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PROCESS FOR PREPARING ENVELOPE STRUCTURES

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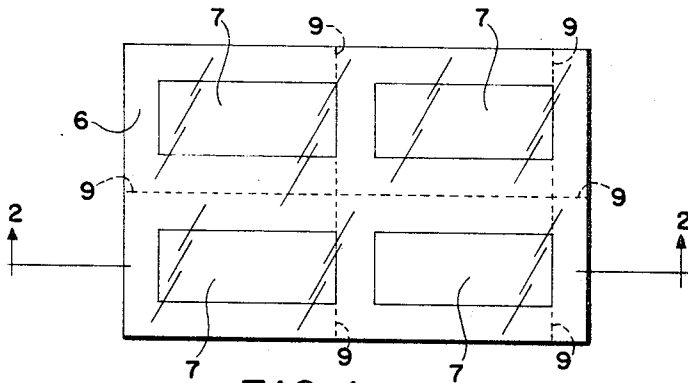


FIG. 1



FIG. 2

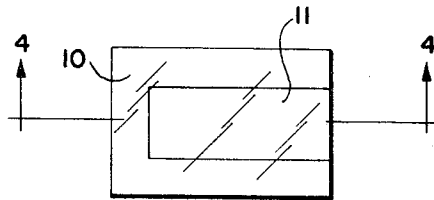


FIG. 3

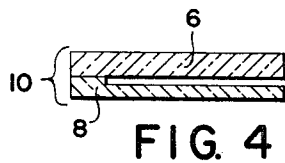


FIG. 4

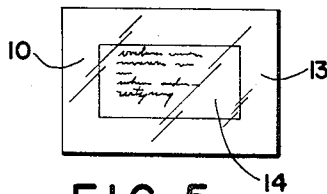


FIG. 5

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PROCESS FOR PREPARING ENVELOPE STRUCTURES

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6 Claims

ABSTRACT OF THE DISCLOSURE

Process of sealing two embossable vinyl sheet-like panels together only at predetermined areas thereof wherein a resist coating comprising cellulose acetate butyrate is employed to prevent adhesion in the other areas.

This invention relates to improvements in transparent envelopes or enclosures for protecting and displaying documents, cards, photographs, badges, and the like.

It is one object of the present invention to provide an envelope, at least one surface of which is both transparent and embossable, which is heat- or heat-and-pressure-sealed along at least a portion of its periphery, the remainder of the periphery being open to permit the insertion of a card or similar object.

It is another object of the present invention to provide an envelope of the type described in which, subsequent to the insertion therein of a card or the like, the remainder of the periphery may be heat-sealed so as to completely and permanently enclose the card.

Still another object is the provision of an improved process for producing envelopes of the aforementioned type.

Other objects of this invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the process involving the several steps and the relation and order of one or more of such steps with respect to each of the others, and the product possessing the features, properties, and relation of elements which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims. For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawing wherein:

FIG. 1 is a plan view of one stage in the preparation of the novel envelopes of this invention;

FIG. 2 represents a section taken along line 2—2 of FIG. 1;

FIG. 3 represents a plan view of an envelope within the scope of this invention;

FIG. 4 represents a section taken along lines 4—4 of FIG. 3; and

FIG. 5 is a plan view of a credit card or the like, completely sealed within the confines of an envelope within the scope of this invention.

Transparent envelope-type card or badge holders are well-known commercially. Such holders may comprise, for example, a first organic thermoplastic transparent panel, and a second superposed organic thermoplastic panel which may but need not necessarily be transparent, the borders of which panels are integrally fused along a portion thereof so as to define a pocket having an opening therein to permit access into the interior thereof. In general, such panels are rectangular, but it will be obvious that a pocket of the above type could have any desired planar geometric configuration.

In practical application, a card, badge, or the like which is sought to be protected is inserted into the opening be-

tween the two thermoplastic panels; if desired, once insertion of the card has been completed, the remaining portion of the boundaries of the panels may be fused so as to completely enclose the card and seal the envelope.

As was mentioned above, it is necessary that at least one of the two thermoplastic panels which comprise the envelope be transparent. Obviously, this is to enable any information or photograph contained on the surface of the card itself to be readily seen without distortion. It will be obvious that the remaining panel need not be transparent unless the back of the card contains information which is sought to be protected but which is intended to be viewable through the envelope structure.

In certain applications, such as where the card being protected together with its protective envelope comprises a credit card or the like, it may be desirable that one panel of the envelope comprise a material which is embossable with certain information, such as with the cardholder's name, address, or code number. Credit cards of this type which are embossed may be placed in a suitable imprinter whereby the embossed indicia are applied to a receipt form or the like. Such cards are generally termed "self-writing" since they eliminate the time that would be required to manually imprint the necessary indicia on the receipt form. It is necessary that such cards have an outer surface comprising a synthetic material capable of providing stable, sharp-edged raised letters or numerals as a result of a suitable embossing procedure, the techniques for which are well-known to the art.

