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METHOD FOR DESENSITIZING SENSITIZED RECORD SHEETS AND RESULTANT ARTICLE

Frank D. Martino, 883 Wendy Drive,
Holtsville, N.Y. 11742

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This invention relates generally to pressure-sensitive record sheets adapted to transfer data entered on an original to an underlying receiving sheet without the use of carbons, and more particularly to a method and materials for selectively neutralizing said sheets to inhibit a transfer action within a predetermined zone.

The conventional expedient for transferring information entered on an original sheet to a copy sheet is by means of carbon paper interleaved between the sheets. The pressure applied in typing or writing on the original produces a carbon impression on the copy sheet. Rather than use carbon paper one may coat the entire back of the original with a carbon transfer composition. It is also possible to confine the carbon transfer composition to a particular area of the original, and thereby produce a so-called spot carbon effect wherein transfer is limited to a desired zone or section of the original.

The main drawback of carbons is that they tend to smudge the undersheet as well as to soil the hands of the user. Moreover, if the back of a sheet is covered with a carbon layer, the distinctive color of this layer renders it unsuitable for many commercial transactions and record applications.

In order to dispense with carbon papers and compositions, sensitized record materials have been developed making use of a base sheet which carries a second normally colorless reactant carried on a top sheet such that when typing or any other character-forming operation is carried out, the resultant reaction between the two materials produces a visible color very much like a carbon impression.

Thus in the patents to Green et al., 2,712,507, 2,550,466, 2,550,467, 2,550,468 and 2,550,469, there are disclosed manifold materials in which the back side of a first sheet is coated with a rupturable film having entrapped therein liquid droplets of an adsorbate substance. This substance produces a distinctive color only when adsorbed by the front side of a second sheet having a coating minute color-reactant adsorbent particles held in a binder film. In the arrangements disclosed in these patents, the reactant material which changes color in an electron donor aromatic organic compound having a double bond system which is convertible to a more highly polarized conjugated form upon taking part in an electron acceptor-donor surface chemical reaction, giving it a distinctive color, and the adsorbent material is an inorganic substance which is an acid relative to the organic compound, so as to be an electron acceptor when in adsorption contact therewith. The inorganic adsorbent material is in fine-particle form and is held in a binder in a coating formed on the front face of a record sheet. The organic adsorbate is in the form of a film layer of entrapped liquid droplets which are ruptured when this film, which appears on another sheet, is brought into contact with the inorganic coating, thereby giving rise to the chemical reaction creating color.

When, therefore, the first or original sheet is laid down on the second or receiving sheet, with the respective coatings in intimate contact with each other, the film on the back of the original will be ruptured in response to writing or printing pressure applied when data is entered, thereby bringing about a distinctive color reaction on the front of the copy sheet and duplicating the entries.

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Hereinafter, sensitized sheets having a back coating thereon as described above, will be abbreviated as "CB" sheets, while those having a complementary front coating will be abbreviated as "CF" sheets. This is also the nomenclature currently in use by the National Cash Register Company, of Dayton, Ohio, the manufacturer of such sheets.

In commercial practice, CB and CF sheets are supplied to printers and binders in standard ream sizes, and these sheets are thereafter cut to various dimensions depending on the requirements of the ultimate user. The CB sheets may have suitable forms printed thereon, and they are collated with CF sheets of the same size to produce manifold sets for visual filing, billing and recording systems make it possible to transfer information entered on the CB sheets onto the CF sheets without the use of carbons.

The entire back surface of the CB sheet is sensitized. Hence, should one wish to block out or desensitize a particular section or zone of a form to prevent transfer within that zone, this could heretofore be accomplished only by inserting a buffer slip between the CB and CF sheets at a position in registration with the zone in question. Since a colored impression resulted only when liquid droplets in the CB sheet were adsorbed by the reactant coating on the CF sheet, the buffer interposed therebetween prevented such reaction.

If, for example, on a business form one wished to enter price data on the original within an assigned space thereon, and yet not have this data reappear on the CF sheet, the usual practice was to insert a slip of tissue paper between the two sheets at a position corresponding to the space to be desensitized. While this was effective for the purpose intended, the need to interleave tissue paper slips with the CB and CF sheets added greatly to manufacturing costs, particularly since the slips were not of the same size as the CB and CF sheets and could not, therefore, readily be collated therewith. Each slip had to be carefully placed at its proper position relative to the CB sheet, this being a time-consuming and tedious operation. Moreover, the tissue paper slips add to the bulk of the manifold sets.

Accordingly, it is the main object of this invention to provide a technique for selectively rendering a CB sheet insensitive to pressure, whereby a given section thereon may effectively be blocked out without the use of buffer sheets.

More specifically, it is an object of this invention to provide a neutralizing layer which may be readily applied to any desired area of the coating on a CB sheet to prevent a color reaction on the CF sheet when entering data within that area.

Another object of the invention is to provide a high speed and effective method for blocking out any desired section of a CB sheet without substantially adding to the cost of manufacturing manifold sets employing such sheets.

