarged scale of a short length of a piece of the tape illustrated in FIG. 1 and showing characters embossed on the front surface thereof;

FIG. 3 is a further enlarged view in longitudinal section through the tape of FIG. 1 along the line 3—3 thereof;

FIG. 4 is a further enlarged view in longitudinal section through the tape of FIG. 2 along the line 4—4 thereof; and

FIGS. 5A through 5E are views diagrammatically illustrating the method of making the embossable tape of FIG. 1.

Referring to FIGS. 1 and 3 of the drawing, there is illustrated an embossable sheet material 100 made in accordance with and embodying the principles of the present invention, the embossable sheet material 100 being in the form of an elongated embossable tape, and accordingly, the embossable sheet material 100 will hereinafter be referred to as an embossable tape. As illustrated, the embossable tape 100 includes a base sheet 101 of a synthetic organic resin, the synthetic organic resin being transparent and rigid, as distinguished from rubber-like, and having a structure and composition such that permanent cold flow deformation thereof to form embossments thereon renders opaque the originally transparent resin in the areas of deformation of the embossments.

More particularly, the material of the base sheet 101 is of the type which can be readily hand embossed to form opaque indicia or characters in the form of raised embossments on the front surface thereof disposed on a field of the transparent synthetic organic resin by means of a hand-operated embossing device of the type disclosed in United States Letters Pat. No. 3,083,807, granted Apr. 2, 1963, to Dalny Travaglio. Such indicia are useful for the purpose of identification or otherwise imparting information, the utility thereof being enhanced by the fact that the embossments are substantially opaque whereas the unembossed base sheet 101 is still transparent, whereby to provide a marked contrast therebetween. The synthetic organic resin of which is formed the base sheet 101 is of the so-called rigid or semi-rigid thermoplastic type for which the yield point occurs after a small amount of elongation and further elongation occurs with permanent deformation, i.e., cold flow deformation; resins with a substantial rubber-like type of elasticity are not suitable.

The base sheet **101** must further be of the type which although rigid or semirigid can, when in the form of a generally flat or continuous strip, be coiled or wound without damage thereto. The preferred synthetic organic resins for forming the base sheet **101** are the rigid polyvinyl chloride polymers and the rigid polyvinyl chloride-polyvinyl acetate copolymers.

In accordance with the present invention, the base sheet **101** is in the form of an elongated tape having a front surface **102** and a back surface **103**. Applied to the front surface **102** is a transparent top coat **110** which has a coloring agent such as a yellow dye uniformly distributed therethrough, and the back surface **103** has applied there- to a background coat **120** which carries a second coloring agent, such as a black pigment, the background coat and the pigment carried thereby being visible through both the transparent base sheet **101** and the transparent top coat **110**, the coloring agent of the transparent top coat **110** being not really discernible in accordance with the present invention. The top coat **110** and the background coat **120** are coterminous with the entire respective surface areas of the base sheet **101**, and accordingly, when opaque embossments are formed on the tape **100**, such as by using the hand tool of Pat. No. 3,083,087, referred to above, an opaque yellow embossment is provided on a black field, whereby to provide a highly decorative embossed tape.

More specifically, the top coat **110** is formed of a transparent synthetic organic resin and has a front surface **111** and a back surface **112**, the back surface **112** being intimately adhered to the front surface **102** of the base sheet **101**. The fundamental purpose of the top coat **110** is to carry the first coloring agent which provides a predetermined color for the embossments formed on the tape **100**. There also may be preferably incorporated in the top coat **110** an ultraviolet screening agent to protect the embossable tape **100** from deterioration when exposed to sunlight and ultraviolet light falling thereon during the use therefor.

The background coat **120** is intimately adhered to the back surface **103** of the base sheet **101** and has a front surface **121** and a back surface **122**, the front surface **121** being disposed against the back surface **103** of the base sheet **101**. The background coat **120** is also preferably formed of a transparent synthetic organic resin of the same general character as the base sheet **101** and further carries therein the second coloring agent which is visible through both the transparent base sheet **101** and the transparent top coat **110**. The background coat **120** also preferably carries a flattening agent which renders the back surface **122** thereof more receptive to other materials applied thereto and which also provides a good background surface for attractively displaying the color of the second coloring agent.

