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G. G. MURRAY.

LITHOGRAPHIC PRINTING FORM AND METHOD OF MAKING THE SAME.

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Fig. 1.

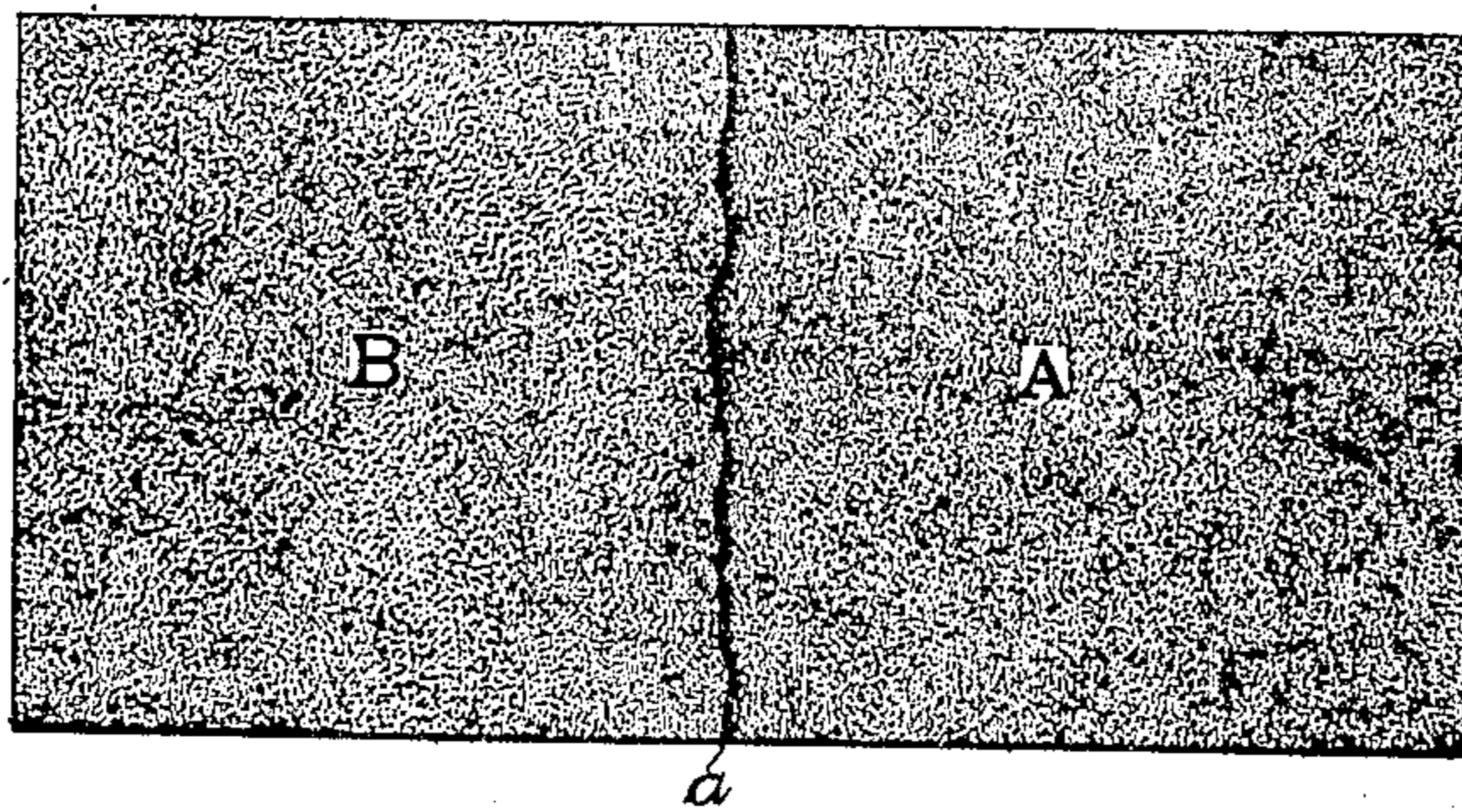
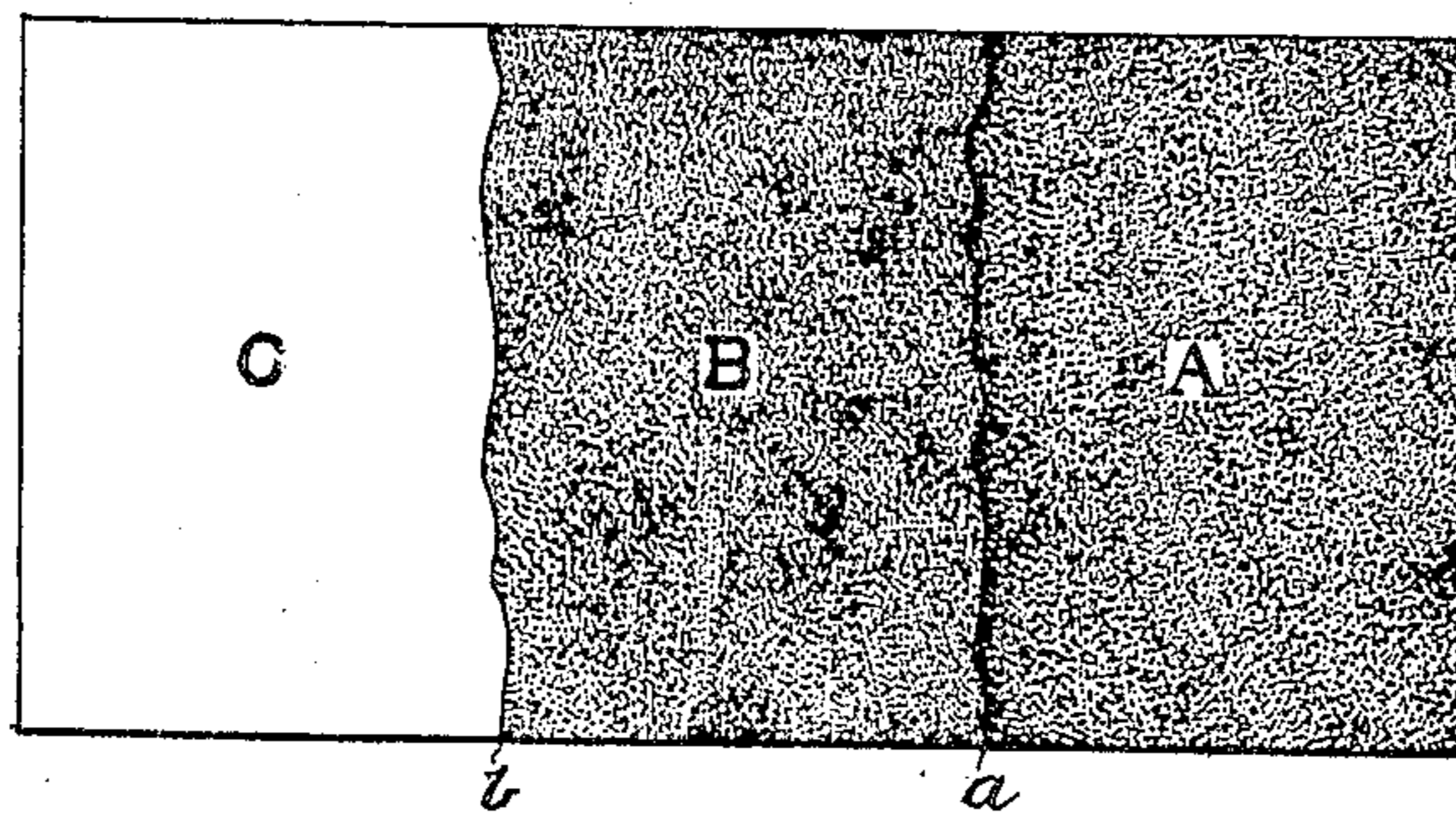


