

UNITED STATES PATENT OFFICE.

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METHOD OF AND MEANS FOR OBTAINING COPIES OF PRINTED OR WRITTEN MATTER.

SPECIFICATION forming part of Letters Patent No. 584,442, dated June 15, 1897.

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To all whom it may concern:

Be it known that I, WILLIAM MOSES WILLIAMS, a subject of the Queen of England, residing at Middlesborough, in the county of York, England, have invented certain new and useful Improvements in or Relating to the Method and Means of Obtaining Facsimile Copies of Typed, Written, or Similar Matter, of which the following is a specification.

The object of this invention is to produce copies of typed, written, or manuscript matter in quantity without the necessity of using a stencil, without inking in the manner usual at present, and without drying the ink of the copies. In order to produce this result, I prefer to employ three kinds of sheet.

First. A sheet coated with a vehicle—such as a mixture of gelatin, glycerin, and water, or some other jelly-like or viscous medium—with which is incorporated a suitable anilin or other dye. For example, the vehicle on this sheet may be composed of one part, by measure, of a solution of gelatin (eight ounces of gelatin to thirteen ounces of water) added to four and a half parts, by measure, of glycerin, this gelatin and glycerin mixture being boiled together until it loses the property of cooling solid and then being supplemented by one part more of gelatin, added hot. In this vehicle the dye is dissolved in a quantity dependent on its character and the intensity of color desired.

Second. A sheet of paper coated with the persulfate of iron or with the double sulfate of iron and ammonium alum (say, commercial "iron alum") or some other substance possessing the property of rendering the surface of the gelatin or jelly-like sheet impervious or less than usually pervious to the anilin color within it when brought in contact with it for a few seconds. The coating for this Sheet No. 2 may be obtained by making a saturated solution of commercial iron alum in cold water, preferably, but not necessarily, with the addition of a little sugar.

Third. A sheet of tissue-paper coated with a substance, such as hereinafter specified, having the property of neutralizing the hardening effect or tendency of the alum or other substance on the gelatin or jelly and of softening the surface of the gelatinous sheet, so

as to allow the dye contained in the last-mentioned sheet to give impressions of the paper if pressed on the surface. This tissue sheet must also have the property of yielding some of its coating to Sheet No. 2 when the surfaces of the two sheets are placed face to face, and an impression or inscription is made on the tissue-paper either with a type-writer or by means of a style, a corresponding impression from the coating of Sheet No. 3 being transferred onto Sheet No. 2. The coating of Sheet No. 3 may consist of various combinations, such as a thin film of the best soft soap dissolved in methylated spirit, or of common soap with or without a suitable acid, such as tartaric acid or phosphoric acid, (syrup,) added to soap which has been dissolved in an alcoholic solution of caustic potash. This latter solution of caustic potash with or without tartaric or phosphoric acid may, if desired, be added to the ingredients of the film aforesaid. There should preferably be a suitable dye in this coating to render an impression therefrom readily visible.

The required impression having been made on No. 2 sheet in the form of coating material transferred from No. 3 sheet the former (No. 2) sheet is placed in contact with No. 1 sheet for a few seconds and, if necessary, dampened on the back with methylated spirit while there. The latter is then removed. The parts of the gelatin or jelly-like or viscous sheet not acted upon by the persulfate of iron or the double sulfate of iron and ammonium alum or other hardening agent thus acquire the property of giving impressions to sheets of ordinary paper pressed on them, all parts of the surface except the writing having been rendered sufficiently impervious to the coloring-matter to prevent it from coming through them during the short period the operation occupies. The methylated spirit will probably not be needed unless very dark copies are required.

It will be understood that modifications may be made without departing from the spirit of my invention. For example, Sheet No. 1 may have its surface hardened in advance by incorporating the persulfate of iron or the double sulfate of iron and ammonium alum or the like with it, an ordinary sheet

of paper being substituted for No. 2; but in this case the impression from the tissue-paper received by the ordinary sheet must be stronger, or if copying is required from manuscript the original may be prepared (without No. 3 sheet) by writing on No. 2 sheet with a suitable ink—for example, a solution in methylated spirit of soft soap or a solution of an alkaline carbonate silicate or other salt or tartaric or phosphoric acid and gum, sugar, or the like. This in operation will be the equivalent of the softening medium carried on No. 3 sheet.

The medium hereinbefore referred to as employed to neutralize the hardening tendency exerted by the persulfate of iron or the double sulfate of iron and ammonium alum or the like and in addition to soften the gelatinous or jelly-like sheet need not be employed for the latter purpose in all cases. For instance, the gelatinous sheet, if not too stiff and hardened in places, as described, by a persulfate of iron or an iron alum surface carrying the record, but left in a soft condition in other parts, will not need any softening to render it fit for printing from.

If any stain or exuded patch of dye exists on the gelatinous or jelly-like or viscous sheet, (owing to excessive dampness of the atmosphere or carelessness in working,) it may be entirely removed from the sheet by laying on the latter a sheet of paper slightly damped with methylated spirit, or the gelatin sheet may be cleaned at the outset with methylated spirit.

I claim—

1. In copying apparatus of the kind described, a sheet having a coating of a solution of methylated spirit and soap.

2. In copying apparatus of the kind described, a sheet having a coating of a solution of methylated spirit and soap, said solution containing a suitable dye.

3. In copying apparatus of the kind described a sheet treated with persulfate of iron or a double sulfate of iron and ammonium alum or a like agent on which the matter to be copied is applied in a medium which will neutralize the effect of said agent upon or

soften the gelatinous viscous or jelly-like sheet.

4. In copying apparatus a gelatinous viscous or jelly-like dye-impregnated sheet of the kind described treated at or about its surface with an agent such as persulfate of iron or a double sulfate of iron and ammonium alum to decrease the normal perviousness of the gelatinous sheet for the purpose described.

5. In copying apparatus the combination with a gelatinous viscous or jelly-like dye-impregnated sheet of the kind described of a sheet on which the matter to be copied is applied in a medium which will restore the normal perviousness of the gelatinous sheet substantially as and for the purpose described.

6. An ink or writing medium of methylated spirit and soap.

7. An ink or writing medium of methylated spirit and soap, and an alcoholic solution of caustic potash.

8. An ink or writing medium of methylated spirit and soap, an alcoholic solution of caustic potash and tartaric or phosphoric acid.

9. In the art of obtaining facsimile copies of writings and the like, the herein-described process which consists in applying the writing to be copied to a sheet of paper coated with a material adapted to have a hardening action upon gelatin, and said writing being written in a medium adapted to protect gelatin from the hardening action of said hardening material, and then pressing the said sheet onto a sheet of paper containing on its surface a gelatinous substance impregnated with a dye.

10. An ink or writing medium of an alkaline carbonate, silicate, or other salt or tartaric or phosphoric acid and gum, sugar or the like for use in obtaining facsimile copies of writings and the like.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

WILLIAM MOSES WILLIAMS.

Witnesses:

JOHN W. C. LANGFIELD,
W. G. SIMPSON.