For a better understanding of the invention, as well as other objects and features thereof, reference is made to the following detailed description to be read in conjunction with the accompanying drawing, wherein:

FIG. 1 is a perspective view of a CB sheet overlying a CF sheet, the CB sheet being coated with a material in accordance with the invention to desensitize a desired area;

FIG. 2 is a plan view of the CF sheet showing the desensitized area; and

FIG. 3 is a section taken in the plane indicated by line 3-3 in FIG. 1.

Referring now to the drawing, there is shown manifold sheets in the form of a CB sheet 10 superposed over a CF sheet 11. These sheets are of the type currently manufactured by National Cash Register Company under Pat-

ent 2,712,507 and other patents identified above. Sheet 10 is of ordinary paper, and on the rear surface thereof there is applied a coating 10A formed by a rupturable film profusely provided with entrapped liquid droplets of adsorbate material giving a distinct color when adsorbed by the particles on the front surface 11A of CF sheet 11. The front surface of sheet 11 is coated profusely with minute color-reactant adsorbent particles held in a binder film.

The uncoated face of CB sheet 10 is printed with a suitable form, and for purposes of illustration a business sales form is shown. Entries may be made by typing or writing. A rectangular area 10B on the form is reserved for price data, and although the rear surface 10A of the sheet 10 is entirely covered with a sensitive coating, it is necessary that transfer not take place on the CF sheet in the area therein corresponding to area 10B.

Ordinarily, as pointed out previously, when pressure is applied by a writing or typing instrument, the coating 10A on the rear surface of sheet 10 is ruptured and the droplets thereon are expelled locally at the points of pressure. These droplets come in contact with the particles on the front surface 11A of the CF sheet 11 to produce a distinctive color reaction. The chemistry of these coatings is disclosed fully in said Green patents, and will therefore not be repeated herein.

In accordance with the present invention, the rear area 10C on the coating 10A, which corresponds to the front area 10B, is desensitized by applying thereto an overlay film formed from a solution of concentrated citric acid, bleach and sodium chloride. The citric acid may be derived from lemon or lime juice, the sodium chloride is preferably iodized table salt, and the bleach is any suitable household whitening agent such as a mixture of calcium hydroxide, chloride and hypochlorite, or other oxidizing bleaching agents.

My preferred formula is about two ounces of concentrated lemon juice, to which is added three ounces of iodized salt and four ounces of household bleach. This solution is applied to the selected area of the CB coating by rotary, cylinder, or flat presses, the solution being used effectively as a printing ink. To impart inking qualities to the solution, suitable inert and volatile gums or oils of the type conventionally used in printing ink compositions are added to the solution to obtain the viscosity appropriate to the press being used. The solution when dried forms a film over the CB coating in the desired area, and when the CB coating is ruptured, the droplets therein, which react with the desensitized film constituents, are neutralized or bleached out, whereby a color reaction with the CF coating is prevented.

While there has been disclosed CB and CF sheets having single coatings, it is to be understood that the invention is applicable to double-coated transfer sheets in which both the top and rear side are coated, whereby when the transfer sheet is interleaved between a CB

sheet and a CF sheet, data received and recorded on the top surface of the transfer sheet from the CB sheet, is transferred to the top surface of the CF sheet. A selected area of this transfer sheet may be coated in the manner described above to render it insensitive.

While there has been shown and described preferred materials for desensitizing sensitized record sheets in accordance with the invention, it will be appreciated that many changes and modifications may be made therein without, however, departing from the essential spirit of the invention as defined in the annexed claims.

What I claim is:

1. The method of desensitizing a selected area of a sheet having a coating thereon of a first normally colorless reactant capable of reacting with a second normally colorless reactant to produce a distinct color when character-forming pressure is applied to the sheet, said second reactant being an electron donor aromatic organic compound having a double bond system which is convertible to a more highly polarized conjugated form upon taking part in an electron acceptor-donor surface chemical reaction, giving it a distinctive color, said first reactant being an inorganic adsorbent substance which is an acid relative to the second reactant so as to be an electron acceptor when in adsorption contact therewith, the inorganic adsorbent substance being held in a binder in said coating, the organic compound being contained in an adsorbate layer of entrapped liquid droplets which are ruptured when this layer is brought by said pressure into contact with said coating to produce said chemical reaction, said method comprising applying to the selected area of said coating a saline solution of citric acid and an oxidizing bleach, and drying said solution to produce a desensitizing film over the selected coating area, the constituents of said film being in such proportions as to neutralize said chemical reaction and thereby inhibit the production of said color.

2. The method as set forth in claim 1, wherein said solution is constituted by lemon juice, sodium chloride and an oxidizing agent.

3. The method as set forth in claim 1, wherein said solution is applied by a rotary printing press.

4. The method as set forth in claim 1, wherein said solution is applied by a flat press.

5. A sheet having a desensitized area produced in accordance with the method set forth in claim 1.

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MURRAY KATZ, *Primary Examiner.*