

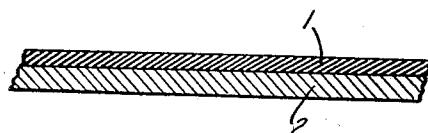
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CARBON PAPER

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## CARBON PAPER

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My invention relates to copying processes and particularly to papers used for making the master copy employed in what is known as the hectograph process, and for other purposes.

5 One object of my invention is to provide a copying paper, commonly called a hectograph carbon paper, which will produce a stronger master copy for the hectograph process. Other objects and advantages of the invention will be 10 set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

15 In the hectograph process the words, figures or designs to be reproduced are first prepared on a sheet of paper or other suitable surface, by typewriting, printing, writing, drawing or the like. In doing so a particular kind of ink is 20 used, known as hectograph ink. This ink may be on the typewriter ribbon used in the typewriter employed to prepare the master copy, or it may be used with an ordinary writing pen, or it may be in the coating of a carbon paper used 25 in a typewriting machine.

In the practice of the hectograph process a master copy is prepared by any of the above enumerated methods, using an ink having certain characteristics, including a very penetrating 30 quality, and also a powerful dyeing quality. Such ink is composed largely of aniline dye with a menstruum as a carrying vehicle. The menstruum consists of oils and waxes. After the master copy is prepared, it is laid face down and 35 pressed into intimate contact with a sheet or layer of a suitable colloidal material, such for example, as gelatin, and allowed to remain for a short period of time, rarely over one minute. During this period the highly penetrating ink 40 penetrates into the colloidal material, leaving the surface of the master copy and going to the colloid, which has a strong affinity for the aniline dye of the ink and absorbs it quickly. The intensity of the impregnation of the colloid by the 45 ink is proportional to the intensity of the ink on the master copy. The master copy is next removed from the surface of the colloid and the desired duplicate copies of the master copy are made by laying sheets of paper, one after another, 50 on the surface of and in intimate contact with the colloid. Each sheet of paper so pressed against the surface of the colloid receives ink from the surface of the colloid and after each such impression the ink on the surface is slightly 55 diminished, so that as copy after copy is taken

off the copies become less bright and distinct until they finally become so faint as not to be readily legible.

The number of legible copies which may be made from a master copy is dependent upon or is influenced by a number of factors, chief among which is the intensity of the ink on the master copy. When the master copy is printed the intensity of the ink is largely governed by the amount of ink laid on the type by the rollers of 60 the printing press at the time of printing. When the master copy is made in a typewriter using ribbon impregnated with hectograph ink, the intensity of the ink on the master copy is largely 65 dependent on the amount of ink in the ribbon and the newness or age of the ribbon. When the master copy is prepared by using a carbon paper coated with hectograph ink, the intensity 70 of the ink on the master copy is dependent largely on the coating on the paper and the amount of 75 the coating which is transferred from the carbon paper to the master copy when struck by the type bar of the typewriter. When the paper used in making the carbon paper is of an absorptive 80 nature, a considerable portion of the coating of hectograph ink penetrates into the paper at the time of coating, and is not readily transferred from the carbon paper to the master copy when 85 struck by the type bar of the typewriter.

My invention relates particularly to this feature of the copy paper. Heretofore papers used in the manufacture of carbon paper for this purpose have been of the absorptive type, and a considerable portion of the ink coating applied to 90 the surface of such paper in the process of manufacture has been absorbed into the fibres of the paper and so can not be transferred to the master copy by the pressure.

It has been common practice in the manufacture of carbon papers to use paper made from fibrous materials of high absorption, such for example, as flax, all of a costly type and having long fibres. I have discovered that the qualities heretofore sought and strived for by the manufacturers do not produce in the highest degree 95 the results desired from a carbon paper for use in making master copies for hectographing. When making such master copies the object is to transfer as much as possible of the ink from the carbon paper to the master copy at the time of writing. The desired end would be obtained if all of the ink on the carbon paper in the area 100 struck by the type bar were transferred from the carbon paper to the master copy.

