

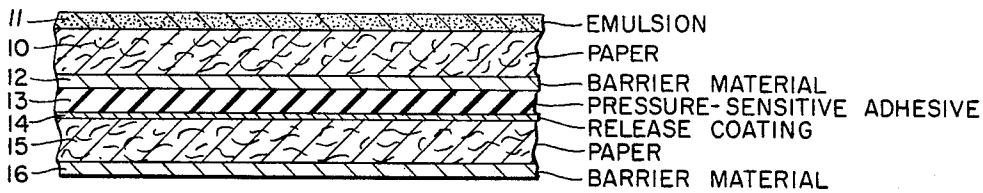
June 2, 1964

L. R. DICKARD

3,135,608

PRESSURE-SENSITIVE WET-PROCESS PHOTOGRAPHIC PAPER

Filed Feb. 17, 1960



INVENTOR.

LESTER R. DICKARD

BY *Ely, Pearne & Gordon*

ATTORNEYS

3,135,608

PRESSURE-SENSITIVE WET-PROCESS PHOTOGRAPHIC PAPER

Lester R. Dickard, Painesville, Ohio, assignor to Avery Adhesive Products, Inc., Painesville, Ohio, a corporation of Ohio

Filed Feb. 17, 1960, Ser. No. 10,535

4 Claims. (Cl. 96—83)

This application is a continuation-in-part of my co-pending application Serial No. 668,514, filed June 27, 1957, now abandoned.

This invention relates to photographic web structures of the well known general wet-process type which comprise a photosensitive emulsion, such as a silver halide developing-out emulsion, combined with a web of paper, foil or film, such well known general type of photographic web structures being intended to be bathed in developers, stop baths, fixing solutions, washing media and the like. The invention relates particularly to applications where it is desired that the exposed and developed pictures or other photographic representations be capable of being conveniently adhered to various surfaces after exposure and development of the photographic web structures without an intervening step of applying adhesive, either manually or mechanically. In such applications, the photographic web structures are pre-coated with an adhesive.

Pre-coated photographic web structures have been proposed for many years. In one proposal, a thermoplastic resin was to be provided on the back of the photographic web structure. After development and complete drying of the product, it was to be mounted by application of heat to cause the thermoplastic to fuse and bond to the receiving surface. An example is shown in U.S. Patent 770,421. In another proposal, the back side of the photographic web structure was to be coated with a water-activated or water-reactivated adhesive or gum (known to paper converters as a "water-gum"). When the web was immersed in a water bath during development, the water-gum was to be activated and the back of the developed film was therefore to be sticky. An example is shown in U.S. Patent 778,740.

In a more recent proposal, a pressure-sensitive adhesive was to be pre-coated on the back of a photographic web structure of a type which includes diazotype photosensitive materials which are not to be processed in solutions. An example is shown in U.S. Patent 2,528,395.

The object of the present invention is to provide a photographic web structure of the type which is to be processed in solutions but which can be conveniently adhered to various surfaces after exposure and development without a preceding or concurrent step of (1) applying adhesive or (2) activating an adhesive by heat or (3) laminating by using a solvent based adhesive (see U.S. Patent 2,266,435), and which can alternatively be stacked or filed away indefinitely without sticking, remaining at all times ready for convenient mounting.

The invention involves the concept of providing a pressure-sensitive adhesive between a pair of webs, each of the webs including or inherently comprising a barrier to inhibit or prevent permeation of the adhesive outwardly or moisture inwardly, the web to which the adhesive is most strongly bonded carrying on its outer face a photosensitive wet-process emulsion such as a silver halide emulsion. In one advantageous aspect of the invention, commercially available photographic papers may be purchased and efficiently processed to provide the product contemplated by the invention. In an even more particular aspect, which is advantageous from the standpoint of economy, not only may commercially available photographic papers be employed, but the additional web

employed may itself comprise merely a commercially available release paper. In this case, two staple articles of commerce, namely, photographic paper and release paper, may be simply and efficiently converted to the advantageous web structure contemplated by the invention by converting steps to be described more particularly below.

