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STENCIL SHEET AND BATH FOR MAKING SAME.
APPLICATION FILED MAR. 19, 1915.

1,215,098.

Patented Feb. 6, 1917.

Fig. 1.

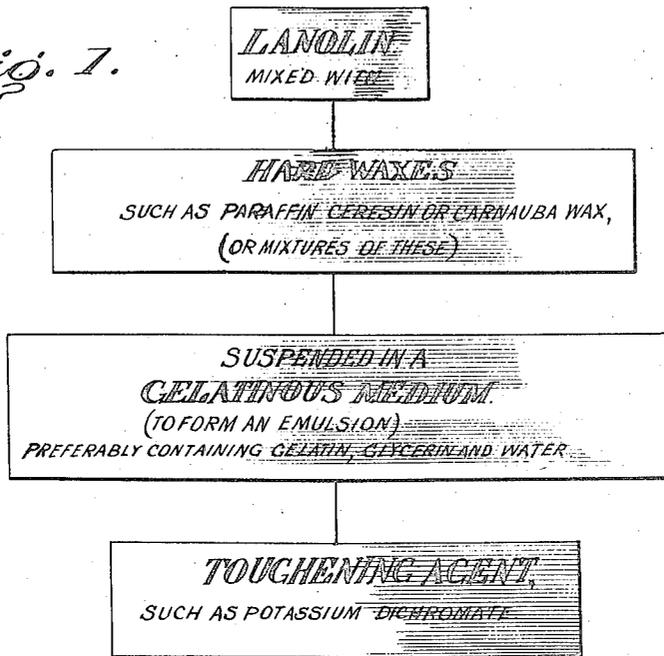
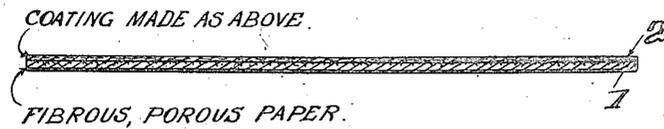


Fig. 2.



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UNITED STATES PATENT OFFICE.

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STENCIL-SHEET AND BATH FOR MAKING SAME.

1,215,098.

Specification of Letters Patent.

Patented Feb. 6, 1917.

Application filed March 19, 1915. Serial No. 15,557.

To all whom it may concern:

Be it known that we, JAMES A. BAILEY and HENRY E. KALUSOWSKI, residents of Washington, District of Columbia, (whose post-office addresses are, respectively, No. 702 Tenth street northwest and No. 808 I street northwest, Washington, District of Columbia,) have invented a new and useful Improvement in Stencil-Sheets and Baths for Making Same, which invention is fully set forth in the following specification.

This invention relates to improvements in paper stencils and baths for making the same.

Heretofore stencil-sheets have been made for producing multiple copies by applying to a porous fibrous base, such as Japanese Yoshino paper, a solution of gelatin in water and glycerin, together with a toughening agent for the gelatin, such as potassium dichromate. Stencil-sheets have also been made by saturating tissue paper with paraffin or wax. Sheets thus prepared, when impressed by a stylus or by typewriter type characters, are expected to give a stencil through which ink will readily pass at those portions of the sheet so impressed, but where the paper has not been impressed no ink should pass through the sheet. Gelatin stencil-sheets yield good printing results when the sheet is freshly prepared or if subsequently moistened, but the tendency of the sheet to dry and harden and to necessitate moistening just before each sheet is used, has proven a serious drawback to the practical use of this form of stencil. The objection to the paraffin or wax stencil resides in the susceptibility of the wax to soften in summer temperatures and render the characters illegible under printing conditions.

The object of the present invention is to overcome the above objections and to provide paper stencil sheets with an impression-receiving material capable of retaining its susceptibility of taking stencil impressions, thereby avoiding the use of moisture or other treatment to restore the material to its impression-receiving condition.

A further object is to obtain ink-resisting properties in the coating material, thereby securing permanency of the impressions un-

der printing conditions, and to enable a wide range of inks to be used without injury to the paper stencils while permitting solvents of the inks to be used in cleaning the stencil sheets.

We have discovered that lanolin, a product of wool fat, and certain hard waxes mixed therewith, such as paraffin, ceresin or carnauba wax or mixtures of the same, when suspended in a gelatinous medium to form an emulsion, are capable of producing a stencil composition which possesses in a marked degree the characteristics above described.

With the above objects in view, our invention resides in a stencil composition for application to paper and in the stencil sheet provided with such composition, and consists in preparing a coating bath in the form of an emulsion by making with a volatile solvent, such as carbon tetrachlorid CCl_4 , a solution of lanolin, preferably anhydrous, ceresin and carnauba wax, alone or mixed, and separately preparing a gelatinous solution preferably containing gelatin, glycerin and water. The two solutions are thoroughly incorporated while warm to form an emulsion, and a toughening agent, such as potassium dichromate, then added. The emulsion is now ready for applying to the fibrous, porous paper, such as Yoshino paper.

The following composition has been found satisfactory and is given by way of example. Parts are given by weight:

Ceresin.....	3.6	
Lanolin, anhydrous.....	0.9	
Carnauba wax.....	0.5	
Glycerin.....	18.0	80
Gelatin.....	4.0	
Potassium dichromate.....	0.28	
Carbon tetrachlorid.....	18.00	
Water to make.....	80.00	95

The bath is prepared from the above ingredients by incorporating them preferably in the following manner. The ceresin, carnauba wax and lanolin are placed in a receptacle, which is preferably adapted to be closed, and the temperature raised sufficiently to melt the materials. The carbon tetrachlorid is next added to effect a solution. The gelatin is dissolved separately in

water and glycerin; the mixture is then emulsified and the potassium dichromate added to the emulsion. The two solutions are incorporated at a temperature of between 26° and 33° C. to form the emulsion.

