

UNITED STATES PATENT OFFICE.

EDWARD THOMAS, OF NEW YORK, N. Y.

STENCIL-PAPER AND COMPOUNDS AND METHOD FOR MAKING THEM.

1,293,983.

Specification of Letters Patent.

Patented Feb. 11, 1919.

No Drawing.

Application filed July 2, 1912. Serial No. 707,254.

To all whom it may concern:

Be it known that I, EDWARD THOMAS, a citizen of the United States, and resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Stencil-Paper and Compounds and Methods for Making Them, of which the following is a specification.

My invention relates to fabric and paper, especially stencil paper, and to the compositions used in making it and methods of preparing said compositions and paper. The stencil paper referred to is that used in so-called mimeographs, duplicators, neostyles and machines for performing similar operations. For use in such machines a stencil design is written on the stencil paper and then ink is applied to the back of this, while the face is lying on or rolling over an impression sheet. The ink passes through the parts written on and makes a copy on the impression paper. In some machines the paper is stretched over an inked pad, in others an inked roller is used.

The paper for this purpose must have a body impervious to ink, but the parts written on must allow precisely the right amount of ink to pass through to give a full, yet clean, impression, and the paper where so written on must be strong enough to hold the centers of letters like the letter "o" permanently in position. One great desideratum of such stencil paper is that it may be written on by a typewriter in the simplest manner possible.

Such stencil paper as hitherto made, usually has had a wax surface which either was easily cracked so that ink would leak through, or else was so soft as to stick together or to other things and become ruined in hot weather. The paper too has usually been easily torn, and when a stencil was to be written in a typewriting machine, a special backing had to be employed either to absorb expelled wax, or to insure the complete expulsion of the wax or to prevent the paper from being cut. Sometimes too, a facing had to be used so that the type would not strike directly on the wax face. Also special inks have had to be used because some inks ruined the surface of the stencil sheet.

My invention is directed to minimizing or overcoming completely these difficulties. For the fabric body of my paper I prefer-

ably use a Japanese paper called Yoshino paper, which the unskilled would call Japanese napkin paper. This appears to be a long fibered unsized tissue paper. This I coat or impregnate with a waxy substance which unlike most waxes has great flexibility and comparatively great tensile strength. Such a substance can be prepared from a number of substances such as a mixture of ceresin and oleate of aluminum. White ceresin is a wax resembling paraffin wax though softer yet with a higher melting point. Oleate of aluminum is commercially a straw colored, putty like substance at all ordinary temperatures. It does not melt at the boiling point of water. A mixture of these two in certain proportions, at the room temperature has much of the consistency of plastic rubber erasers. Paper coated or impregnated with this is stronger than the untreated paper and even though it contains but a small percentage of oleate of aluminum it can be folded without breaking or cracking unless smoothed down.

With the above and other objects in view, my invention and some of its applications and improvements are described in detail below as applied in specific instances.

To make my wax composition I melt one ounce of white ceresin in a water bath, and to this add one fourth ounce of oleate of aluminum which may be in one lump. If now the wax and oleate are stirred and kept at the temperature of boiling water, after say 10 minutes the mixture becomes thick. When the oleate of aluminum is entirely incorporated with the molten wax I add another ounce of wax and stir this in while hot till the mixture is uniform. Apparently a little water in the wax during these processes is beneficial. Apparently the wax dissolves in the oleate, rather than the oleate in the wax, though of this I can not make certain.

The mixture or composition with both portions of wax is still too thick and viscous to spread on paper, but I have found that if I now add one sixteenth or one twentieth ounce of wool wax to this, the mixture is much thinned and then if an ounce of water is added and stirred in the resulting emulsion will be easily applied to paper. This I preferably do by drawing Yoshino paper over the top of the hot emulsion, and then over a straight edge or doctor as the paper rises from the wax. This leaves a thin coat-

ing of wax composition which partly impregnates the paper apparently, but mostly lies on one side. This paper will harden almost at once in ordinary temperatures and may be laid on a marble slab to cool. Paper prepared in this way has one face thoroughly waxed and the other less so. In writing stencils on such paper I believe the smooth waxy side should be next the platen of the typewriter. So far as I have found all aluminum-oleate-ceresin paper differs on the two sides and the wax lies apparently on the surface of the paper base. Apparently this greatly increases its flexibility.

After a few hours the water will have evaporated from the paper, and then if placed in a typewriter and written on in the ordinary manner (except without any ribbon between the type and paper), it will make an excellent stencil. Usually it seems to require no backing or facing sheet. The paper after being written on may be placed in a duplicator and used in the ordinary manner.

