UNITED STATES PATENT OFFICE.

JOSEPH JULIUS SACHS, OF BARROW-IN-FURNESS, COUNTY OF LANCASTER, ASSIGNOR OF ONE-HALF TO WILLIAM MATHER, OF MANCHESTER, ENGLAND.

PRINTING-SURFACE.

SPECIFICATION forming part of Letters Patent No. 243,306, dated June 21, 1881.

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To all whom it may concern:

Be it known that I, JOSEPH JULIUS SACHS, of Barrow-in-Furness, in the county of Lancaster, England, have invented Improvements in Printing-Surfaces, of which the following is a specification.

This invention relates to the use, as printing surfaces or media for printing upon fabrics and other materials, of open or figured, woven, knitted, embroidered, crocheted, or other similar fabrics, prepared in the manner hereinafter described; also, to the use of such prepared fabrics for obtaining casts or impressions for printing or other purposes, embossing in colors, stenciling, and engraving; also, to the application of such prepared fabrics or materials to decorative and other useful purposes.

This invention has for its object the obtaining of the desired patterns from the fabrics themselves, in or on which the pattern is formed by weaving, knitting, crocheting, embroidering, or similar manner.

In preparing such fabrics according to this invention various means may be employed; but the method next hereinafter described is preferred as having been found most suitable in practice. The fabric is coated or covered, either wholly or partly, on one or both surfaces, with a film or layer of metal or metals by galvanic agency, by what is known as the "electrotype process." This operation may be conveniently performed by first coating the fabric with black lead or other conducting substance, and then immersing the fabric thus treated in a galvanic bath, so as to receive a film or layer of metal, or into two or more galvanic baths in succession, so as to receive a series of layers of different metals. Or, in lieu of employing a galvanic bath, a metallic coating may be produced upon the fabrics by chemical agency, in the following manner: The fabric may be steeped in or impregnated with acetate of lead, (for example,) or other well-known metallic substance, and then treated with an acid, such, for example, as sulphurous acid, or sulphuric acid, or with a salt, or with other chemical substances, such, for example, as hyposulphide of soda, which will fix the metallic substance previously applied. Or, in lieu of employing metallic substances, other substances may be used in or for the preparation of the fabrics. Good results may be obtained by the use of chrome-gelatine or similar substances or solutions; or the fabric may be tanned, and the fabric may, in either of these cases, be subsequently painted or varnished, if desired, for which purpose any suitable paint or varnish may be used—as, for example, white lead dissolved in oil, linseed-oil, dissolved shellac, and the like. As a substitute for the methods hereinbefore referred to it is found sometimes advantageous to coat the fabric with gelatine, and then to immerse such fabric in or treat it with tannic acid, chromic acid, or other suitable acid.

Another means of preparing the said fabrics consists in covering the same with chrome-gelatine or albumen, and then reproducing thereon, by the action of light, the pattern of any required fabric, the portions of the coating acted upon by the light being rendered more or less insoluble, so as to admit of the soluble portions being washed off or removed, leaving a surface which is a fac-simile of the original pattern, and may be galvanized, as before, or used without any preparation, if desired.

According to the method lastly hereinbefore described the reproduction of the original pattern is effected simply by the passage of light therethrough. When, however, the usual photographic apparatus is employed, the reproduced design may either be the same size as the original design or enlarged or reduced, as required.

When the fabrics prepared by one of the means hereinbefore described are employed as printing-surfaces or printing media they may be charged with color or other matter by the aid of rollers, brushes, color-boxes, or other suitable means, and may be brought into contact with the surface to be printed in any convenient manner. For example, when a prepared close-figured fabric is used as the printing surface or medium the color or other matter is applied to such surface or medium, and the fabric or material to be printed being

brought into contact therewith, the figure of the printing surface or medium is printed upon the fabric or material. When a prepared open fabric is used as the printing surface or medium, the color or other matter is either applied to the same and the pattern reproduced by pressure upon the fabric or material to be printed, or such color or other matter is supplied through the interstices of the open fabric, whereby a counterpart pattern is reproduced upon the fabric or material to be printed. The prepared fabrics forming the printing surfaces or media may be arranged around a roller or on a platen; or they may be formed into endless webs, and means are provided for printing upon two sides of a fabric or material, or upon two or more pieces of fabric or material simultaneously.