Synthetic films which are embossable as described above and which also are transparent and thermoplastic so as to be suitable as panels for envelopes of the aforementioned type are conventionally known as "rigid vinyls" or "semirigid vinyls"; in general, they may be characterized as comprising polyvinyl chloride/vinyl acetate resins which are blends of polyvinyl chloride and polyvinyl acetate or copolymers of vinyl chloride and vinyl acetate, having a relatively high chloride content. In the case of semirigid vinyls, a minor amount of a suitable plasticizer, that is, a plasticizer which is compatible with the main polymeric materials and which does not significantly affect their embossability, may also be present.

Where one panel of envelopes of the type described above comprises a rigid vinyl or semi-rigid vinyl film, it is necessary to select, as the material for the second panel, a material which will readily adhere to the first panel and preferably, one which may be simply fused thereto with heat and/or pressure. While any number of organic thermoplastic films are obviously suitable for this purpose, it is frequently found most convenient and reliable to simply employ a similar rigid or semi-rigid vinyl sheet as the second, or back, panel, as well as for the first, or front panel.

One procedure for making pouches or envelopes of the aforementioned type which has been used heretofore is to apply a chemical resist coating on a large sheet of embossable vinyl of the type described above, in a pattern of blocks the size of which correspond to the ultimate desired size of the opening (non-adhering) portion of the envelope or pouch; generally, such a resist coating is applied from solution, and dried. Thereafter, the backing sheet, of approximately the same dimensions as the coated embossable vinyl sheet, is superposed on the resist-coated side of the latter, and the two sheets are passed through pressure- and/or heat-applying rolls. In the areas in which there was a resist coating, there is no adhesion between the embossable sheet and backing; in the remaining areas, the effects of heat and/or pressure bring about adhesive sealing between the two sheets. Finally, the two sheets are cut into individual envelopes or pouches by severing through the sealed areas.

While the aforementioned technique results in envelopes

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or pouches having the desired physical structure, the combined effects of heat and pressure upon the resist-coated areas have been found to bring about certain undesirable changes. Specifically, the optical clarity of the embossable vinyl sheet which forms the front panel of the envelope or pouch tends to be adversely affected, to the extent that it may appear stained and/or frosted. The disadvantages of such a phenomenon are particularly acute where it is desired to employ the envelope or pouch as a displaying and protecting means for an image-bearing card, since the image is at least in part obscured. Moreover, once the resist coating has been applied and the embossable vinyl sheet and backing pressed and trimmed into individual envelopes or pouches, it is virtually impossible to seal any remaining portion of the envelope or pouch by physical treatment alone. Thus, while an envelope or pouch so produced may have a card or the like inserted therein, the remaining portion of the envelope or pouch cannot be sealed so as to totally enclose the card without resorting to the use of some chemical solvent or adhesive.

It has now been found that vinyl sheets of the type described above may be used to prepare envelopes or pouches by the technique outlined above without sacrificing optical clarity by employing as the chemical resist a coating of cellulose acetate butyrate dissolved in a suitable solvent. Moreover, it has been found that if a portion of the cellulose acetate butyrate solution is replaced with an acrylic resin solution in 2-ethoxyethyl acetate (commercially available as "Acryloid 101," from Rohm & Haas Co.), it is possible to achieve a differential heat seal such that at a given temperature, the surfaces of the rigid vinyl sheet and backing which are not resist-coated may be heat-sealed, and at a higher temperature (or with the aid of sonic vibration), the resist-coated areas may be sealed. Thus, by using coatings of this type, it is possible to provide an embossable pouch or envelope which is sealed along a portion of its periphery so as to be suitable for receiving a card or the like, and which subsequent to the insertion of such a card, may be simply heat-sealed along the remainder of its periphery so as to totally enclose the card.

The instant invention will be more clearly understood by referring to the accompanying drawing.

FIG. 1 shows a plan view of a sheet of transparent embossable vinyl 6 having areas 7 on which a resist coating of cellulose acetate butyrate has been applied. (It will be apparent that where, as in the preferred embodiment, the backing sheet is of substantially identical chemical composition to the transparent embossable vinyl sheet and differing, if at all, only with respect to overall thickness and possibly the presence of an inert pigment or opacifying material, the resist coating could have been applied to the backing sheet as well as to the sheet intended to serve as the front panel of the envelope.) In practicing the instant invention, once the cellulose acetate butyrate coating has been applied and dried, the backing sheet is superposed thereon, and the two sheets are passed through heat- and pressure-applying rollers.

FIG. 2 represents a section taken along line 2—2 of FIG. 1, wherein the embossable rigid vinyl sheet 6 has been sealed to backing 8 except in those areas 7 wherein the cellulose acetate butyrate coating was applied.

FIG. 3 represents a plan view of a single envelope or pouch comprising a transparent embossable vinyl panel sealed along a portion of its periphery 10 to a backing panel, preferably of similar or identical chemical composition; in the central area of the pouch 11, there is no adhesion between the respective panels, so that the pouch is readily adapted for receiving a card or the like. It will be appreciated that an envelope or pouch having the configuration as shown in FIG. 3 can be obtained by severing the "sandwich" as shown in FIG. 1 along the dotted line 9.

