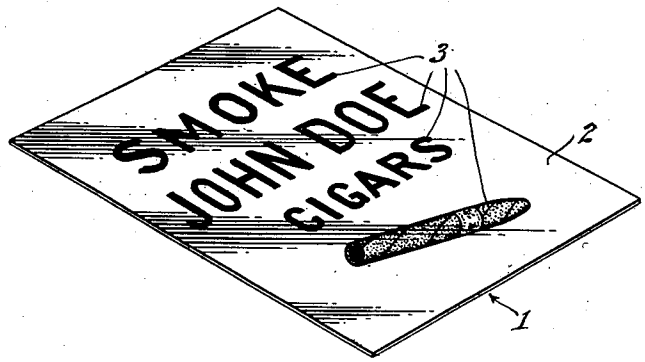
July 7, 1936. J. V. MEHL 2,046,959

ART OF PRINTING

Filed July 26, 1935



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Patented July 7, 1936

2,046,959

UNITED STATES PATENT OFFICE

2,046,959

ART OF PRINTING

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Application July 26, 1935, Serial No. 33,361

6 Claims. (Cl. 101—149)

This invention relates to improvements in the art of printing and to printing material, and has specific relation to the art of printing lithographically and to lithographing material.

Originally lithographic printing impressions were made with a special type of absorbent limestone on which the design to be printed was formed with a greasy, grease absorbent material so as to absorb the greasy lithographic ink, the non-printing portions of the stone having a coating of water thereon so as to reject the lithographic ink. However, at the present time practically all commercial lithographic printing is carried on with plates made of a suitable metal, such as zinc or aluminum. To give to the metal plate the characteristic of being able to absorb and retain moisture, the surface of the plate is grained or scored usually by means of a suitable abrasive material, marbles, and water in a graining mill.

The lithographic printing impression is formed on the grained face of the plate by any of the well known photographic methods or by the transfer method, the printing portions of the plate being coated with a greasy, grease absorbent material, such as rubbing ink, which will attract the greasy lithographic ink but will repel moisture. The plate is then wiped with a cloth, brush, sponge or roller containing water, a thin coating of the moisture forming on the metallic non-printing portions of the plate. However, the printing portions of the plate being coated with the greasy moisture repellent material will reject the water. Lithographic ink is then wiped over the face of the plate as by means of a roller, the ink adhering to the greasy printing portions of the plate but being repelled by the wet non-printing portions of the plate. An impression is then made by the plate, usually by first printing upon a blanket and then transferring the impression from the blanket to the medium to be printed.

The graining on the surface of the plate not only increases the cost of making the plate but has many disadvantages and has given rise to a great many technical difficulties. It makes it practically impossible to produce impressions having sharp well defined edges. Particular difficulty arises where half-tone printing dots are used, as the dots vary greatly in size and shape due to the fact that the graining produces a very irregular surface, the plate having innumerable raised and depressed portions of different dimensions and configurations.

Further difficulty has been experienced from the fact that air currents or improper humidity or temperature will often cause the moisture on the non-printing portions of the plate to evaporate, with the result that the non-printing portions of the plate will absorb lithographic ink from the ink roller, destroying the outline of the printing matter or design and making it impossible to print further from that plate.

It is accordingly an object of this invention to provide an improved method of printing lithographically whereby the printed impressions are made by means of an ungrained substantially smooth plate, thereby eliminating the difficulties heretofore encountered due to the graining on the plate.

Another object is to provide an improved method of printing lithographically and an improved lithographic plate coating material which will overcome the difficulties caused by evaporation of the water from the moistened non-printing portions of the plate, the plate coating material being grease repellent so as to reject the lithographic ink and being substantially unaffected by air currents or variations in temperature and humidity.

Among other objects is the provision of a satisfactory lithographic printing plate having an ungrained surface and having a lithographic printing design formed thereon.

In the accompanying drawing an ungrained lithographic plate having a lithographic printing impression formed thereon is shown.

In carrying out my improved method of printing lithographically, I first form lithographic printing matter or designs in any of the well known methods upon a plate of the usual thickness made of a suitable metal, such as aluminum or zinc, but which has an ungrained surface which is substantially smooth and polished. In the accompanying drawing the numeral 1 indicates a metal plate of this type having a smooth ungrained surface 2, on which is provided the printing matter or design 3 formed in the usual manner of a greasy, grease absorbent, water repellent material, such as rubbing ink. The printing matter or designs may be produced on the plate by any of the well known methods, such as any of the photographic methods or the transfer method, and may be of the deep etch, planographic, or any other desired type of lithographic printing design and may be formed in solid, full-lines or may be formed of half-tone dots, the important element being that the impression is formed upon an ungrained and substantially smooth metal surface.

After the printing impression has thus been formed upon the metal plate, I then wipe the surface of the plate with a tacky, grease repellent, moist, and preferably hygroscopic substance which adheres to the non-printing metallic portions of the surface of the plate, but due to its grease repellent characteristics will be rejected by the printing impression 3.

I have found that a very satisfactory coating material is a mixture of glucose, glycerine and sodium hyposulphite solution, and proportions by weight which I have found to be satisfactory, but which may be varied, are 8 ounces of glucose, 8 ounces of glycerine, and 16 ounces of 50% solution sodium hyposulphite. This mixture may be applied to the surface of the plate by means of a cloth or sponge and, as stated above, will adhere to and form a thin coating upon the non-printing metallic portions of the plate but will be rejected by the printing portions which have a greasy moisture repellent coating.