In the accompanying drawings:—

Figure 1 is a skeleton diagram setting forth the elements of applicants' composition; and

Fig. 2 is a vertical section through the sheet of paper coated with said composition.

Referring to Fig. 2, 1 is a sheet of paper, and 2 is a coating applied thereto.

- 15 The emulsion or bath may be applied to the porous, fibrous paper, such as Yoshino paper, in various ways, but the preferred way is to float the paper on the surface of the warm bath and remove the excess of liquid by drawing the coated side over a smooth edge, such as a rod supported above the bath. The coated paper is then permitted to yield up its volatile solvent and excess of moisture in any suitable manner. The sheet
- 20 is then ready for receiving stencil impressions and is strong and durable. The temperature of the room in which the coating is applied should be sufficient to prevent too rapid setting of the ingredients of the emulsion. A room temperature of about 21° C. is suitable. If a single ply stencil sheet is desired, as indicated diagrammatically in cross-section in Fig. 1, each sheet is permitted to dry separately. The process herein described, but not claimed, forms the subject-matter of our divisional application Serial No. 106,289, filed June 27, 1916, wherein the process is claimed.

- 35 In the preparation of the stencil sheet, the lanolin plays an important part, both in making the bath and in the completed stencil. Because of the capability of lanolin to combine with water in a marked degree to form an emulsion, and also to blend with the waxes, it materially facilitates in emulsifying the waxes. In the finished stencil the minute particles or globules held in the gelatinous matrix consist of a blend of hard wax and lanolin which holds water and
- 40 glycerin. These wax bodies in the gelatin act to seal the moisture in the coating, while in themselves they have the property of keeping the coating alive or in a plastic state for receiving stencil impressions without adding moisture to the surface. The lanolin also enables the content of glycerin to be increased without rendering the stencil surface sticky.

- 45 The carnauba wax gives stability to the impressions under printing conditions, especially when the temperature is elevated, as in summer.

- 50 The emulsion applied to the paper is plastic and is readily displaced by the type of a typewriter, leaving a network of fibers of

the paper through which ink readily penetrates. The surface where the stencil characters are not formed is impervious to, and is practically insoluble in, all forms of ink and most solvents to which the sheet would be apt to be subjected.

70 The emulsion composition, when applied by the flotation method, has the peculiar property of depositing a coating of waxy particles, mainly on the surface of the paper, which do not penetrate through or to the opposite side, or to any material extent into the body of the paper, but which are retained by a matrix of gelatin on and near the surface. It has been found that better results are attained in stenciling by localizing the composition on the surface than by permitting the composition to disseminate through the paper.

75 When it is desired to produce a stencil sheet of greater strength, it is found preferable to locate the coating between two sheets and in this case the emulsion may be made slightly thinner with a view of reducing the thickness of the plastic coating. This form of stencil sheet has the additional advantage of protecting both sides of the coating and of interposing between the coating and the type-characters a protecting layer of fiber which enables the type to present clean faces after prolonged use.

80 It is to be understood that the proportions given above may be varied within quite wide limits. For instance, to increase the hardness, the carnauba wax may be increased or even replace the ceresin. Toughness may be varied by varying the proportions of gelatin and potassium dichromate. In lieu of potassium dichromate, other toughening agents may be substituted, such as formaldehyde. While we prefer to use and do use a toughening agent, it is to be understood that it may be omitted without sacrificing all the advantages of our invention.

85 Instead of carbon tetrachlorid, other volatile solvents may be used, such as xylol, chloroform, benzin, or the like, but the ingredients named in the formula are preferred.

90 What is claimed is:—

1. A bath for making stencil sheets consisting of lanolin and a hard wax dissolved in a volatile solvent and held in emulsified condition in a toughened gelatinous medium.

2. A bath for making stencil sheets consisting of lanolin, ceresin and carnauba wax dissolved in carbon tetrachlorid and held in emulsified condition by a solution of gelatin in water and glycerin to which potassium dichromate has been added.

3. A stencil sheet consisting of a fibrous, porous sheet provided with a stencil composition containing a mixture of lanolin and hard wax held in divided state in a toughened gelatinous matrix.

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4. A stencil sheet consisting of a fibrous, porous sheet provided with a stencil composition containing a mixture of lanolin, ceresin, and carnauba wax held in divided state in a gelatinous matrix to which potassium dichromate has been added.

5. A stencil sheet consisting of a fibrous porous sheet provided with a stencil composition containing emulsified wax and lanolin in a gelatin matrix containing water, glycerin and a toughening agent.

6. A stencil sheet consisting of a fibrous porous sheet provided with a stencil composition containing emulsified ceresin, carnauba wax, and lanolin in a gelatin matrix containing water and glycerin and a toughening agent.

7. A stencil sheet consisting of a fibrous porous sheet provided with a stencil composition containing a mixture of lanolin, ceresin and carnauba wax held in divided state in a matrix consisting of gelatin, glycerin and

water to which potassium dichromate has been added.

8. A compound stencil sheet consisting of fibrous porous sheets cemented together by a mixture of hard wax and lanolin containing water and glycerin, held in divided state by a toughened gelatinous matrix.

9. A compound stencil sheet consisting of fibrous porous sheets cemented together by a stencil composition consisting of emulsified ceresin, carnauba wax and lanolin holding water and glycerin, the emulsified particles being held in a toughened gelatinous matrix.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

JAMES A. BAILEY.

HENRY E. KALUSOWSKI.

Witnesses:

R. C. FITZHUGH,

S. L. STRUBLE.