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MANIFOLD SHEET HAVING A FRANGIBLE COATING THEREON

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FIG. 1

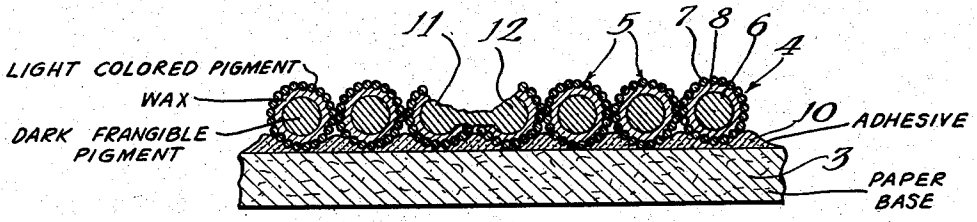
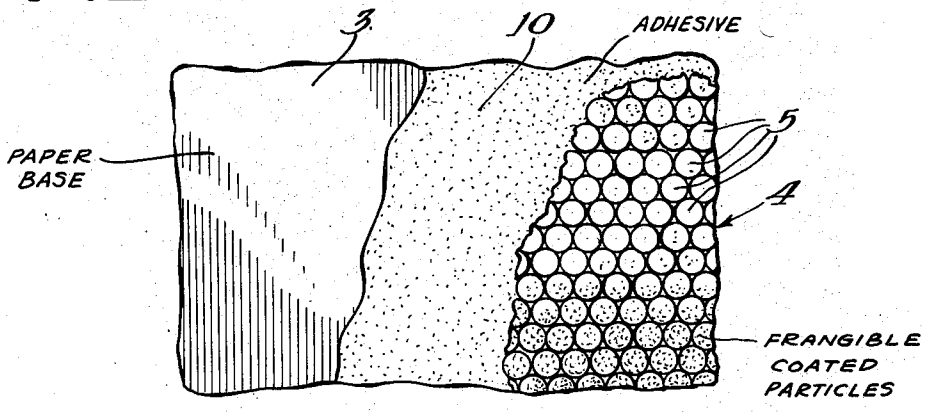


FIG. 2



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MANIFOLD SHEET HAVING A FRANGIBLE COATING THEREON

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13 Claims. (Cl. 117—36)

This invention relates to improvements to pressure sensitive manifold sheets and more particularly to a sheet having a coating that is pressure sensitive and adapted for use in making copies without the use of the usual carbon paper.

Normally, copies are obtained in typewriting machines by inserting a transfer sheet between two ordinary sheets of paper. Such transfer sheets are commonly referred to as carbon sheets. They are objectionable from a standpoint of smudging upon touch, both the underlying sheets and the fingers and hands of the operator. Attempts have been made to avoid the use of carbon sheets by employing films of chemicals coated on the paper in such a way that impact or pressure would rupture the films and allow liquid chemicals to mix or react to produce a visible color. These manifold sheets have been subject to some objection because they are easily injured by handling and were subject to deterioration when exposed to light or heat.

It is the primary object of this invention to provide a manifold sheet obviating the difficulties previously encountered with transfer sheets.

Another object of the invention is to provide a manifold sheet having a coating of dark colored particles individually coated with a light colored pigment frangible by inscribing pressure or impact.

Another object is to provide a manifold sheet which ordinarily has the appearance of an uncoated paper and is capable of receiving legible writing by inscribing pressure or impact.

A further object of the invention is to provide a manifold sheet which will not deteriorate when exposed to heat.

A further object is to provide a pressure sensitive coated manifold sheet which will not smudge by handling and which does not deteriorate when exposed to light.

Other features, advantages and objects of the present invention will become apparent from the following description of preferred embodiments described in conjunction with the accompanying drawing in which,

Figure 1 is a greatly enlarged fragmentary sectional view through a section of a manifold sheet having a coating of the present invention thereon, and

Figure 2 is a fragmentary plan view of the sheet illustrated in Figure 1 with parts broken away for clarity of illustration.

The present invention provides a coating which may be applied to paper in order to render the paper capable of receiving inscribing pressures or impacts to make a legible copy. Thus, the coated paper may be placed beneath a top sheet, as in a typewriter, and the writing produced on the top sheet will also appear on the underlying sheet.

In general, the present coating includes a dark colored particle of very small size individually coated with a light colored pigment. Enough of these individually coated particles are adhered to the surface of the manifold sheet to cover it. The individual light colored

pigment coatings are quite frangible so that inscribing pressure applied to the particles will break and brush aside the coating to expose the interior dark particle color. The contrast in color between the exposed dark particles and the light colored pigment produces a visible mark.

Referring particularly to the figures of the drawing, there is illustrated a manifold sheet 3 of paper material having a coating generally designated 4. As illustrated in Figure 2, the coating, if sufficiently magnified, would appear to have individual particles 5. These particles are formed of a core individually coated with a pigment. Preferably, the core is of a dark colored material either black, blue or of some color darker than the coating on the particles. The coating on the particles is of a light color, either white or just off-white so that the coating may present an appearance very similar to that of the usual white paper.

