Nov. 9, 1943. A. M. ALTMAN ET AL 2,333,624

ART OF STENCILIZATION

Filed Sept. 3, 1940

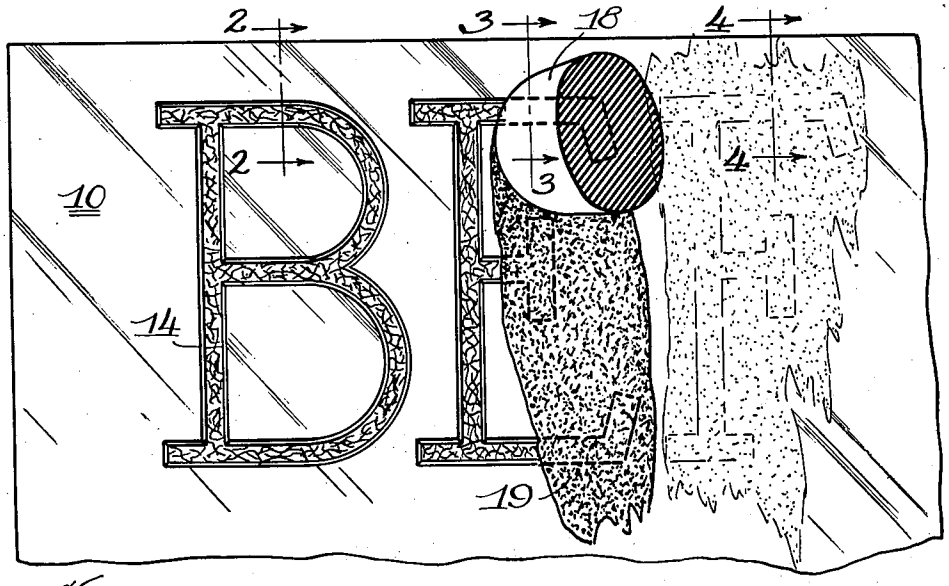


Fig. 1

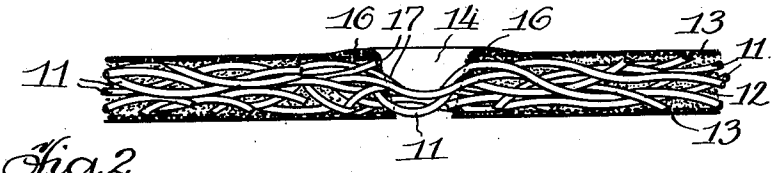


Fig. 2

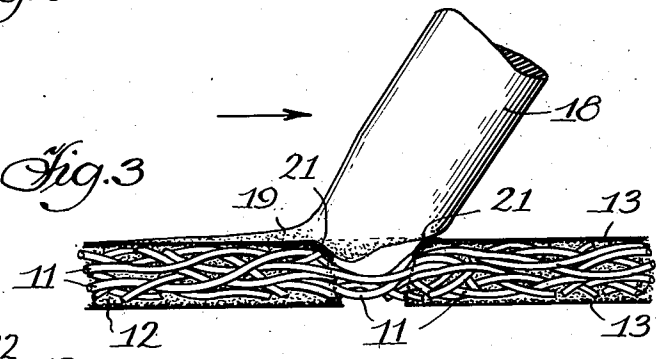


Fig. 3

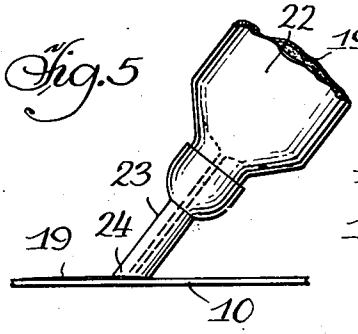


Fig. 5

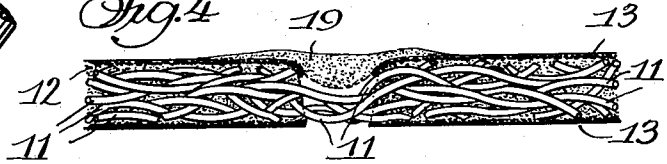


Fig. 4

INVENTOR.
Ardell M. Altman
and Everett J. Shaw.
Denis A. Wright Atty.

