

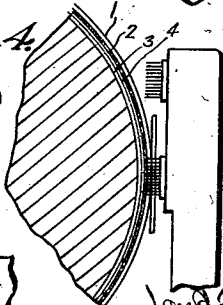
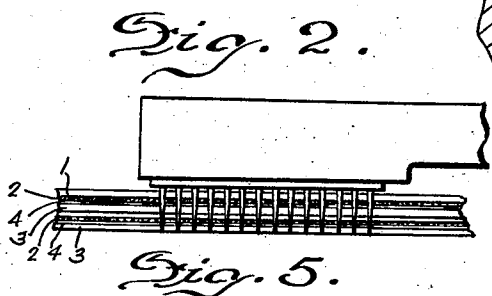
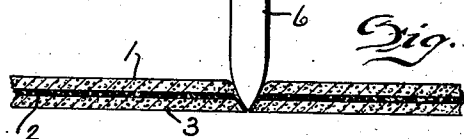
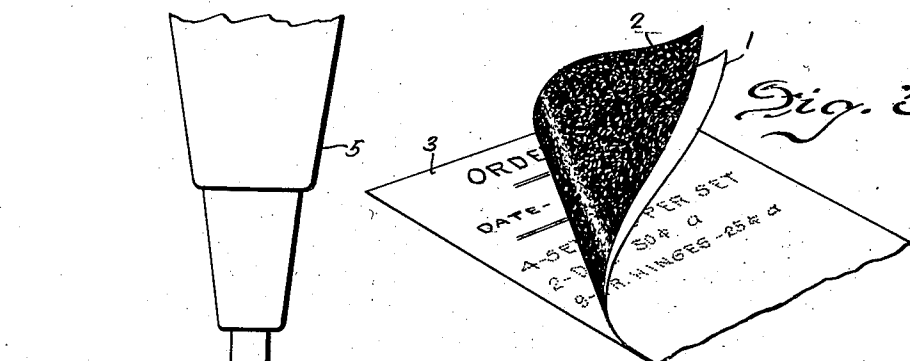
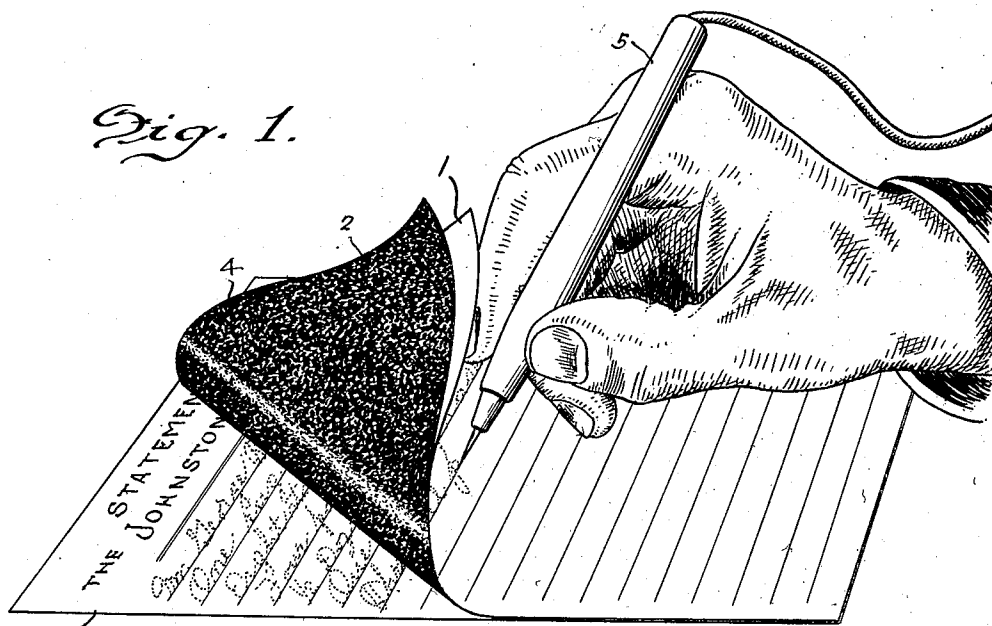
July 5, 1932.

J. Q. SHERMAN ET AL

1,865,708

DUPLICATING MATERIAL

Filed Nov. 1, 1927



HAT

Fig. 6.

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UNITED STATES PATENT OFFICE

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DUPLICATING MATERIAL

Application filed November 1, 1927. Serial No. 230,321.

Our invention relates to manifolding and more particularly to a carbon or transfer paper having a permanent surface which does not rub off or transfer by contact, pressure or friction, and means for producing duplicate copies of script or typewritten record by bodily transferring minute particles of such transfer or carbon material and embedding them in predetermined arrangement in an underlying duplicate record sheet.