In order to permit the embossable tape **100** to be readily applied to an underlying support surface for the labeling or identification function, an adhesive assembly **130** is provided on the back thereof, and specifically on the back surface **122** of the background coat **120**. More specifically, there is applied to the back surface **122** of the background coat **110** a pressure sensitive adhesive layer **131** having a front surface **132** and a back surface **133**, the front surface **132** being securely adhered to the back surface **122** of the background coat **120**. Carried on the back surface **133** of the adhesive layer **131** is a backing sheet **135** including a front surface **136** and a back surface **137**, the front surface **136** being detachably adhered to the back surface **133** of the adhesive layer **131**, whereby the backing sheet **135** can be readily removed from the adhesive layer **131** without stripping the adhesive layer **131** from the back surface **122** of the background coat **120**. The backing sheet **135** serves to prevent blocking, i.e., sticking of the adjacent convolutions of the embossable tape **100** to each other, when the embossable tape **100** is wound into rolls or coils for storage purposes.

In the use of the embossable tape **100**, a suitable tool such as the hand-operated embossing tool of Pat. No. 3,083,807 referred to above may be utilized to emboss a desired letter, character or other indicia upon the tape **100**, such as the indicia "140" illustrated in FIGS. 2 and 4 of the drawings. At least the base sheet **101** and in certain cases also the top coat **110** and the background coat **120** are formed of a suitable thermoplastic resin having a structure and composition such that the permanent cold flow deformation thereof to form embossments therein, such as the indicia "140" illustrated in FIG. 2, renders the resin opaque in the areas of such deformation. Referring specifically to FIG. 4, the embossment **141** to the left is formed by a cold flow deformation of at least the base sheet **101** to form a stressed opaque portion **101a** flanked by stressed and deformed portions **101b** and **101c** that rise upwardly out of the unstressed and undeformed base sheet **101**. The portions **101a**, **101b** and **101c** are all opaque and milky white, whereby the black color of the background coat **122** is not visible therethrough, whereas the yellow color of the top coat **110** now becomes the dominant color seen, whereby the embossment **141** has a definite yellow color that may be somewhat milky in character. On the other hand, the black color of the background coat **120** is readily seen through the undeformed portions of the base sheet **101** on either side of the embossment **141** and is clearly visible therethrough, whereby the embossment **141** is of a yellow color positioned upon a field of black, thereby to produce a highly pleasing and decorative embossed tape.

The embossment **144** to the right in FIG. 4 also includes a stressed whitened opaque and generally horizontally disposed portion **101d** of the base sheet **101** and upwardly directed side portions **101e** and **101f** that are also opaque and extend upwardly out of the transparent unstressed portions of the base sheet **101**. The opaque character of the stressed portions **101d** and **101e** and **101f** renders the embossment **144** opaque so that the black color of the background coat **120** disposed therebelow is not visible therethrough, while the yellow color of the top coat **110** now becomes the dominant color seen, whereby the embossment **144** has a definite yellow color that may be somewhat milky in character. On the other hand, the black color of the background coat **120** is readily seen through the undeformed portions of the base sheet **101** on either side of the embossment **144** and is clearly visible therethrough, whereby the embossment **144** is of a yellow color positioned upon a field of black, thereby to produce a highly pleasing and decorative embossed tape. It will be understood that in the embossments **141** and **144**, the other layers of the embossable tape **100** are likewise deformed and corresponding suffixes *a* through *f* have been applied to parts which underlie and overlie the correspondingly lettered parts of the base sheet **101**.

In order further to illustrate the present invention, further details of the composition of the various layers of the embossable tape **100** will be given and the method of making the embossable tape **100** will be further described with reference to FIGS 5A through 5E of the drawings. Referring to FIG. 5A, there is diagrammatically illustrated the base sheet **101** with the front surface **102** disposed upwardly. The base sheet **101** is preferably formed of an unplasticized rigid polyvinyl chloride resin, particularly that sold under the trademark "Genotherm UG 200," which material is a mixture of two different vinyl chloride polymers at least one of which is an emulsion polymer. The resin is processed in such a manner that less than 5% residual stress is left in the base sheet **101**; the elongation to breaking point is greater than 100%; the heat distortion point is higher than 160° F.; and the appearance thereof is clear transparent with a slight brown or white haze. The thickness of the base sheet **101** may be from a few mils to about 100 mils, the preferred thickness being 8 mils, i.e., a thickness of 0.008 inch. This resin

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provides an opaque milky white embossment when a sheet thereof is embossed utilizing the tool of United States Pat. No. 3,083,807, it being believed that the transformation from a clear transparent form to an opaque milky white form is a result of the fracture or rupture at the phase or micelle boundaries within the resin generated by stress applied thereto during the embossing operation, at least the emulsion polymer ingredient responding in this manner, whereby light striking the embossed and stressed portions of the resin is reflected therefrom rather than being transmitted therethrough.