The individual particles may be formed as diagrammatically illustrated in Figure 1 wherein the core 6 is of black material of a small particle size and its coating 7 is of a white pigment, having a much smaller particle size. One pigment found satisfactory is titanium-dioxide. In order that this white pigment adhere easily and readily to a black core of tar or similar material, a thin coating of wax 8 may first be placed upon the core material. This wax coating is very thin and does not affect either the color of the titanium-dioxide or cover the particles of the titanium-dioxide. The wax is present only in amounts sufficient to insure the adherence of the pigment to the dark particles.

The particles of the coating, once prepared, may be adhered to the manifold sheet 3 by the use of a binder 10. The binder is spread upon the paper by usual and known methods which may include roller coaters or brushing techniques after which the particles are applied to the paper in excess so as to completely cover the exposed binder. One binder found satisfactory is a latex binder which was applied to the paper by means of a spray. The latex binder did not affect either the color or pressure sensitivity of the coating.

It is preferred that the particle size of the dark pigment be between 20 and 100 microns so that individual particles may easily be coated with titanium-dioxide, the particles of which are generally between 1 and 5 microns. The physical properties of the dark particles should be such that they can be crushed easily under normal writing pressures. The impact delivered by typewriting machine type should also crush the particle. This crushing should be distinguished from a collapse of the particle upon itself as it is desired the the crushing spread the dark particle in order to make a very visible mark on the paper surface. In Figure 1, particles 11 and 12 have been indicated as crushed to expose the black substance of the particles. The titanium-dioxide film or coating being white and of small particle size could be mixed with the dark colored material without being visible.

Various materials may be used for the dark particles. Tar from a petroleum base is particularly satisfactory from a standpoint of cost and physical properties provided the particles chosen have sufficient brittleness. Other black pigments such as magnetite and pyrolusite may be used in the place of the tar. Some colored pigments such as chromate-oxide or cadmium red may also be used. The process for forming the coated particles prior to their adherence to the manifold sheet is particularly pointed out and claimed in our co-pending application, Serial No. 602,020, filed August 3, 1956.

The manifold sheets coated with the individually coated particles may be handled without breaking the light colored coating on the particles. Light does not affect

the coating adversely. The coating is also quite stable under most humidity conditions. The coated paper may be used with equal facility in manifolding employing writing machines or scribing methods.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, for some modifications will be obvious to those skilled in the art.

We claim:

1. A manifold sheet having a coating of particles crushable by printing pressures, which particles are of dark color and individually coated with a pressure sensitive pigment of light color crushable by printing pressures, the dark color particles being of a size generally in the range of 20 to 100 microns and the light color pigment being of a particle size generally in the range of 1 to 5 microns.

2. A manifold sheet as specified in claim 1 wherein each particle of dark color is individually coated with a film of light colored pigment frangible under inscribing impact or pressure to expose the dark particles.

3. A manifold sheet as specified in claim 1 wherein each particle of dark color is individually coated with a film of white titanium dioxide frangible under inscribing impact or pressure.

4. A manifold sheet comprising a paper base sheet and a coating on the base sheet having discrete solid particles of dark color individually coated with a light colored pigment crushable by pressure of the order of writing pressure, the dark color particles being of a size generally in the range of 20 to 100 microns and the light color pigment being of a particle size generally in the range of 1 to 5 microns.

5. A manifold sheet as specified in claim 4 wherein the particles of dark color are brittle so as to be crushable under inscribing impact or pressure and have a hardness to avoid crushing with ordinary handling of the sheets.

6. A manifold sheet having thereon a coating of pressure-rupturable dark colored solid particles of a size generally in the range of 20 to 100 microns, each particle having an individual coating of light colored pigment frangible under inscribing impact or pressure to expose the particles thereunder, said pigment having a particle size generally in the range of 1 to 5 microns.

7. A manifold sheet as specified in claim 6 wherein each solid particle has a thin wax coating with the light colored pigment coating adhering to the wax coating.

8. A manifold sheet comprising a base sheet and a coating on the base sheet including solid particles of from 20 to 100 microns in size and of dark color individually coated with a light colored pigment of from 1 to 5 microns in size, the pigment and particles being frangible under inscribing impact or pressure to expose the dark color of the solid particles.

9. A manifold sheet comprising a base sheet, a coating of adhesive binder on the base sheet and a coating of pressure-rupturable dark colored solid particles adhered to the adhesive, each solid particle having a pressure sensitive coating of light colored pigment, said solid particles being of a size of from 20 to 100 microns and the light colored pigment being of a size of from 1 to 5 microns.

10. A manifold sheet as specified in claim 9 wherein the solid particles are carbon and the light colored pigment is titanium dioxide.

11. A manifold sheet as specified in claim 9 wherein the adhesive is a colorless latex emulsion for binding the coated solid particles to the base sheet without changing the color of the light colored pigment.

12. A manifold sheet as specified in claim 9 wherein the solid particles having a thin wax film thereon and titanium dioxide is adhered to the wax film to provide the light colored pigment.

13. A manifolding paper having a light colored coating thereon of a profuse number of discrete particles of dark coloring matter with a thin wax film encasing each particle and a light colored covering adhering to the wax film, the particles being from 20 to 100 microns in size and the covering being particles of from 1 to 5 microns in size, said covering encasing the dark particles against ordinary handling but being frangible by printing impact to expose the dark particles to view.

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