The use of ordinary carbon or transfer paper for producing duplicate records is objectionable for many conditions of use due to the fact that the communicable or coloring material will rub off, smear or smudge. The use of "one time" carbon is quite common, wherein the reverse side of a record sheet is coated with colored carbon or transfer material by which a record written or typed upon the face of such sheet is simultaneously reproduced upon an underlying duplicate record sheet. However, such carbon backed sheets, like ordinary carbon, are objectionable due to the fact that the color rubs off upon the fingers of the clerks or accountants who may handle such records, and when stacked one upon the other such carbon deposit has a tendency to smudge and discolor the face of the underlying sheet. Such carbon back paper also presents an unsightly and objectionable appearance.

By the present method the carbon or transfer material may be disguised and concealed by a surface coating of distinctively different color simulating the face of the record sheet, and in any event it will be given a hard non-communicable surface finish. The method of transfer is by perforation, either by the use of pin type, wherein the surface of the type is provided with a series of small needle point projections, or in the case of script such transfer is effected by a vibrating stylus. In either event the writing element whether of pin type or vibratory stylus perforates the superposed record sheets forming therein a succession of closely spaced minute perforations in arrangement producing a succession of letters, figures or characters. Such perforation of the record sheets produces an indelible and permanent record. However,

to render such record more distinctive and more easily read the sealing or protective surface of the carbon surface is punctured and minute particles of transfer color material are carried bodily by the needle points of the pin type or by the vibrating stylus from one sheet and embedded in the perforations of the other. By this means the record formed by the perforations is given a distinctive and contrasting appearance. The manifolding material may be ordinary sheets of carbon or transfer material interleaved between the record sheets and having a surface coating of a hard protective material which will prevent the rubbing, smearing or smudging of the carbon. In lieu thereof the carbon or transfer material may be deposited on the back of the record sheets. Such protective coat may be in the nature of a shellac, a varnish, or a lacquer applied either by floating the paper or by spraying the protective material thereon. Regardless of the specific character of the colored material employed, the process of manifolding involves the simultaneous perforation of two or more overlapping sheets of material and the projection of small particles of the color material from one sheet into the other.

The object of the invention is to improve the material as well as the means and mode of manifolding whereby permanent and indelible records are produced.

A further object of the invention is to provide a perforated record, that is to say, one made by a succession of minute perforations systematically arranged, which may be given a distinctive appearance or increased visibility.

A further object of the invention is to provide means for distinctively coloring the perforations of a perforated record sheet.

A further and important feature of the invention is to provide a manifolding material which will be more or less permanent and without the characteristic of smudging, smearing or rubbing off, and therefore not tending to soil the fingers of those who must handle such materials, nor soiling the face of underlying record sheets when such sheets are superposed upon each other.

A further object of the invention is to provide a transfer or manifolding material having a comparatively hard sealing surface coating.

5 A further object of the invention is to provide a manifolding or transfer material having a distinctive and pleasing color and which will not possess the appearance of the usual commercial transfer or carbon sheets.

10 A further object of the invention is to provide a manifolding or transfer material that is incapable of reproducing records by impact, by pressure or friction, and is responsive only to a perforating operation as by pin type or a sharpened stylus.

15 A further object of the invention is to provide a manifolding material wherein a normally free, communicable color material is sealed or affixed by a non-communicable surface material which must be broken or punctured to release and permit transfer of the enclosed color material.

20 With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

25 Referring to the accompanying drawing, wherein is shown the preferred, but obviously not necessarily the only form of embodiment of the invention, Fig. 1 is a perspective view showing a record being produced upon superposed record sheets by a vibrating stylus. Fig. 2 is a greatly exaggerated view of the superposed sheets and stylus showing the projection of a severed portion of the colored surface of the upper sheet into the perforation of the lower sheet. Fig. 3 illustrates a record produced by the use of pin type perforations in lieu of a stylus. Fig. 4 is a detail view illustrating pin type operation. Fig. 5 is an exaggerated sectional view of a set of superposed record sheets punctured by a pin type. Fig. 6 is an enlarged view showing colored and uncolored perforations.

30 Like parts are indicated by similar characters of reference throughout the several views.

35 The present method of manifolding is particularly applicable to the production of permanent records wherein it is desired to avoid any attempt at erasures or subsequent changes of the recorded data. Obviously, however, the herein described method is not limited to such use, but may be given a general application for duplicating records of various types. The duplicating or manifolding material herein described is intended primarily for "one time" use, although it is capable of producing records repeatedly. The present trend in the manufacture of "one time" carbon or transfer material is to place a coating of such duplicating or transfer

material upon the back or reverse side of the succeeding record sheets. In this way each record sheet has within itself the means for transferring the written or typed record onto an underlying sheet without the necessity of an interleaved carbon. The present invention is applicable to either direct deposits of carbon on the backs of the record sheets or to separate interleaved carbon sheets.