Patented Nov. 9, 1943 2,333,624

UNITED STATES PATENT OFFICE

2,333,624

ART OF STENCILIZATION

Ardell M. Altman, Chicago, and Everett J. Shaw, Western Springs, Ill., assignors to A. B. Dick Company, Chicago, Ill., a corporation of Illinois

Application September 3, 1940, Serial No. 355,142

2 Claims. (Cl. 101—127)

This invention relates to the art of stencilization and more particularly to the correction or other alteration of letters, characters, figures, or other indicia or images, which have been stencilized in duplicating stencils.

Stencil sheets adapted for conversion into duplicating stencils, as now widely used in the art, comprise a support or base sheet coated or impregnated with a suitable mass which is impervious to duplicating ink and which may be removed from desired areas of the sheet, by the process of stencilization, to permit the passage of the ink through such predetermined areas. The base sheet usually consists of a thin, foraminous, highly permeable material, such as the well-known Japanese yoshino paper. The coating mass consists in general of any suitable material which is impervious to ink, such as fatty or oily material, with suitable modifiers integrated or held together by a film-forming material, such as cellulose nitrate or gelatin, combined with suitable tempering agents. The stencil coating mass may be compounded with reference to the expected use; for example, to the process by which the stencil is to be stencilized, and as the structure of duplicating stencil sheets and the composition of their coatings are well known in the art, and as such composition forms no part of the present invention, further description thereof is deemed unnecessary.

Stencilization of stencil sheets may be effected in various ways, of which the best known and most commonly used is pressure stencilization, as by the impact of type or by a stylus, in which the impressible coating mass is expressed by the pressure of the instrument used, from the desired areas of the stencil. The present invention has been described by way of example in connection with a stencil made by this method of stencilization, but it is to be understood that stencilization may be effected in different ways, as by heat, by chemical or photochemical action, and others, and this invention is not to be limited to the correction or alteration of images which have been stencilized by pressure, but is adapted for use with any duplicating stencil, however made and stencilized.

As now commonly practiced, the correction or alteration of matter stencilized in stencil sheets is effected by the application of correction fluids, which consist in general of ink-impervious materials dissolved in volatile solvents. To correct or change a character which has been stencilized in a stencil with a typewriter, for example, it is necessary to first burnish with a suitable blunt instrument that area of the stencil occupied by the character to be changed, so as to partially close the stencilized opening with stencil-coating mass which was expressed from the area during the stencilization. After such burnishing, one or more drops or blobs of correction fluid are applied to the area, as by means of a brush, and are permitted to dry thereon by evaporation of the solvent. The original stencilized opening is thus closed by the material deposited from the correction fluid solution and the corrected character may then be typed in the space which is so filled.

This method of closing stencilized openings by means of correction fluid is subject to various disadvantages and annoyances. It requires the handling of a sticky liquid and is difficult, tedious and slow in application. Correction fluid solvents are always volatile so that they tend to thicken and dry out before use, and are usually inflammable and a potential fire hazard. Moreover, the relatively thin solvent frequently attacks the stencil coating, penetrates the stencil sheet at the area of the stencilization to be corrected, and carries through sufficient correction material and dissolved stencil material to permit the stencil sheet to stick to its backing, causing damage to and loss of the stencil sheet, and considerable annoyance.

The principal object of the present invention is to provide improved means for the alteration and correction of duplicating stencils in which the above-mentioned disadvantages of correction fluid are obviated, and by which superior corrections may be made with greater ease and in much less time. Other objects of the invention will appear from the following description taken in connection with the drawing, which forms a part of this specification, and in which:

Fig. 1 is a plan view of a duplicating stencil showing the method of obliterating or filling in a stencilized opening.

Figs. 2, 3 and 4 are fragmentary sectional views taken substantially on the lines 2—2, 3—3, and 4—4 of Fig. 1 respectively.

Fig. 5 is a view in elevation showing another means of applying the correction material.

The invention contemplates broadly the closing or filling of stencilized openings in duplicating stencils by solid or semi-solid correction material, to be deposited in the openings at the desired areas by mechanical pressure. Thus, the correction material may be in the form of a stick or pencil of suitable ink-impervious material, sufficiently solid to retain its form in handling and in use, but sufficiently soft so that it may be

squeezed into the openings which are to be closed by the pressure of application. Or the correction material may be extruded from a suitable container into position on the stencil and then spread, and squeezed by the pressure of spreading, into the stencilized opening to be closed.