The top coat 110 is preferably formed from a coating having the following composition:

TABLE 1

| Ingredient:  | Percent by weight |
|--|-------------------|
| Acrylic resin (Rohn & Haas "B66") -----                                      | 15.0              |
| Vinyl resin (Bakelite "VYHH") -----  | 7.5               |
| Ethyl acetate -----  | 30.0              |
| Methyl ethyl ketone -----  | 15.0              |
| Toluene -----  | 29.0              |
| Yellow dye (Eastman lacquer yellow "GLF")                                    | 2.0               |
| 4-tert-butyl phenyl salicylate ultraviolet screening agent (Dow "TBS") ----- | 1.5               |
|  | 100.0             |

The coating having the composition of Table 1 above is applied to the front surface 102 of the base sheet 101 using a reverse roll coater. This coating step is diagrammatically illustrated in FIG. 5B, the apparatus being designated by the numeral 155 and including a roller 156 which is shown applying a coating 157 of the composition set forth in Table 1 above to the front surface 102 of the base sheet 101, the base sheet 101 moving to the right under the roller 156 with the roller rotating in the direction indicated by the arrow. After the coating 157 has been applied to the base sheet 101, it is dried in an oven (not shown) including three zones, the first zone being at a temperature of 100° F., the second zone being at a temperature of 155° F. and the third zone being at a temperature of 155° F., the coated base sheet 101 being in each of the three zones for about 30 seconds, the residence time in each zone being variable from about 20 seconds to about 40 seconds with satisfactory results; it will be understood that the temperatures in the three zones can also be varied and the residence times correspondingly varied from those indicated to achieve the desired drying of the coating 157. After leaving the oven, the coated sheet is cooled on a water chilled roll (not shown), and if the coated sheet is to be stored before further processing, it is wound with the coated side disposed outwardly. In the process, enough of the coating composition 157 is applied to wet the base sheet 101 to obtain complete coverage of the front surface 102 thereof, so that after evaporation of the solvents therefrom, the top coat 110 has a thickness on the order of about 0.3 mil, as little as 0.2 mil and as much as 0.4 mil being also useful.

In place of the resins illustrated in Table 1 above for the top coat 110, other suitable resin combinations may be used, and for example, only acrylic resin may be used or only vinyl resins or nitrocellulose resins and other acrylic resins and vinyl resins may be used in place of those illustrated therein. In the preferred formulation, the acrylic resin may constitute as little as 5% by weight of the composition and up to as much as 35% by weight of the composition, while the vinyl resin may constitute as little as 2% by weight of the composition up to as much as 25% by weight of the composition.

The ethyl acetate in the formulation of Table 1 serves as a solvent for the resin, and particularly the acrylic resin, and may be utilized in lesser or greater amounts, as little as 10% by weight and as much as 50% by weight of ethyl acetate being useful in the composition. It will be understood that if the amount of acrylic resin in the formulation is varied, the amount of ethyl acetate in the

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formulation likewise is preferably varied. The ethyl acetate is a preferred solvent because of its limited penetration of the base sheet 101 after application thereto of the coating 157 and prior to the drying thereof. The methyl ethyl ketone in the formulation of Table 1 serves as a solvent for the resins and particularly for the vinyl resin and may also be utilized in lesser or greater amounts, as little as 5% by weight and as much as 50% by weight of methyl ethyl ketone being useful in the composition; it will be understood that if the amount of vinyl resin in the composition is changed from that illustrated, the amount of methyl ethyl ketone used will likewise be varied. The toluene serves as a solvent for the resins and particularly for the acrylic resin and further may be considered to be a solvent diluent. Lesser or greater amounts of toluene may be used such as for example as little as 10% by weight and up to as much as 60% by weight of the coating composition. Other solvents may be used in place of those illustrated and other solvents systems utilized. Examples of other useful solvents being n-propyl acetate and butyl acetate which may be utilized in place of the ethyl acetate, and other hydrocarbons which may be utilized in place of the toluene illustrated.