40 In the drawing, 1 is the original or top-most record sheet of a series, upon which the original writing, typing or inscription is impressed. The reverse side of this original record sheet 1 is coated or colored as at 2 to provide communicable pigment particles to be detached from the overlying record sheet and embedded in perforations in the underlying or duplicate record sheet 3. Obviously the number of sheets may be increased to any reasonable desired number, each succeeding duplicate record sheet also having its reverse face colored or coated to afford the necessary pigment particles. The coating of color material 2 upon the reverse sides of such sheets may be ordinary carbon or transfer material such as ordinarily used in manifolding sales books, typewriters, autographic registers, and the like. Such material, however, is objectionable due to its tendency to smear and to smudge or rub off upon the fingers of persons handling the record and upon underlying record sheets. Inasmuch as the present record is not dependent upon production by contact of the colored material or by transfer in the ordinary manner, but involves the bodily transfer of colored particles from one sheet to another, the surface of such colored coating 2 is protected by a sealing film 4. This sealing film or surface material may be of various substances but is preferably a comparatively hard surface which will not rub off nor smear.

45 In practice a thin solution of shellac or varnish or of lacquer, or the like, has been employed for this purpose. Likewise a hard wax surface is suitable to protect the underlying coat of colored material against being rubbed off or smeared by contact or friction.

50 In the event that carbon or transfer material of the usual character is employed and the surface sealed and fixed against smudging or smearing by the application of a sealing, such sealing material may be opaque in character or may be impregnated with an opaque coloring matter which will serve to disguise and conceal the objectionable dark colored carbon or transfer material. One of the methods of so disguising or concealing the underlying strata of carbon or transfer material is to effect a deposit of talc, whiting, or the like, upon the carbon or transfer deposit prior to the application of the surface sealing coating 2. Such material may be mixed with stearic acid or paraffine or may

be intermixed directly with the sealing or surfacing material.

In carrying out the manifolding process the coated record sheets are superposed one upon the other and the record is imprinted by perforating the sheets with closely positioned small perforations arranged in the form of letters, figures or characters. If the record is to be in script or handwriting it is effected by a vibratory stylus 5, the needle 6 of which is reciprocated at a rather high speed of operation by electrically driven operating means. In order to afford a distinctive and contrasting writing upon the original copy or topmost sheet, ink feeding means may be provided upon the stylus thus enabling a small deposit of ink or marking material to be made in each of the succession of small punctures. The particular mechanism of the vibratory manifolding stylus 5 with its feed means is the subject matter of a separate and distinct invention and will not be here described.

In lieu of perforating the superposed record sheets by the vibrating stylus the imprint may be effected by means of pin type wherein the letters are formed by a series of systematically arranged needle points. Such type are already provided for typewriter purposes, and are commonly used in time clocks, tabulating machines and various forms of recording devices.

As the writing implement whether it be the needle 6 of the stylus, or the needle point face of the pin type, punctures the superposed record sheets it presses through the colored coating of transfer material breaking the surface seal thereof and in entering the next successive record sheet carries with it the minute particles of the colored stratum of the preceding sheet. These colored particles are thus embedded in the perforations of the underlying sheets, thereby giving the perforations a contrasting appearance. By thus coloring the punctures with small particles of color matter carried from the preceding record sheet, the letters, figures or characters thus impressed are given a contrasting appearance enabling them to be easily read while the puncturing of the sheet in the outline of such letters, figures or characters renders such record permanent and prevents manipulation or falsification of records.

From the above description it will be apparent that there is thus provided a construction of the character described, possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, and arrangement of parts, without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention is described in language more or less specific as to structural features, it is

to be understood that the invention is not limited to the specific details shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described our invention we claim:

1. A record sheet, a coating of transfer pigment on the back thereof and a sealing coat of hard adherent material overlying the pigment coating.

2. A record sheet, a coating of transfer material capable of transference by contact on the back thereof, and a pressure resistant sealing coat thereover impermeable to the transfer material and adapted to be punctured to release particles of such transfer material.

3. A record sheet, a coating of transfer pigment on the reverse side thereof and an opaque coating of hard resistant material overlying the coating of pigment.

4. In a manifolding material, a supporting stratum, a stratum of transfer material, and an opaque coating of fixed inert sealing material impervious to the transfer material and having a color different from that of the transfer material overlying the stratum of transfer material said coating of sealing material being adapted to be broken to release transfer material for transposition to a second sheet.

5. In a manifolding material, a supporting stratum, a stratum of transfer material, and a sealing coat of impermeable material overlying and confining the stratum of transfer material.

6. A manifolding material having a coating of communicable color material and an overlying coating of non-communicable inert coloring material confining the communicable color material substantially as specified.

7. As an article of manufacture, a stratified sheet of manifolding material including a stratum of communicable color material and an overlying stratum of impermeable color material enclosing and preventing transfer by frictional contact of the communicable color.

In testimony whereof, we have hereunto set our hands this 26th day of October, A. D. 1927.

JOHN Q. SHERMAN.
ALBERT W. METZNER.