The improved method may be clearly understood by reference to the drawing, of which 10 indicates generally a conventional type-impressible stencil sheet having a fibrous base sheet 11 of yoshino or similar material impregnated with a soft type or stylus-impressible, ink-impervious coating mass 12 of any well-known composition. The coating 12 completely envelops the base sheet 11 forming clear coated surfaces 13 on each side thereof, the mass on the side from which the coating was applied being somewhat thicker than that on the other side, as is well known.

At 14 is shown a type-stencilized opening in the form of the letter B, indicating the manner in which the coating material 12 is expressed by the blow of the type (not shown) from the base sheet, being pushed aside and piled up at the edges of the opening, as at 16, to expose the fibers 11. These fibers, as indicated at 17 in Fig. 2, are bent down by the impact of the type and some of them may be broken off, but these bared fibers serve to retain the centers of the loop letters in their proper position with respect to the stencil sheet without offering any material resistance to the passage of ink through the stencilized opening.

The closing or filling in of such a stencilized opening by means of the plastic correction material of this invention is also indicated in the central portion of Fig. 1 and in Fig. 3, in which 18 indicates the stick or pencil of correction material which is drawn over the stencilized opening, shown in the form of the letter E, in contact with the upper surface 13 of the stencil, being held in firm contact therewith as will be readily understood. The correction material 19 wiped off the soft, semi-solid pencil 18 by the pressure of contact is spread in the form of a relatively thin film across the surface 13 of the stencil sheet. The action at the point where the pencil 18 crosses a stencilized opening is clearly shown in Fig. 3. The ridge or mound of extruded stencil coating mass 16 at the edges of the opening is to some extent wiped laterally and downwardly into the stencilized opening, as at 21, in advance of the correction material 19 which is also forced downwardly by a component of the pressure to fill and close the upper part of the stencilized opening.

A filled or obliterated correction of the letter F is shown at the right-hand side of Fig. 1 and in Fig. 3, the stencilized opening being entirely closed by the correction material 19 and the adjacent area being covered by a thin film of this material deposited from the pencil 18 in the course of application.

Another means of applying the correction material of this invention to close a stencilized opening is illustrated somewhat diagrammatically in Fig. 5, in which the plastic material 19 is extruded from any convenient container, such as a collapsible tube 22 provided with a nozzle 23 and a suitable spreading member 24. By this device a small quantity of the material can be deposited from the nozzle 22 in position on the stencil over the opening to be closed and then spread by the member 23 across said opening, being forced into and filling the opening by the spreading pressure, as will be readily understood.

The correction material of the pencil 18 may be of any composition which possesses the desired characteristics. It must be impervious to and insoluble in the duplicating ink which is to be used in connection with the stencil to be corrected or altered, and must not affect the stencil coating mass. It should have sufficient mechanical strength and coherence to permit forming in the shape of a rod or pencil and maintaining its form in handling and use. It should be sufficiently soft and plastic to flow readily and smoothly under the pressure of application into the stencilized openings, and to spread evenly into a thin film on the surface of the stencil sheet without scratching or tearing.

Compositions possessing these characteristics may be made from various film-forming substances when properly plasticized and combined with suitable filling material, preferably of an oily or waxy nature, and with lubricants. As an example of a satisfactory correction mass, the following composition has given good results, the proportions being expressed in parts by weight:

Example I

Stearic acid	29
Ethyl cellulose	16
Stearin	15
Primex (hydrogenated cotton seed oil)	12
Oildag (graphited mineral oil)	15
Castordag (graphited castor oil)	15

In this example, the cellulose ether is an ink-impervious film-forming material dissolved in and plasticized by the stearic acid. The stearin (glycerol stearate) is a fatty substance soluble in stearic acid which acts as a modifier, distender and softener for the mass, while the Primex is a fatty substance which also acts as a modifier for the cellulose binder, and which, as a lubricant, cooperates with the graphited oils to prevent tearing of the stencil. The castordag also acts as a modifier for the ethyl cellulose.