The wool wax is a special form of dégras recovered from the washings of wool and is the basis of lanolin ointment. Oleate of aluminum may be prepared from red oil (crude oleic acid) by saponifying with caustic soda, and then precipitating by pouring a solution of the soda soap into a solution of sulfate of aluminum. Oleate of aluminum gives the ceresin a curious molasses like consistency when hot, and the wax containing it when melted may be drawn out in long threads.

A similar product can be made with paraffin wax, but it is less flexible and requires more oleate to give the same apparent viscosity. The wool wax is also an article that gives long strings when drawn out melted, but when mixed as above described it seems to have a shortening effect, that is to say, it renders the wax less stringy, with the result that the letters of the stencil are clearer cut. I find I can make a stencil paper without the wool wax by thinning my mixture of ceresin and oleate of aluminum with ceresin till it contains only five per cent. or even less of the oleate, but the stencil paper made by saturating Yoshino paper with this has some tendency to occasionally be cut through by the type of a typewriter. I have also used paraffin to thin my ceresin mixture, or even paraffin alone with oleate of aluminum, but such paper, though making a good stencil as far as the writing goes, usually has a great tendency to crack when bent compared with the paper first described. This paraffin combination is however, more flexible and tougher than that now on the market.

I have also used wool wax both with ceresin and with paraffin, but without the oleate of aluminum this lacks the wonderful

flexibility of the oleate paper. An emulsion of wool wax and paraffin wax gives a very flexible stencil, and the wax of this lies apparently mostly or entirely on the surface of the paper. A few per cent. of wool wax is sufficient to give the necessary effect. Sometimes a little alkaline substance may be necessary to give a good emulsion if oleate of aluminum is not used. This paper is less sticky than that now on the market.

I have no doubt that other waxes and substances may be substituted for the various articles described above, but there are some which must be avoided. Stearic acid, for example, will not mix directly with oleate of aluminum under ordinary circumstances. I have found that if the papers above described containing oleate of aluminum have a tendency to stack together they will keep perfectly clear if separated by a layer of stearic acid. I have found that paper coated with stearic acid even largely adulterated will fulfil the above requirement in separating the stencil paper, and probably equally the result can be obtained by giving each stencil sheet a coat of stearic acid on one or both sides. Then it would be safe to ship the sheets in large piles to hot climates. It should be noted that some chemists believe that wool wax is seriously injured by being heated to the boiling point, I therefore prefer to heat my mixtures containing it to not over 200 F.

While I am aware that many modifications and equivalents may be employed in the use and making of the stencil paper and the coating compositions, I have given what I believe to be the best method of making and using my invention, and I have given the above directions only to enable those skilled in the art to appreciate the valuable points.

What I claim as my invention is.

1. In stencil material, the combination of oleate of aluminum with a waxy substance.

2. The combination with Yoshino paper, of a composition coating thereon comprising wax and a soap formed from the combination of an organic acid with a base, said soap being softer at ordinary temperatures than the wax and non-melting at temperatures above the melting point of the wax.

3. A composition of matter comprising a waxy substance and less than fifteen per cent. as much oleates including oleate of aluminum and substantially free from other oleates than oleate of aluminum.

4. The combination with Yoshino paper of a waxy substance and oleate of aluminum.

5. The combination with a fibrous base of ceresin and a much smaller quantity of oleate of aluminum.

6. The combination with a fibrous base,

of ceresin, a viscosity adding substance and a shortening substance.

7. The combination with a fibrous base of a mineral wax and less than fifteen per cent.

5 of oleate of aluminum mixed with the wax.

8. A composition of matter comprising a small amount of oleate of aluminum, mixed with a very much larger quantity of a wax and water.

10 9. The step in the process of coating paper which consists in making a mixture of a relatively large quantity of oleate of aluminum and a wax, and then thinning the mixture with more wax.

15 10. A composition of matter comprising about a hundred parts of ceresin, twelve parts of oleate of aluminum and four parts of wool wax.

11. The process of dissolving oleate of

aluminum which consists in making a thick 20 hot mixture of it and a solvent and then thinning with more of its solvent.

12. The combination with a surface comprising oleate of aluminum of a layer comprising stearic acid. 25

13. The combination with Yoshino paper, of a coating thereon comprising ceresin mixed with a small percentage of oleate of aluminum.

14. The combination with a fibrous ma- 30 terial having a waxy coating thereon, comprising oleate of aluminum, of a layer comprising stearic acid facing said waxy coating.

EDWARD THOMAS.

Witnesses:

F. GRANVILLE MUNSON,
AGNES K. MUNSON.