

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

A process of Developing Fingerprints on paper and the like materials.

I, SVANTE ODEN, a Swedish Subject, of Institutionen foer marklaera, Lantbrukshoegskolan, Uppsala, Sweden, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a process of treating paper fabric and like material to develop latent fingerprints occurring thereon.

As a criminological term of art "latent fingerprint" means those substances which are directly deposited from the finger(s) on some kind of substratum, e.g. paper, and form a fingerprint pattern but are invisible to the naked eye. Latent fingerprints are mostly deposited from naturally occurring substances on the skin, originating from the human body. It is the object of this invention to make such latent fingerprints visible by reactions fundamentally described below.

The invention is based on the discovery that the concentration of amino acids and/or proteins in a latent fingerprint is so great that it will become fully visible at the development thereof by means of indicators for amino acids or proteins, which form coloured compounds with these substances.

In the following the indicators are called amino acid or protein indicators. The greatest value of the invention resides in that both extraordinarily weak prints, which could not be developed by processes hitherto known, and very old prints can be made visible with the aid of the improved process, which is due to the deposits of proteins and amino acids being very durable.

According to the present invention the material and deposited fingerprints are treated with an indicator, which either reacts with amino acids or proteins forming coloured compounds, thus making the fingerprints visible.

It is extremely advantageous to use ninhydrin as amino acid indicator. The treatment with ninhydrin must be performed with almost waterfree solvents, since the easy solubility of the amino acids in water would result in a blurring of the fingerprint pattern if ninhydrin dissolved in water were used. The ninhydrin is therefore dissolved in acetone, ether or another organic solvent. The solution should besides be acidified with e.g. acetic acid since the ninhydrin reaction gives the strongest colour development in an acid environment. As certain paper types contain lime or other bases, the added acetic acid neutralizes their action, and the development thus takes place under favourable conditions.

The amino acid indicator preferably consists of a 0.2% ether or acetone solution of ninhydrin, to which solution 4% of glacial acetic acid have been added. It is obvious, however, that the composition of the solution can be changed within relatively wide limits.

The paper can be rapidly dipped into the acetone solution for treatment, whereupon the solution is permitted to drip off and the paper is left to dry by itself. More suitable than the dipping process which is the simplest one, is however the spraying process which involves that the solution is finely distributed by means of compressed air and sprayed onto the paper surface as an extremely fine mist.

After the spraying the paper is left to dry in air, which is important for obtaining a good colour intensity at the subsequent development. The development is a process which is very slow at room temperature, and it should therefore preferably be carried out in heating cabinets at a temperature of 80-120°C. for a time of 1-3 minutes. Other temperatures and times can of course also be used.

The colour of the prints varies between

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carmine and bluish violet depending *inter alia* on the paper types and the composition of the amino acids. Some of these paper types give dark blue colours, others bright red to pink colours. If the paper is exposed to the action of ammonia vapour, a change of colour occurs into blue which gives a better contrasting effect.

It may be suitable in certain cases to interrupt the developing process by a treatment with copper salts, which simultaneously involves a fixation of the prints so that they will be durable almost unlimitedly.

The ninhydrin process is applicable on a great variety of paper types, such as ordinary glazed stationery, envelopes, hard-sized envelopes, newspaper, blotting-paper, grease-proof paper, and bank notes. The process can also be employed for developing prints on fabrics.

Amido black is especially suited as protein indicator. In using this reagent the following method should be applied. The paper is dipped into an acetous methanol solution which has been saturated with said reagent. After about half a minute the paper is taken out of the solution which is permitted to drip off. The paper is then rinsed several times in a pure mixture of methanol and acetic acid. Finally, the paper is left to dry at room temperature. The finger line pattern will then appear in dark blue colour against a background of brighter blue colour. This developing process gives an especially good result if the fingers which have left the print were stained with blood serum.

The invention must not be considered as limited to what is described above, for many modifications of the process described can be resorted to.

What I claim is:

1. A process of treating paper and like

materials to develop latent fingerprints occurring thereon, characterized by treating the material and deposited finger prints with an indicator which either reacts with amino acid or protein forming coloured compounds, thus making the fingerprints visible.

2. A process according to Claim 1, characterized by using ninhydrin as amino acid indicator.

3. A process according to Claim 1, characterized by using an acetone, ether or like organic solution of ninhydrin as amino acid indicator.

4. A process according to Claim 1, characterized by using as amino acid indicator an acetone, ether or like organic solution of ninhydrin which has been admixed with some acid, preferably acetic acid.

5. A process according to Claim 3, characterized by spraying the solution onto the material in the form of a fine mist.

6. A process according to Claim 3, characterized by drying the material after the treatment with the solution until the solvent has evaporated, and then subjecting the material to a heat treatment by which the prints are developed.

7. A process according to Claim 6, characterized by performing the heat treatment for 1-3 minutes at a temperature of 80-120°C.

8. A process according to Claim 1, characterized by interrupting the development by treating the material with copper salt, whereby the developed prints are fixed.

9. A process according to Claim 1, characterized by using amido black as protein indicator.

10. A process of developing fingerprints substantially as described above.

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