When the plate has been thus prepared it is ready to receive the lithographic ink, which is applied in the usual manner, generally with an inking roller. Where the plate is secured on the printing cylinder of a lithographic press, it will in the course of operation of the press come in contact with the inking roller which receives ink from the ink fountain.

In carrying out my process, an ink having moisture particles held in suspension therein should be employed, such as the ink shown in my Patent No. 1,958,311, consisting of an emulsion of a greasy ink, a saturated solution of sodium hyposulphite, glycerine, rubber cement and nicotine.

When the ink has been passed over the surface of the plate, as by means of an inking roller, it will adhere to the grease absorbent printing portions of the plate, but due to the coating upon the remaining portions of the plate will be rejected thereby. The printing impression may then be made either by direct lithography, i. e. from the plate directly upon the medium to be printed or by offset lithography, that is, upon a printing blanket and transferred from the printing blanket in the well known manner to the medium to be printed. If the impression is to be made directly from the plate, then the printing impression on the plate should be in reverse. On the other hand, if the printing is to be done through the medium of a blanket, the impression may be a positive one, as shown in the accompanying drawing.

I have found that from time to time between taking the impressions and applying new ink, preferably after taking each impression and before applying additional ink, it is desirable to renew the coating material upon the non-printing portions of the plate, and this may be accomplished by placing the desired mixture in the dampening fountain of the press so that a roller will apply it to the plate after each printing operation. The material thus used in renewing the coating on the plate between printing impressions is similar to the coating material and is a tacky, grease repellent, moist, hygroscopic substance, but preferably includes a small amount of stock which serves to etch or clean the non-printing portions of the plate.

A mixture that I have found operates very satisfastorily, but which may be modified, consists of the following approximate proportions by weight: 8 ounces of glucose, 8 ounces of glycerine, 110 ounces of 50% solution sodium hyposulphite, and 2 ounces of stock. Many different types of stock are at present in use and may be used in this association. I have found, however, that a stock of the following approximate composition by weight gives very satisfactory results: 3 ounces of ammonium phosphate, 3¼ ounces of ammonium nitrate, ½ ounce calcium chloride, 2 ounces of phosphoric acid (80% syrup) dissolved in 126 ounces of 50% solution sodium hyposulphite—although the proportions may be varied.

After the coating material on the non-printing portions of the plate have been renewed by passing a cloth or a roller containing the above material over the surface of the plate, the inking roller is again passed over the surface of the plate and a further printing impression is taken. The printing then proceeds in much the usual manner. After each printing impression is taken, the coating renewing material mentioned above is applied to the plate, the inking roller is passed over the surface of the plate, and another impression is taken.

The coating material and coating renewing material disclosed and described herein will adhere to the non-printing, metallic portions of the plate and will not be caused to evaporate by air currents or fluctuations in humidity or temperature. As a result the life of the plate is greatly prolonged. Furthermore, by the method of printing and by means of the ungrained plate herein disclosed and described, clearer and more sharply defined impressions may be obtained and better half-tone and color values will result due to the regularity in size and shape of the printing dots on the smooth surface of the plate.

My coating material and my coating renewing material may be used not only in association with the method of printing lithographically with ungrained plates herein described, but may be used in association with any type of lithographic printing plate either grained or ungrained. In addition to the other advantages mentioned above, my coating material and coating renewing material serve to preserve the plate and prevent it from oxidizing.

It will be understood that my improved plates and lithographing material and my method of printing may be used in any type of lithographic printing, either multi-color, half-tone, or solid one color printing.

I claim:

1. In the method of printing lithographically with an ungrained metallic plate having lithographic printing portions and non-printing metallic portions, the step of coating the non-printing portions with a mixture of glucose, glycerine and hyposulphite solution.

2. In the method of printing lithographically with an ungrained metallic plate having lithographic printing portions and non-printing metallic portions, the step of coating the non-printing portions with a mixture of glucose, glycerine and 50% sodium hyposulphite solution in the proportion by weight of approximately one part of each of the first two ingredients to two parts of the sodium hyposulphite solution.

3. In the method of printing lithographically with an ungrained metallic plate having lithographic printing portions and non-printing metallic portions, the step of first coating the non-printing portions with a coating material including glucose which is tacky, hygroscopic and

grease repellent, and which adheres to the metal.

4. In the method of printing lithographically with an ungrained metallic plate having lithographic printing portions and non-printing metallic portions, the step of first coating the non-printing portions with a coating material including a glucose and glycerine which is tacky, hygroscopic and grease repellent, and which adheres to the metal.

5. In the method of printing lithographically with an ungrained metallic plate having lithographic printing portions and non-printing metallic portions, the step of first coating the non-printing portions with a coating material including glucose and a hygroscopic agent which is tacky and grease repellent, and which adheres to the metal.

6. In the method of printing lithographically with an ungrained metallic plate having lithographic printing portions and non-printing metallic portions, the step of first coating the non-printing portions with a coating material including gluocose, glycerine, and a hygroscopic substance which is tacky and grease repellent, and which adheres to the metal.

JOHN V. MEHL.

CERTIFICATE OF CORRECTION.

Patent No. 2,046,959. July 7, 1936.

JOHN V. MEHL.

It is hereby certified that the above numbered patent was erroneously issued to the inventor said "MEHL", whereas said patent should have been issued to Lawrence Harris, Trustee, of Montclair, New Jersey, as assignee of the entire interest in said invention, as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of September, A. D. 1936.

Leslie Frazer

(Seal) Acting Commissioner of Patents.