In all cases the colors or matters to be printed may be brought into contact with the printing-surfaces either directly or indirectly—that is to say, the rollers or devices receiving color from the color-reservoirs may either apply the same to the printing-surface directly or through the intervention of an intermediate roller or device.

If desired, different patterns in the same or various colors may be printed upon a plain fabric or material, or upon any desired ground. The fabric or material may also be printed with mordants and afterward dyed, or discharging matters may be printed upon the dyed or printed material.

When open-work printed surfaces are employed a pile of pieces of fabric or material may be printed simultaneously, the pile being secured in clamps or frames, with the printing surface or pattern either above or below, or both above and below, the same, and the color or other matter is forced through the whole, either by inducing a vacuum on the opposite side to that at which the color-reservoir is situate, or by air-pressure, as will be well understood.

When the prepared fabrics are used for embossing, either plain or in colors, they may be heated by gas or other convenient means.

From the prepared fabrics casts or impressions may be taken by the electrotype or other process, and such casts or impressions may be used either for printing purposes or otherwise. For example, the prepared fabric may be placed around a roller and a hollow cast, in gypsum or india-rubber, taken from the same, the said cast bearing the impression of the roller fabric upon its interior. From the interior of this gypsum or india-rubber cast may then be taken a cast by the electrotype process, which cast will thus bear on its exterior a fac-simile of the pattern on the original roller, and may be used as the printing-roller.

When it is required to print a concentric design in a number of colors the following method may be adopted: A figured fabric is prepared by one of the means hereinbefore described, and, if necessary, secured to a flat surface. A cast is then taken therefrom by the electrotype process, and from this electro-cast or stereotype is taken a cast in gypsum, (for example.) The latter cast having been allowed to dry and shrink, so as to reduce the scale of the pattern, it is made conducting in the manner hereinbefore described and galvanized, and a gypsum cast (for example) is taken therefrom, which, when dry and contracted, may be used for the preparation of another stereotype, as before, and so on in succession, according to the number of copies of a graduated scale that are required. These several stereotypes may then be used for printing in separate colors, the one over the other, in succession, thus producing a pattern which is formed of a concentric series of similar outlines filled in with different colors. This method of obtaining a series of impressions of a gradually reducing scale may also be employed when it is not required to print in multiple colors, and a similar result may be obtained by weaving or otherwise forming a series of printing-surfaces adapted the one to the other, and which (after having been prepared by one of the means hereinbefore indicated) may be used for printing separate colors, after the manner of calico-printing.

When prepared open-work fabrics are employed they may be applied to stenciling or engraving—as, for example, by the employment of means analogous to what is known as the "sand-blast," as will be well understood.

The prepared open-work fabric can be used in the ornamentation of fabrics or materials for curtains and other purpose in the following way: The fabric or material to be ornamented is printed from lace or other open-worked or figured fabric with any suitable adhesive substance, and into contact with the surface thus prepared is brought sawdust, dyed or otherwise, gold or silver powder, or any other suitable powder or fibrous material, which is thus caused to adhere to the adhesive surface and impart to the fabric or material a highly ornamental appearance.

Having now fully described the invention, and the manner of carrying the same into effect, I would observe, in conclusion, that I do not intend to include as part of the said invention the preparation of open-work fabrics for printing by treating them with solutions of rubber or by paint or varnish directly applied, which treatment has not the same advantages as the preparation with a metallic deposit or the described substitutes; but

What I do claim, and desire to secure by Letters Patent, is—

1. A printing-surface, or medium for the production of printing-surfaces, consisting of a fabric having the desired pattern formed therein or thereon, by weaving, crocheting, embroidering, or knitting, or in a similar manner,

prepared with a metallic deposit, or equivalent, substantially as described.

2. A printing-surface of open-work fabric prepared with a metallic deposit or equivalent, as set forth, the said fabric being adapted to be used for printing upon fabrics and other materials by transfer, or as a stencil, or both, substantially as described.

In witness whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH JULIUS SACHS.

Witnesses:

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