By using a non-absorptive paper having a 110

glazed surface, to which the applied coating of ink will adhere, but into which it can not penetrate, I produce a carbon paper from which the hectograph ink is almost completely transferred 5 to the master copy when pressure is applied, as for example, when struck by the type bar of a typewriter or otherwise pressed into firm contact with the master copy. I find that by using a treated paper of a type which is highly impervious and impenetrable, I am able to apply thereto a coating of hectograph ink, which will give a much denser layer of ink on the master copy than is possible when absorbent paper is used to receive the coating of ink. This is because my non-absorbent paper permits practically all of its coating of ink to be detached from the surface of the copy paper and be transferred to the surface of the master copy by the pressure of the type bar. Almost a complete transfer 10 takes place, for the reason that practically none of the coating of ink on the impervious copy paper has been absorbed into the paper, but practically all the ink is still on the surface and is readily detached therefrom and wholly transferred to the master copy under the influence of pressure. As an example of the type of paper which I find suitable for this service, I may mention the kind commonly known in the trade as 15 glassine paper.

Many other papers possess the requisite non-absorbing quality besides glassine paper. Any thin, uniform paper, to which the ink will adhere, but into the body of which the ink will not penetrate, and having the usual other qualities necessary in a carbon paper, such as freedom from imperfections, etc., may be used. Suitable 20 papers may be prepared by applying impenetrable coatings to otherwise penetrable paper, or by saturating the body of the paper with a suitable penetration resistant material to render the paper resistant to the absorption of the hectograph ink. Nor do I limit my base membrane on which I apply my ink coating to paper alone, since I may also use various membranes, such as celluloid, 25 cellophane, rubber, fabrics or any other sufficiently thin, uniform and impervious membrane.

In the accompanying drawing Fig. 1 is a much enlarged cross section of a portion of carbon paper made according to my invention, in which 30 1 is the coating of hectograph ink and 2 is the base of impervious membrane to which the ink is applied. By the practice of my invention I am able to place a much denser layer of ink on the master copy, which in turn results in a much denser impregnation of ink into the surface of the colloid when the master copy is brought into contact therewith, and as a result a much greater 35 number of legible copies may be taken from the surface of the colloid. I find that by the practice of my invention I am able to make some 50% more legible copies of a typewritten master copy 40

than with the best copy paper of the absorptive type heretofore on the market.

In making my new carbon paper, I use for convenience paper known in the trade as glassine paper of various thicknesses, from the thin variety, half a thousandth of an inch thick, up to the heavy varieties, measuring as much as two thousandths of an inch in thickness. I coat this paper with an ink composed of a mixture of oils and waxes, into which is ground a very large proportion of aniline dyes of various types and colors, such as crystal violet or methylene blue, and others, depending on the color desired and the purpose for which it is to be used. 85

The term "carbon ink" is used in the trade and in this description, and in the following claims, to mean any ink of any color or formula which is used in the manufacture of carbon paper. 90

The term "carbon paper" is used in the trade and in this description and in the following 95 claims to mean any ink coated paper which will transfer its ink coating to another surface on the application of pressure.

While I have described the application of my invention to carbon paper for use with the hectograph process, there are other uses to which it is well adapted. For example, carbon papers are used in certain cases where only one writing is made on it, after which it is not used again. Certain systems of recording sales, preparing bills 100 of lading, etc., involve the use of carbon paper for one writing. For such purposes a very thin coating of ink on a membrane which it can not penetrate, but from which it is practically all removed by pressure against a receiving surface, is to be 110 preferred to a heavier coating of ink on the usual type of base membrane.

Another application of my invention is in making of copies of writings or drawings by photographic means. In this application the carbon 115 paper is used as a negative to print copies of the original writing. When my new carbon paper is used in the ordinary manner, the ink coating is so nearly completely removed from the surface area affected by the pressure applied that a transparent or translucent area is left. Such a sheet of carbon paper, after having received the desired writing or drawing, may be used to produce as many duplicates as may be desired by well-known photographic means. 120

Having described my invention and the manner of its use, I now state what I claim to be new and for which I pray that Letters Patent be granted. 125

1. A carbon paper consisting in combination of 130 glassine paper base to which has been applied a coating of hectograph ink.

2. A carbon paper consisting of glassine paper base to which has been applied an ink coating.

3. A carbon paper consisting of cellophane having a coating of ink. 135

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