The yellow dye set forth in Table 1 serves to provide a transparent color to the transparent top coat 110, and may be utilized in lesser or greater amounts, as little as 0.5% by weight and as much as 10.0% by weight of the dye being useful in the composition. Other light stable dye systems may also be utilized in lieu of the specific yellow dye illustrated in the composition of Table 1, the lighter colored dyes being preferred as will be explained more fully hereinafter.

The ultraviolet screening agent in the composition of Table 1 is an optional ingredient, but is highly desirable when the tape 100 is to be exposed to sunlight and ultraviolet light. Other amounts of the ultraviolet screening agent may be used, as little as 0.5% and as much as 5.0% by weight of the composition being useful. Also, other ultraviolet screening agents may be utilized in lieu of the one illustrated in the composition of Table 1, such for example as phenyl salicylate (Dow "Salol").

The background coat 120 is preferably formed from a coating having the following composition:

TABLE 2

| Ingredient:   | Percent by weight |
|---|-------------------|
| Vinyl chloride-vinylidene chloride resin ("Geon 222") ----- | 20.0              |
| Ethyl acetate -----   | 48.5              |
| Hexane -----  | 24.0              |
| Carbon black pigment -----                                  | 5.0               |
| Silica flattening agent ("Syloid 308") -----                | 2.5               |
|   | 100.0             |

The coating having the composition of Table 2 above is applied to the back surface 103 of the base sheet 101 using a reverse roll coater. The coating step is diagrammatically illustrated in FIG. 5C, the apparatus being designated by the numeral 165 and including a roller 166 which is shown applying a coating 167 of the composition set forth in Table 2 above to the back surface 103 of the base sheet 101, the base sheet 101 moving to the right under the roller 166 with the roller rotating in the direction indicated by the arrow. After the coating 167 has been applied to the base sheet 101, it is dried in an oven (not shown) including three zones, the first zone being at a temperature of 100° F., the second zone being at a temperature of 155° F., and the third zone being at a temperature of 155° F., the coated base sheet 101 being in each of the three zones for about 30 seconds, the residence time in each zone being variable from about 20 seconds to about 40 seconds with satisfactory results; it will be understood that the temperatures in the three zones also may be varied and the residence times correspondingly varied from those indicated to achieve the desired drying

of the coating 167. After leaving the oven, the coated sheet is cooled on a water chilled roll (not shown), and if the coated sheet is to be stored before further processing, it is wound with the back surface 103 disposed inwardly. In the process, enough of the coating composition 167 is applied to wet the base sheet 101 to obtain complete coverage of the back surface 103 thereof so that after evaporation of the solvents therefrom, the background coat 120 has a thickness on the order of about 0.3 mil, as little as 0.2 mil and as much as 0.4 mil being also useful.

In place of the vinyl resin illustrated in the composition of Table 2 above for the background coat 120 other suitable resins may be used such as acrylic resins, other vinyl resins or nitrocellulose resins. As little as 10% by weight of the composition may constitute the resin and up to as much as 40% by weight of the composition may be resin.

The ethyl acetate in the formulation of Table 2 serves as a solvent for the resin and may be utilized in lesser or greater amounts, as little as 37% by weight as much as 73% by weight of ethyl acetate being useful in the composition. The ethyl acetate is a prime solvent for the resin and is preferred because of its limited penetration of the base sheet 101 after application thereto of the coating 167 and prior to the drying thereof. Other suitable prime solvents for use in place of the ethyl acetate are methyl ethyl ketone, n-propyl acetate and butyl acetate. The hexane serves as a solvent diluent and serves to lower the viscosity of the coating composition, and since it possesses a lower boiling point, aids in the drying process, carrying out the prime solvent such as the ethyl acetate. The solvent diluent is an optional ingredient, whereby none may be used, and likewise greater quantities may be used such as as much as 37% by weight of the coating composition. Other hydrocarbon diluents may be used in place of the hexane illustrated in the composition of Table 2, another suitable example being heptane.

The carbon black pigment utilized in the composition of Table 2 above serves to impart a deep black color to the background coat 120, and may be utilized in lesser or greater amounts therein, as little as 2% by weight and as much as 10% by weight of the carbon black pigment being useful in the composition. Other pigments or dyes may be utilized in place of the carbon black pigment of the composition of Table 2, the darker colored pigments or dyes or coloring agents being preferred as will be explained more fully hereinafter.