In a preferred example, photographic paper or photographic web structure is provided comprising a paper web 10 and a photosensitive emulsion 11, as shown in FIGURE 1. According to the invention, the paper 10 is coated on the back side with a barrier material 12 which may also promote adhesion of the paper to the pressure-sensitive adhesive. The barrier material inhibits or prevents permeation of the adhesive outwardly to the emulsion and permeation of moisture inwardly through the paper 10 to the adhesive.

Suitable barrier materials will be apparent to those familiar with web converting processes. They include: cellulose nitrate, cellulose acetate butyrate, vinyl chloride-vinyl acetate copolymer, vinylidene chloride-acrylonitrile copolymer, butyl rubbers and the like, and they may be suitably compounded for most ready application in any one of numerous possible combinations which will readily occur to those familiar with web converting. For example, there may be provided for application a mixture comprising by parts vinylidene chloride-acrylonitrile copolymer 15, methyl ethyl ketone 20, acetone 65. As another example there may be provided for application R.S. ½ second nitrocellulose 50, dioctyl phthalate 10, ethanol 10, butanol 10, toluene 50, ethyl acetate 10, butyl acetate 20, this mixture being preferably combined with an additional commercially available modifier such as 20 parts of "Neolyn" (Hercules Powder Co.). As another example there may be provided a vinyl chloride-vinyl acetate copolymer 20, methyl ethyl ketone 45, toluene 55, dioctyl phthalate 5.

A self-adhesive 13 is then coated on top of the primer coat. Examples of formulations which may be employed for the self-adhesive are as follows, parts being given by weight.

Example 1

	Parts
Latex crepe paper	50
Butadiene-styrene rubber copolymer	50
Non-oxidizing resin	40-60
Aliphatic solvent (e.g. hexane)	550

Preferably there is added a small amount, say one part, of an antioxidantizing agent, several of which will be familiar to the art.

Example 2

	Parts
Polyisobutylene	100
Monomeric plasticizer (e.g. di-octyl phthalate)	35
Terpene resin (e.g. piccolyte)	40
Aliphatic solvent (e.g. hexane)	500

Example 3

	Parts
GR-S rubber	100
Non-oxidizing pentaerythritol resin	50
Aliphatic solvent	450

These adhesives comprise what are known in the art as rubber based adhesives.

The structure as described above is then laminated to a commercial release paper of the type commonly supplied by paper manufacturers to the paper converter industry and which are familiar to paper converters. Such commercial release paper comprises a paper web 15 coated with a release coating 14.

The release coating may be one of those coatings the use of which for release purposes has been known in the

art such as, for example, coatings employing polyvinyl carbamates as the release agent which are the subject of Dahlquist Patent No. 2,532,001, issued November 28, 1950, coatings employing acrylic ester copolymers as the release agent which are the subject of Henricks Patent No. 2,607,711, issued October 19, 1952, coatings employing polyvinyl acetate copolymers as the release agent, and the like.

Of course, more recently developed improved release coatings may be employed, such as the release coatings disclosed in my copending patent application Serial No. 678,040, filed August 14, 1957.

In the example of the invention being described, the release coating is on the inner side of the web 15. In this manner the web 15 is rendered more readily separable from the pressure-sensitive adhesive than is the web 10. The outer side of the web 15 is coated with a barrier material 16. The barrier material 16 may be the same as the barrier material 12. The several coatings should be balanced out so that the finished product will lie flat or not curl excessively.

The web 15 and barrier coating 16 can be replaced by a self-supporting film of low water absorption, such as polyvinyl chloride, cellulose acetate butyrate, cellulose acetate propionate, vinylidene chloride-acrylonitrile copolymers, polyethylene terephthalate.

The photographic web structure produced according to the present invention can be wet-processed and then may be conveniently adhered to various surfaces without a preceding or concurrent step of applying an adhesive or activating an adhesive by moisture, heat or the like. The web 15 or the film of low water absorption substituted therefor is stripped to expose the pressure-sensitive adhesive 13. The adhesive is then applied to the mounting surface by placing it in contact and smoothing it down. This may be done immediately after processing while the product is still wet or the product may be allowed to dry before application is made. If desired, the web 15 or the corresponding film substituted therefor can be left in place in which case the developed pictures or other photographic representations can be handled or can be stacked or filed away indefinitely without sticking, always remaining conveniently mountable when and if desired.