Fig. 2.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## LITHOGRAPHIC-PRINTING FORM AND METHOD OF MAKING THE SAME.

No. 865,719.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed February 26, 1900, Serial No. 6,466. Renewed December 3, 1904. Serial No. 235,330.

*To all whom it may concern:*

Be it known that I, GEORGE G. MURRAY, a citizen of the United States, and a resident of Larchmont, in the county of Westchester and State of New York, have  
5 invented certain new and useful Improvements in Lithographic-Printing Forms and Methods of Making the Same, of which the following is a specification.

The invention relates to lithographic printing and has special reference to the character or construction of  
10 the printing form or device to be used in such lithographic printing, and it consists of the improved printing form herein described and claimed and of the method of making the same.

The invention has reference to the character and  
15 construction of that part of the printing form by means of which the ink and water carrying functions of the structure are carried out, to wit: the ink and water-carrying surface of the said printing form, and especially to the water-carrying parts or portions of the form.

20 One of the most important characteristics of a lithographic printing surface is what may be termed its granular structure, by means of which is secured to a greater or less degree the peculiar porosity essential to such a surface. Where this granular structure is not  
25 originally possessed by the material of the printing form, mechanical means, such as the sand blast, have been resorted to in order to secure the proper granular or porous surface, and electrolytical deposition has also been employed for this purpose.

30 A printing form constructed in accordance with my present invention is comprised of an interior or basic layer of a material which originally possesses, or which by the mode of its application acquires, or to which has been imparted mechanically, or otherwise, a surface which is suitably granular or porous in character,  
35 and an outer electrolytically deposited protective layer, the characteristics of which as to grain or porosity are secured in whole or in part through the said basic layer. By applying the outer layer as a very thin  
40 electrolytical deposition, the grain of the basic layer may be wholly or almost wholly preserved in the surface characteristics of the composite printing form as a whole, especially if the electrolytically deposited  
45 outer layer be without inconsistent or opposing marked granular characteristics of its own. It will readily be seen that by proper variation, regulation, or combination of the granular characteristics of the basic and outer layers, composite surfaces may be secured varying greatly in characteristics from each other and adapted  
50 to varying kinds of work. The basic layer of the new composite printing form may be applied to an underlying support, say of brass, or the surface of the support itself may be or become said basic layer, an essential

feature of the invention being that the granular characteristics of the basic surface persist through, and co-  
55 operate with the exterior layer to constitute a composite printing surface possessing in whole or in part the granular characteristics of the said basic surface. Of course, the printing form may be of any desired shape or size.  
60

The accompanying drawings, which form a part hereof, represent the invention in its preferred form.

Figure 1 is a plan view of a printing form constructed according to my invention. Fig. 2 is a similar view  
65 embodying a modification thereof.

In Fig. 1 of the drawings A represents a portion of the thin outer layer of metal electrolytically deposited upon a granular basic surface layer B of a flat printing form, the granular characteristics of the basic layer showing in the outer layer A which is broken away on  
70 the line *a* to show the granular basic surface B at the left.

In Fig. 2 A represents the thin exterior layer of metal applied to a granular basic layer B which is electrolytically deposited upon a support C. This drawing shows the exterior layer A broken away on the line *a* to show  
75 toward the left the electrolytically deposited basic layer B, which in its turn is shown broken away on the line *b* in order to show still farther to the left the support C.

I prefer to constitute both the ink-carrying and the water-carrying parts or portions of the lithographic  
80 printing surface in a manner heretofore set out, but the invention is especially important when applied to the water-carrying parts or portions and is present if applied to those parts or portions only. I prefer also to electrolytically deposit the outer layer on the basic  
85 layer, as by this method of application of the outer layer, the porous or granular characteristics of the basic layer is not injured by the decomposition of the material of which the basic layer is constituted; and I prefer also to attain the granular character of the basic layer  
90 by electrolytically depositing that basic layer on an underlying support, as by this method of preparing the basic layer the best character of porosity or grain suitable for lithographic printing is produced. By my  
95 invention I am enabled to employ for the basic layer a softer metal (as say copper or zinc), and so one more readily adapting itself to the production of the necessary granular characteristic and to employ for the outer layer a harder metal (as say nickel) and so one better fitted to withstand wear although less fitted in  
100 and of itself to produce the necessary suitable granular characteristic. For the reasons just suggested, I prefer to employ a softer metal for the basic layer and a harder metal for the outer layer, and I prefer specifically to employ copper for the basic and nickel for the outer  
105 layer and to apply them respectively by suitable elec-

trolytical deposition so as to attain the suitable granular characteristic in and by the basic layer and to maintain it through the outer layer.

The outer layer of the composite printing form may be removed from and renewed upon the basic layer or surface an indefinite number of times, a new surface being thus provided for each new design without the trouble and expense of producing a new grained surface each time, and I regard this as an important advantage of my invention. The outer layer may be removed by any suitable method. For example, it may be removed by a suitable agent which will not materially decompose the basic layer, or by electrolysis. It is to be observed also that when a basic layer is applied to a support, it, together with the outer coating, may be removed from and renewed upon the support.