A correction material of somewhat harder composition well adapted to the alteration of fine lines, may be compounded as follows:

Example II

Ethyl cellulose	16
Stearic acid	20
Castordag	20
Ketone wax (phenoxyphenyl heptadecyl ketone)	20
Triphenyl phosphate	6

Various materials may be used to form these semi-solid correction masses. Thus benzyl cellulose may be substituted for ethyl cellulose in the formulae given, and the esters of cellulose, cellulose nitrate and cellulose acetate, may also be used to form satisfactory compositions, as follows:

Example III

Stearic acid	35
Benzyl cellulose	20
Carnauba	5
Petrolatum	10
Oildag	20
Tricresyl phosphate	10

Example IV

Nitrocellulose (6 second)	16
Camphor	20
Castordag	20
Tricresyl phosphate	10
Dibutyl phthalate	20

While the cellulose ethers are preferred as binders, the invention is not limited to cellulosic substances, since we have found that other well-known film-forming materials, when properly plasticized, give good results. For example, the substance known as Tornesit, which is chlorinated rubber, plasticized with substances such as the glycol ethers or the chlorinated diphenyls, and combined with suitable waxes, makes a useful correction material. We may mention other suitable film-forming materials, as: Zein (a vegetable protein derived from corn), Pliowax (a mixture of paraffin with Pliolite resin which is rubber reacted with stannic chloride), polyvinyl alcohol and the cumarone-indene resins. The following examples are by way of illustration:

Example V

Tornesit (20 C. P. s.)	6
Butyl carbitol acetate	10
Carnauba wax	22
Halowax	36

(Butyl carbitol is a mono butyl ether of diethylene glycol and Halowax is chlorinated naphthalene).

Example VI

Zein	5
Carbitol (mono ethyl ether of diethyleneglycol)	10
Stearic acid	40

Example VII

Pliowax	30
Stearic acid	30
Dark green petrolatum	12
Primex	12
Mineral oil	30
Carnauba wax	90

Example VIII

Polyvinyl alcohol (491)	10
RH 539 plasticizer	10
Urea	20
Sorbitol laurate	10
Glycerine	5

RH 539 plasticizer is ethanol acetamid.

Example IX

Neville resin R6	10
Dark green petrolatum	32
Castordag	20
Paraffin	8
Carnauba wax	30

(Neville resin R6 is a substance known as Nevindene, which is a cumarone-indene resin.)

In general, any film forming substance compatible with the stencil coating mass and impervious to the duplicating ink, and which is soluble in or miscible with the plasticizer and capable of producing the proper consistency may be combined with suitable filling material to form a correction mass in accordance with our invention.

These binders may be plasticized with a number of substances which are adapted to keep the mass sufficiently soft and ductile. For example, tributyl citrate, ethyl tartarate, benzyl benzoate, diamyl or dibutyl phthalate, tricresyl phosphate, or hydrogenated methyl abietate may be substituted for the triphenyl phosphate of Example II with excellent results. Most of the non-volatile organic esters are suitable as plasticizers for the cellulose ethers and cellulose esters which are preferred as binders for the correction mass, and in general, any substance is suitable as a plasticizer for any particular binder if it forms therewith a compound of the proper density and plasticity, neutral to the stencil coating and impervious to the ink.

A wide range of materials of fatty or waxy nature, which have the desired consistency and which are miscible with the other elements of the mass are also suitable as fillers and lubricants. Thus, a number of natural and synthetic waxes may be used in place of or together with the stearic acid and stearin of the formulae given, such as Japan wax, bees wax, candelilla wax and carnauba wax. Also useful is the material known commercially as Stenol, which is a mixture of high molecular-weight alcohols, Opal wax which is hydrogenated castor oil, and, in limited quantities, paraffin. Paraffin, however, not being fully compatible with ethyl or benzyl cellulose must be used in limited quantities, e. g., below 25%. Other materials, such as the product known commercially as Impervium (made by Impervious Products Company of Wyandotte, Michigan) and the micro-crystalline waxes made by the Socony-Vacuum Oil Company of New York, New York, the chemical composition of which are not known to us, are readily incorporated in the mass, and have the advantage of being more compatible with the cellulose ethers.

It will be understood that any suitable coloring matter may be added to the mass in accordance with the color of the stencil sheet to be corrected in order to improve by contrast the visibility of the operation.

What we claim is:

1. A stencil correction material including a cellulose ether, a non-volatile solvent and plasticizer for said cellulose ether, a soft semi-solid filler, and a lubricant.

2. A plastic semi-solid correction material adapted to flow into and close stencilized openings in duplicating stencils in response to pressure, comprising a cellulose binder dissolved in and plasticized by stearic acid, a filler of waxy material and a lubricant.

ARDELL M. ALTMAN.
EVERETT J. SHAW.