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MANIFOLDING

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My invention relates to the art of manifold-
ing by which duplicates of writing, typing, printing,
drawing and other indicia are made by trans-
ferring under pressure ink, carbons, graphite or
other like substances from a carrier to a copy
receiving surface to make on the latter a visible
impression.

The object of my invention is to fix the im-
pression of carbon paper or other similar media
so that subsequent smearing and blurring is
eliminated, legibility is improved, the impression
is brightened and made resistant to erasure. By
this method of treatment the impression from the
carbon paper or the like is fixed into the sheet to
give improved characteristics, and these char-
acteristics will hereinafter be more fully de-
scribed.

In the following description ink, unless other-
wise designated, is taken to mean the pigment
carrying wax-like coating on a transfer member
which is transferred to a copy receiving sheet by
application of pressure to produce a copy of typ-
ing, writing, or other indicia. A copy so made
will hereinafter be referred to as a carbon copy.

Carbon paper, which may be used as an ex-
ample, consists of a sheet of tissue paper coated
on one face with what may be called ink. This
ink consists of carbon black or other pigment
dispersed in a vehicle or carrier. The vehicle or
carrier, for the purpose of this invention, may be
of any suitable substance which is rendered more
or less fluid by heat, such as paraffin, ceresin,
carnauba wax and the like with or without an
oil or similar plasticizer.

In the practice of making manifold copies, the
carbon paper is alternated between sheets of writ-
ing paper or the like with the inked face of the
carbon paper against the face of the sheet on
which the desired copy is to be produced. Any
pressure such as that from type-face striking the
sheets, or pressure of a pencil results in the
transfer of a small amount of ink from the car-
bon paper to the sheet in contact therewith.

Examination of a typewritten carbon copy
under a microscope of about one hundred mag-
nifications shows that the apparently solid lines
of a letter in reality consist of a great number
of small spots of transferred ink which cling to
the surface fibers of the paper. As the paper
consists of interlocking fibers, the surface is
irregular and the ink from the carbon paper is
only transferred to the surface fibers which the
ink contacts. The surface of the transferred
ink is rough and the ink particles appear to be

only lightly bonded to the fibers of the paper and
to each other.

My invention therefore contemplates the treat-
ment of such copy by a method which causes
these ink particles to form solid lines which are
not merely held loosely on the surface of the
paper but which are bonded firmly to the paper
in a manner to fix these impressions and thereby
prevents smearing and blurring of the carbon copy.
When the copies are treated in accordance with
my invention, contact of one set of copies with an-
other does not cause blurring, nor can the ink
which has been transferred to the copy receiving
sheet in making the carbon copies be again trans-
ferred to the hands of persons, to another sheet of
paper, or to another portion of the same sheet.
Furthermore, the treatment in accordance with
my method greatly improves the legibility of the
copies so treated and results in manifold copies
of which the color and intensity of a plurality of
copies made at the same operation is improved
throughout.

My process consists in subjecting the carbon
copy which has been produced as hereinabove
stated to heat which melts the paraffin or other
wax-like pigment carrier and causes it to be ab-
sorbed into the fibers of the impression receiving
paper. Other substances used as a part of the
pigment carrier or vehicle, such as paraffin oil,
mineral oil and oleic acid are also rendered more
fluid and are absorbed by the fibers of the copy
receiving paper. By this treatment, the ink
which is otherwise loosely attached to the surface
of the paper is firmly bonded in the paper and
is thereby rendered compact and smooth.

I have found that the use of a blotting surface
against the ink impressions on the carbon copy
is in some cases useful in eliminating the possi-
bility of an excessive amount of ink melting and
running over the paper. I have also found in
the practice of my invention that the heat may
be applied to either or both sides of the carbon
copy, but I have found that the application of
heat to the reverse side of the paper tends to
absorb the ink more firmly into the fibers and
therefore often results in better copies than when
the heat is applied to the ink carrying surface of
the paper.

The temperature necessary to melt the vehicle
or carrier naturally varies, but in general about
250° F. is sufficient. The heat, in accordance with
my invention, may be applied in any of several
different ways. The copy for example may be
pressed with an electric iron held against a heat-
ed platen, pressed between two heated rollers,

slid over a heated cylindrical surface, or held in contact with a rotating cylinder, in the manner of paper held in a typewriter carriage. Furthermore, the heat may be applied in an oven or by radiation from a radiant source of heat. Steam, flame or electricity may be used to produce the heat, and I do not therefore wish to restrict the practice of my method to any particular manner of applying heat to the copy. I have discovered that the result may be enhanced by applying pressure to the copy either during the heating thereof or immediately thereafter. Such pressure tends to more firmly drive the ink into the fibers of the paper and it also eliminates any rough or uneven characteristics from the face of the copy paper.

I have further discovered that after subjecting a carbon copy to the treatment of my method, certain residual particles of the original ink remain on the surface of the copy paper. These residual particles tend to impart a slightly blurred effect to the outline of the letters or other impressions. Since the major portion of the ink has been absorbed into the fibers of the paper in the form of solid lines, these residual particles of ink may be removed from the surface of the paper without danger of smearing or erasing. Such removal may be accomplished by rubbing the copy sheet lightly with an eraser, preferably a soft gum eraser, or otherwise burnishing or removing these particles with the result that the indicia which have been fixed will remain and stand out in clear-cut legible outline.

It will therefore be seen that the practice of my invention results in manifold copies in which the impression is fixed against smudging and smearing, copies in which the impression is brightened and in which the characters stand out in a legible manner. By the practice of my invention a carbon copy is rendered as legible and permanent as a ribbon copy and a great number of carbon copies may be made from the same impression, among which, when treated in accordance with my invention, the last copy will be as good as a second preceding untreated copy and all will be legible and fixed as contemplated by this invention.

It will be seen that the invention is capable of being performed in a number of different ways and the exercise of my method shall therefore be unrestricted, other than by restrictions that may be imposed thereon in the subjoined claims.

What I claim is:

1. The method of producing fixed manifold copies upon a copy receiving member which comprises the steps of superimposing upon said copy receiving member a transfer sheet having on the face thereof in contact with the copy receiving member a pigment dispersed in a carrier which becomes more or less fluid under the influence of heat, transferring a portion of said pigment and carrier to the surface of said receiving member by applying pressure to the back of said transfer sheet at spaced points thereof to form spaced intelligible characters on said copy receiving member, thereafter subjecting said manifold copies to the influence of heat to cause an absorption of carrier and pigment in said copy receiving member.

2. The method of producing fixed manifold copies upon a copy receiving member which comprises the steps of superimposing upon said copy receiving member a transfer sheet having on the face thereof in contact with the copy receiving member a pigment dispersed in a carrier which becomes more or less fluid under the influence of heat, transferring a portion of said pigment and carrier to the surface of said receiving member by applying pressure to the back of said transfer sheet at spaced points thereof to form spaced intelligible characters on said copy receiving member, thereafter subjecting said manifold copies to the influence of heat to cause an absorption of carrier and pigment and then removing residual particles of carrier and pigment from the surface of said copy.

3. The method of producing fixed manifold copies upon a copy receiving member which comprises the steps of superimposing upon said copy receiving member a transfer sheet having on the face thereof in contact with the copy receiving member a pigment dispersed in a carrier which becomes more or less fluid under the influence of heat, transferring a portion of said pigment and carrier to the surface of said receiving member by applying pressure to the back of said transfer sheet at spaced points thereof to form spaced intelligible characters on said copy receiving member, thereafter subjecting said manifold copies to the influence of heat to cause an absorption of carrier and pigment and subjecting said manifold copies to pressure.

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