

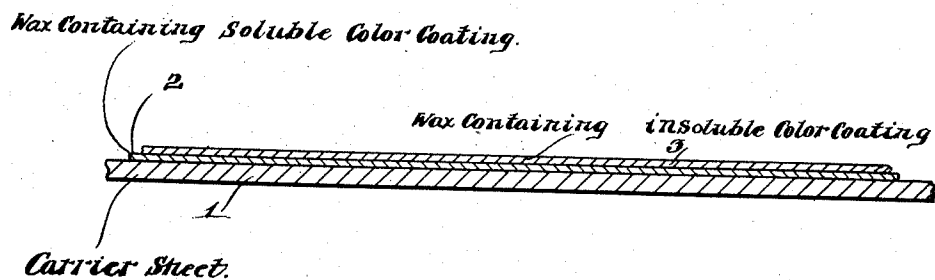
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CARBON PAPER AND METHOD OF MAKING SAME

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UNITED STATES PATENT OFFICE.

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CARBON PAPER AND METHOD OF MAKING SAME.

Application filed August 4, 1922. Serial No. 579,752.

To all whom it may concern:

Be it known that I, WINFIELD P. PEMBROKE, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Carbon Paper and Methods of Making Same, of which the following is a specification.

Carbon sheets may be divided into two classes, namely, those which produce a substantially non-permanent record and are employed for pencil carbons and those which produce a substantially permanent record and are employed most generally for making copies on typewriting machines.

Those carbon sheets of the first class employ a high saturable carrier or paper with an extremely penetrating color or coating, due to the use of little or no insoluble coloring matters in the coating and to the use of but a small amount of wax. The other class of carbon sheets employs a high grade of paper stock most generally linen tissue as a carrier, and a color-coating high in wax-content and low in soluble color content.

In manufacturing the second class of carbon sheets, it is customary to employ a coating containing a wax with an insoluble color, such, for instance, as lamp black. This is applied to one face of the carrier while in a hot condition, and after properly being spread over the carrier, is immediately subjected to a cooling action for the reason that if the wax in the coating is maintained in a heated condition for too long a period of time, the most desirable carbon paper is not obtained. Owing to the short period of time that the color coating is heated, the color coating does not have sufficient time to penetrate the carrier, so that the carbon sheet produced has the color coating adhering substantially only to the face thereon. Such a carbon sheet has two disadvantages; first, the sheet is substantially a stencil and upon each use thereof a great deal of the coating comes off, so that the life of the carbon sheet is comparatively limited; and second, the coating has a different coefficient of expansion from that of the carrier sheet and, as a consequence, the carbon sheet has a tendency to curl, making it im-

possible to arrange the sheet in a flat condition and interfering with the handling of the sheets in use. The life of such carbon sheets may be slightly increased by ageing them, that is, permitting them to stand for a considerable length of time until the wax containing coating penetrates to a slight degree the carrier sheet. This, however, requires that the manufacturer shall maintain a space to store the goods, and at the same time, have a money investment tied up in the stored goods.

According to this invention a carbon sheet of the second class is obtained which is substantially non-stencilling, due to the fact that the coloring matter penetrates the paper or other carrier, and which also is non-curling because the coloring coating is so intimately combined with the paper or other carrier sheet that the latter has substantially a uniform co-efficient of expansion throughout.

The drawing shows in section a carbon sheet with three clearly defined layers, but it must be understood that this is only for the purpose of illustrating the sequence of the application of the two coatings, the final production being a homogeneous structure in which no definite layers are present.

In carrying out this invention, a carrier sheet 1 is employed which has a low saturability, but which preferably has a higher saturability than the carrier sheets usually employed in carbon sheets of this class. A carrier sheet, which may be employed is made from a pulp composed largely of linen mixed with a small percentage of precipitate of chalk, so that the paper produced from the pulp after the chalk coating of the different fibers has a slight saturability.

A color coating 2, which may be employed, embodies an insoluble color such as lamp black, a wax, oleic acid and some one or more of the basic aniline oil soluble colors. The color coating is applied to the carrier, preferably one whose saturable properties have been increased in a manner hereinbefore mentioned, by a coating machine which runs at a high rate of speed, the coating being immediately cooled as is now a common custom. The speed of the coating machine may be materially increased over machines now in use. After the first

coating, either on the same machine or on another machine, immediately or after the coating has been permitted to partially penetrate the carrier sheet, the carbon sheet is again heated and immediately cooled, thus causing the wax and oils of the original coating to still further penetrate the carrier sheet and carry the coating therein. During such reheating a second color coating may be applied. This rerunning of the carbon sheet either with or without additional coatings may be continued any desired number of times until the degree of saturation of the carrier sheet desired is obtained. The second or any one or more of the coating after the first coating may not contain the soluble colors but may contain an insoluble color.

From the foregoing it will be seen that there has been provided a new method of making carbon paper whereby there is obtained a carbon paper in which the color coating is substantially homogeneous with the carrier sheet, so that the stencilling properties of the sheet are reduced to a minimum, thus increasing the life of the carbon sheet. At the same time, a sheet is obtained which is non-curling due to the fact that the color coating penetrates the carrier sheet and gives to the sheet, as a whole, a substantially equal coefficient of expansion. The sheet also has a heavier body and this naturally tends to stop the wrinkling and the consequent cracking of the coating. The carbon sheet produces a larger number of copies, as only a small portion of the coating is removed by each use. In fact the sheet may be employed until it is substantially worn out through the use thereof by the typewriting machine. This is different from the ordinary carbon where upon the first use substantially all of the coating is removed from the surface at the printing point.

What I claim as my invention and desire to secure by Letters Patent is:

1. A method of making carbon paper which consists in applying, to a slightly saturable carrier sheet, a heated wax-contain-

ing color coating with penetrating properties, immediately cooling the wax-containing color-coating, and thereafter reheating the coated sheet and immediately cooling the same to cause the color-coating to still further penetrate the carrier sheet.

2. A method of making carbon sheets which consists in applying, to a slightly saturable carrier sheet, a heated wax-containing color-coating with penetrating properties, immediately cooling the wax-containing color-coating, thereafter applying to the coated side of said sheet another heated wax-containing coating, heating the coated sheet to cause the first coating to still further penetrate the carrier sheet and immediately cooling said sheet.

3. The method of making carbon paper which consists in applying a heated wax-containing color-coating to the sheet, immediately cooling said coating, and thereafter reheating and immediately cooling the coating a number of times to obtain a carbon sheet saturated by the coating to a desired degree.

4. A method of making carbon sheets which consists in providing a saturable carrier sheet, coating said sheet with a hot wax-containing soluble color-coating, immediately cooling said coating, and thereafter reheating and immediately cooling the sheet to cause the color-coating to penetrate the sheet.

5. A method of making carbon sheets which consists in providing a saturable carrier sheet, coating said sheet with a hot wax-containing soluble color-coating, immediately cooling said coating, and thereafter applying to the coated side of said sheet a heated insoluble color coating and immediately cooling said sheet and coating.

6. A non-curling carbon sheet comprising a carrier sheet, a wax-containing soluble color coating penetrating the carrier sheet, and a separate wax-containing insoluble color-coating applied to the first mentioned coating.

WINFIELD P. PEMBROKE.