FIG. 4 is a section taken along lines 4—4 of FIG. 3, showing the transparent embossable vinyl panel 6 sealed

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along a portion of its periphery 10 to backing 8; the central portion of the pouch or envelope and a portion of the periphery thereof remains open for the insertion of a card.

FIG. 5 is a plan view of an embossable envelope or pouch within the scope of this invention having contained therein an identification card or the like. Where a portion of the cellulose acetate butyrate has been replaced with acrylic resin as previously described, once the card has been inserted into the central area 14 of the pouch or envelope, the remaining portion of the periphery 13 may be sealed to totally enclose the card.

In practicing the instant invention, it was found that pouches or envelopes having excellent optical properties could be made employing a transparent polyvinyl chloride/vinyl acetate film commercially available from Union Carbide as "3604 Grade Vinyl"; film having a thickness of about 0.020 inch was selected to provide the front panel, the thickness being determined primarily by embossability, while the same film having a thickness of 0.009 inch was employed as the backing, the thickness being determined primarily by the desired flexibility. Particularly good physical properties were observed when the cellulose acetate butyrate employed was one-tenth second cellulose acetate butyrate (commercially available from Eastman Chemical Products Inc. subsidiary of Eastman Kodak Company, Kingsport, Tenn.), applied from a toluene or alcohol, e.g., methanol, ethanol, or isopropanol, solution. While the exact concentration and composition of such a solution is not critical, highly satisfactory results were obtained by employing a solution consisting of 10% one-tenth second cellulose acetate butyrate, 60% toluene, and 30% ethyl acetate.

Where a differential heat seal was desired, it was found that up to about 20% of the cellulose acetate butyrate in the resist coating could be replaced by acrylic resins such as that described above, with no apparent sacrifice in optical properties of the final envelope or pouch. While in the preferred embodiment the acrylic resin is actually incorporated into the resist coating solution, substantially the same result may be obtained by applying a coating of a solution of the acrylic resin alone directly onto the vinyl sheet, drying this coating, and then applying an overcoat of cellulose acetate butyrate solution.

Pouches made by the process of the instant invention were carefully scrutinized for optical properties; while both of the "in" sides of the respective panels displayed excellent resist characteristics with respect to each other, no stain or "frosting" could be detected.

While it will be obvious that the seal between the respective panels in the non-resist areas could have been brought about by any one of numerous processes well-known to the art, the particular pouches made in connection with this invention involved heat seals made with a Sentinel Sealer at 60 p.s.i., 60 sec. dwell, 325° F. upper jaw, 150° F. lower jaw. The 60 second dwell time was employed to establish that, at least of dwell times of this duration, i.e., contact with the respective jaws of the heat sealer, the resist areas released. To effect the desired heat seal, dwell times as short as, say, 5 seconds may be employed.

The bond values of the resulting seals were obtained by measurement with an Instron Tensile Tester and were found to be as follows:

	Gms.
Vinyl to Vinyl	1600
CAB/Vinyl to Vinyl	20
CAB/Vinyl to CAB/Vinyl	0
4 CAB:1 101/Vinyl to Vinyl	100
1 CAB:1 100/Vinyl to Vinyl	400
1 CAB:4 101/Vinyl to Vinyl	600
"101/Vinyl to Vinyl	1600+
CAB/101/Vinyl to Vinyl	20

Where:

Vinyl=Polyvinyl chloride/vinyl acetate

CAB=one-tenth second cellulose acetate butyrate

101="Acryloid 101"

Since certain changes may be made in the above process without departing from the scope of the invention herein involved, it is intended that all matter contained in the above description and accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In the process for preparing envelope structures comprising a first transparent thermoplastic embossable vinyl sheet-like panel comprising a polyvinyl chloride/vinyl acetate resin and a second thermoplastic vinyl sheet-like panel superposed on said first panel, said panels being sealed together only at predetermined areas thereof, said process comprising applying a resist coating to at least one of said sheet-like panels in all areas other than those at which adhesion to the remaining panels is desired, drying said coating, superposing said second panel on said first panel, and sealing said panels to each other in said predetermined areas by physical means, the improvement which comprises employing as said resist coating a solution of cellulose acetate butyrate.

2. The process as defined in claim 1 wherein said resist coating comprises cellulose acetate butyrate dissolved in at least one organic solvent selected from the

group consisting of toluene, ethyl acetate, methanol, ethanol, and isopropanol.

3. The process as defined in claim 1 wherein up to about 20% of said cellulose acetate butyrate is replaced with acrylic resin.

4. The process as defined in claim 1 wherein said resist coating consists of two sub-coatings, said first sub-coating comprising a solution of an acrylic resin and said second sub-coating comprising a solution of cellulose acetate butyrate.

5. The process as defined in claim 1 wherein said second thermoplastic vinyl sheet-like panel comprises a poly-vinyl chloride/vinyl acetate resin.

6. The process as defined in claim 1 wherein said physical means employed to effect adhesion between said first panel and said second panel comprises the application of heat and pressure.

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REUBEN EPSTEIN, Primary Examiner

U.S. Cl. X.R.

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