In a broader aspect of the invention, the elements 10, 11 and 12 may be replaced by commercially available waterproofed photographic papers, photographic engineering tracing cloths, photographic resinous film structures, photographic glass cloth and, in general, any wet-process type photographic web structure which has, either inherently or by suitable coating or other treatment, low moisture permeability.

It is obvious that various changes may be made in details of the invention without departing from the fair scope of the teaching contained in this disclosure. The invention is therefore not limited to any of these details, except insofar as the following claims are necessarily so limited.

What is claimed is:

1. A method of converting staple articles of commerce

which are (a) photographic printing paper bearing a wet-process, photosensitive emulsion, and (b) paper bearing a release coating, into a wet-process printing paper which may be wet-processed and then adhered to a backing surface, which may be handled after such wet-processing, and which may be indefinitely stored after such wet-processing without sticking, comprising the steps of moisture-proofing the release-coated paper by coating said paper with a moisture barrier material on the reverse side from said release coating, coating the printing paper with a moisture barrier material on the reverse side from said photosensitive emulsion, then coating the moisture barrier coated surface of said printing paper with a pressure-sensitive adhesive, and joining together the adhesive-coated surface of said printing paper with the release-coating surface of said release-coated paper.

2. A method of converting staple articles of commerce which are (a) photographic printing paper bearing a wet-process, photosensitive emulsion, and (b) moisture-proofed paper bearing a release coating, into a wet-process printing paper which may be wet-processed and then adhered to a backing surface, which may be handled after such wet-processing, and which may be indefinitely stored after such wet-processing without sticking, comprising the steps of coating the printing paper with a moisture barrier material on the reverse side from said photosensitive emulsion, then coating the moisture barrier coated surface of said printing paper with a pressure-sensitive adhesive, and joining together the adhesive-coated surface of said printing paper with the release-coating surface of said release-coated paper.

3. A method of converting staple articles of commerce which are (a) photographic printing paper bearing a wet-process, photosensitive emulsion, and (b) self-supporting film of low water absorption bearing a release coating, into a wet-process printing paper which may be wet-processed and then adhered to a backing surface, which may be handled after such wet-processing, and which may be indefinitely stored after such wet-processing without sticking, comprising the steps of coating the printing paper with a moisture barrier material on the reverse side from said photosensitive emulsion, then coating the moisture barrier-coated surface of said printing paper with a pressure-sensitive adhesive, and joining together the adhesive-coated surface of said printing paper with the release coating surface of said release-coated film.

4. An article of manufacture comprising in combination in order, a wet-process photosensitive emulsion, a paper sheet, a moisture barrier layer, a pressure-sensitive adhesive layer, a release coating, a second paper sheet and a second moisture barrier layer.

References Cited in the file of this patent

UNITED STATES PATENTS

2,528,395	Slifkin	Oct. 31, 1950
2,740,716	Forman	Apr. 3, 1956

FOREIGN PATENTS

641,273	Great Britain	Aug. 9, 1950
---------	---------------	--------------

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,135,608

June 2, 1964

Lester R. Dickard

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 1 to 3, for "assignor to Avery Adhesive Products, Inc., of Painesville, Ohio, a corporation of Ohio," read -- assignor to Avery Products Corporation, of San Marino, California, a corporation of California, --; line 12, for "Avery Adhesive Products, Inc., its successors" read -- Avery Products Corporation, its successors --; in the heading to the printed specification, lines 4 to 6, for "assignor to Avery Adhesive Products, Inc., Painesville, Ohio, a corporation of Ohio" read -- assignor to Avery Products Corporation, San Marino, Calif., a corporation of California --.

(SEAL) Signed and sealed this 24th day of November 1964.

est:

NEST W. SWIDER
esting Officer

EDWARD J. BRENNER
Commissioner of Patents