The silica flattening agent utilized in the composition of Table 2 above provides a matte finish for the background coat 120 that improves the appearance thereof when viewed through the transparent base sheet 102 and the transparent top coat 110; and the matte finish on the rear surface 122 of the background coat 120 also enhances the adherence of the adhesive layer 131 thereto. Other amounts of flattening agent may be utilized, as little as 0.6% by weight or as much as 6.0% by weight of the flattening agent being useful. In addition, other flattening agents may be utilized in place of the silica illustrated, other suitable flattening agents being calcium carbonate, gypsum, barium sulfate, diatomaceous silica, clay, magnesium silicate, and aluminum hydrate. The flattening agent also serves to aid in the release of the solvent from the coating 167 during the drying thereof and also serves as an anti-blocking agent when the coated sheet is to be rolled and stored prior to further processing.

The tape 100 after drying following the coating step illustrated in FIG. 5C is useful for embossing purposes, but the utility of the tape is greatly enhanced if the adhesive assembly 130 is added to the back surface 122 of the background coat 120 thereof. To this end the adhesive layer 131 is applied to the back surface 122 of the background coat 120 in a coating operation diagrammatically illustrated in FIG. 5D, the adhesive being applied by mechanism generally designated by the numeral 171 and including an applying roller 172, it being under-

stood that any of the other generally useful methods of applying the adhesive layer 131 may be utilized. The adhesive is of the pressure sensitive type and one that is tightly adherent to the back surface 122 of the background coat 120.

After application of the adhesive layer 131, the backing sheet 135 is applied over the back surface 133 of the adhesive layer 131, this operation being diagrammatically illustrated in FIG. 5E. The backing sheet applying mechanism is generally designated by the numeral 175 and includes a roll of the backing sheet 135 from which a web is fed downwardly around a pressure applying roller 177 which presses the front surface 136 of the backing sheet 135 against the back surface 133 of the adhesive layer 131, the base sheet 101 moving to the right under the roller 177 as the web of the backing sheet 135 is fed from the roll 176, the roll 176 and the roller 177 rotating in the directions indicated by the arrows respectively associated therewith. After the backing sheet 135 has been applied, the finished embossable tape 100 is preferably wound in a roll or coil with the back surface 137 of the backing sheet 135 disposed inwardly. It will be understood that the material of the backing sheet 135 is preferably a synthetic organic resin and one which has a composition or has the front surface 136 thereof treated in such a manner as to be readily releasable from the adhesive layer 131 without disruption thereof. Further details of a suitable adhesive assembly for use on the embossable tape are set forth in United States Letters Patent No. 3,036,945, granted May 29, 1962, to David W. Souza, the disclosure of that patent being incorporated herein by reference.

The resultant embossable tape 100 is highly useful for its intended purposes and furthermore is highly decorative and has a most pleasing appearance. It will be understood that the base sheet 101 and the top coat 110 and the background coat 120 are tightly adherent to the adjacent named sheet and coats and can be considered to be solvent welded one to the other throughout the thickness of the tape 100. The yellow dye in the top coat 110 is embedded therein and therefore cannot be worn off by scuffing or the like, and likewise the black background coat 120 disposed to the rear of the tape 100 is protected from scuffing and marring, the black coloring agent therein being distributed therethrough, whereby the pleasing appearance of the tape is permanent and will not be marred in the normal use thereof.

All of the sheets and coats named further are readily deformed during the embossing operation as illustrated in FIGS. 2 and 4, the base sheet 101 and the top coat 110 which before embossing were transparent, being rendered opaque and milky in appearance upon embossment so as to block out the black color of the background coat 120, whereby the yellow dye in the top coat 110 becomes readily visible and colors the embossment. The yellow embossment is seen by an observer on a field of dark black, whereby to provide a very pleasing decorative appearance of the yellow embossment on the black field. The adhesive assembly 130 is likewise deformed in the embossing operation, the backing sheet 135 being readily peelable or detachable from the adhesive layer 131 to permit the embossed tape to be readily adhesively applied to an underlying support surface. The top coat 110 further has the ultraviolet screening agent therein which protects the tape against deterioration when exposed to sunlight and ultraviolet light during the use of the tape 100.

It will be understood that other colors can be used in place of the yellow color in the top coat 110 and the black color in the background coat 120, it being preferred, however, that the coloring agent in the top coat 110 be a relatively lighter color and the coloring agent in the background coat 120 be a relatively darker color. This arrangement provides a more pleasing appearance in the embossed tape and also the lighter color in the top coat 110 interferes less with the color of the background coat 120, it being understood that the color perceived by the ob-

server looking at the front surface 111 of the tape 100 is actually a combination of the color of the coloring agent in the top coat 110 and the color of the background coat 120.

More specifically, it is preferred that the coloring agent in the top coat 110 be transparent and preferably a dye having a color in the range from about the Fraunhofer line F to the Fraunhofer line C in the normal solar spectrum, i.e., from a blue color at a wave length of about 4,861 angstroms to a red color having a wave length of about 6,563 angstroms. Specific examples of preferred colors of the dye in the top coat 110 in addition to yellow are light blue, green and light red. Conversely, the color of the coloring agent in the background coat 120 is preferably one of the relatively darker colors, for example, colors having a shorter wave length than the Fraunhofer line F in the normal solar spectrum and colors having a wave length greater than the Fraunhofer line C in the normal solar spectrum, i.e., colors having a wave length less than about 4,861 angstroms and colors having a wave length greater than about 6,563 angstroms. Other specific examples of colors useful in the background coat 120 in addition to the black illustrated are dark blue, brown, dark red and purple. It will be understood that normally compatible contrasting colors will be chosen for utilization in the top coat 110 and in the background coat 120 so that the embossed tape has a pleasing appearance.

From the above it will be seen that there has been provided an improved embossable sheet material and specifically an improved embossable tape which fulfills all of the objects and advantages of the present invention. More specifically, there has been provided an improved embossable tape carrying on the front surface thereof a transparent top coat incorporating therein a first color and carrying on the back surface thereof a background coat having a second color, whereby the tape when embossed provides opaque embossments having the first color on a field of the second color. In addition, the top coat carries an ultraviolet screening agent to protect the tape from deterioration when exposed to sunlight, and the background coat carries a flattening agent to improve the appearance thereof and to improve the adherence of the adhesive assembly thereto. Furthermore, there has been provided on the back surface of the tape a layer of pressure sensitive adhesive and an overlying detachable backing sheet removably adhered to the exposed surface of the adhesive layer, whereby the embossable sheet material after embossing thereof can be adhesively adhered to an underlying support surface after the removal of the backing sheet therefrom. Finally, improved compositions have been provided for making embossable sheet materials and tapes, all as described hereinabove.

While there have been described what are at present considered to be certain preferred embodiments of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A colored adhesive tape in which a backing of the kind which normally allows transmission of light but becomes opaque when subjected to a mild cold drawing

operation, such as embossing, is overlaid on the side opposite the adhesive by a light transmitting film, so that in areas which are rendered opaque the tape takes up the color of the film whereas in other areas it takes up a color which is a combination of the color of the film and color beneath the film.

2. The tape of claim 1, in which the backing is rigid transparent polyvinyl chloride and the like transmitting colored film is a vinyl ink coating.

3. An embossable sheet material comprising a base sheet having a front surface and a back surface, said base sheet being formed of a transparent rigid synthetic organic resin having a structure and composition such that permanent cold flow deformation thereof to form embossments thereon renders such resin opaque in the areas of deformation of the embossments, a transparent top coat of synthetic organic resin firmly bonded to the front surface of said base sheet and having a first coloring agent uniformly distributed therethrough, and a background coat of synthetic organic resin firmly bonded to the rear surface of said base sheet and having a second coloring agent uniformly distributed therethrough, whereby said sheet material is embossable to provide opaque embossments having the color of said first coloring agent on a field having a color that is a combination of the color of said first coloring agent and the color of said background coat.

4. The embossable sheet material set forth in claim 3, wherein said first coloring agent is a dye of a relatively lighter color, and said second coloring agent is of a relatively darker color.

5. The embossable sheet material set forth in claim 3, wherein said transparent top coat also includes an ultraviolet screening agent uniformly distributed therethrough.

6. The embossable sheet material set forth in claim 3, wherein said background coat of synthetic organic resin has a flattening agent uniformly distributed therethrough.

7. The embossable sheet material set forth in claim 3, wherein said base sheet is formed of a vinyl resin, said top coat is formed of a mixture of an acrylic resin and a vinyl resin, and said background coat is formed of a vinyl resin.

8. The embossable sheet material set forth in claim 3 and further comprising a layer of pressure sensitive adhesive adhered to the exposed surface of said background coat, and a detachable protective backing sheet removably adhered to the exposed surface of said adhesive layer.

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