In carrying out my invention in its preferred form, I apply by electrolytical deposition a suitably granular coating of copper, to a suitable base or support, say of brass, and in so doing, the following bath may be employed, to wit: 400 lbs. of water, 62 lbs. sulfate of copper, 12 degrees hydrometer test and 16 lbs. sulfuric acid, 15 degrees hydrometer test. With this bath a current of .1 ampere per square inch of the portion of the base receiving the deposit, applied for three hours will produce a good grain. I then apply to this granular basic layer by electrolytical deposition a suitably thin outer layer of nickel, preserving substantially in the nickel layer the substantial granular characteristic of the basic layer, and in so doing the following bath may be employed, to wit: 100 gallons of water, 75 lbs. of the double sulfate of nickel and ammonia. After the salt is thoroughly dissolved the bath is made neutral by the addition of either sulfuric acid or ammonia, as may be required. A current of from .015 to .02 amperes per square inch of the portion of the surface receiving the deposit applied for a space of ten to fifteen minutes of time will produce a suitably heavy outer layer. The proportions of the ingredients of these baths may be varied, as well as the strength of current and period of application, without departing from the principle of my invention.

If the water-carrying parts only are to receive the outer layer, I apply or transfer the design to the copper basic layer before the nickel outer surface is applied, and I then subject the entire form to the same electrolytic bath treatment, the nickel being deposited only on the parts or portions of the form not occupied by the design.

What I claim as new and desire to secure by Letters Patent is:—

1. A lithographic printing form the water-carrying parts of which consist of a granular basic layer and an outer electrolytically deposited water-carrying protective layer the characteristic of which as to grain is secured in whole or in part through the said basic layer.

2. A lithographic printing form the water-carrying parts of which consist of a granular basic layer and an outer electrolytically deposited water-carrying protective layer of metal the characteristic of which as to grain is secured in whole or in part through the said basic layer.

3. A lithographic printing form, the water-carrying parts of which consist of an electrolytically deposited porous or granular layer and an outer electrolytically deposited water-carrying protective layer, the characteristic of which as to grain is secured in whole or in part through the said basic layer.

4. A lithographic printing form the water-carrying parts of which consist of an electrolytically deposited granular basic layer and an outer electrolytically deposited water-carrying protective layer of metal the characteristic of which as to grain is secured in whole or in part through the said basic layer.

5. A lithographic printing form the water-carrying parts of which consist of a granular basic layer and an outer electrolytically deposited nickel water-carrying protective layer the characteristic of which as to grain is secured in whole or in part through the said basic layer.

6. A lithographic printing form the water-carrying parts of which consist of an electrolytically deposited granular basic layer and an outer electrolytically deposited nickel water-carrying protective layer the characteristic of which as to grain is secured in whole or in part through the said basic layer.

7. A lithographic printing form the water-carrying parts of which consist of an electrolytically deposited copper granular basic layer and an outer electrolytically deposited nickel water-carrying protective layer the characteristic of which as to grain is secured in whole or in part through the said basic layer.

8. A lithographic printing form the ink-carrying and water-carrying parts of which consist of a granular basic layer and an outer electrolytically deposited protective layer the characteristic of which as to grain is secured in whole or in part through the said basic layer.

9. A lithographic printing form the ink-carrying and water-carrying parts of which consist of a granular basic layer and an outer electrolytically deposited protective layer of metal the characteristic of which as to grain is secured in whole or in part through the said basic layer.

10. A lithographic printing form the ink-carrying and water-carrying parts of which consist of an electrolytically deposited granular basic layer and an outer electrolytically deposited protective layer the characteristic of which as to grain is secured in whole or in part through the said basic layer.

11. A lithographic printing form the ink-carrying and water-carrying parts of which consist of an electrolytically deposited granular basic layer and an outer electrolytically deposited protective layer of metal the characteristic of which as to grain is secured in whole or in part through the said basic layer.

12. A lithographic printing form the ink-carrying and water-carrying parts of which consist of a granular basic layer and an outer electrolytically deposited protective layer of nickel the characteristic of which as to grain is secured in whole or in part through the said basic layer.

13. A lithographic printing form the ink-carrying and water-carrying parts of which consist of an electrolytically deposited granular basic layer and an outer electrolytically deposited protective layer of nickel the characteristic of which as to grain is secured in whole or in part through the said basic layer.

14. A lithographic printing form the ink-carrying and water-carrying parts of which consist of an electrolytically deposited copper granular basic layer and an outer electrolytically deposited protective layer of nickel the characteristic of which as to grain is secured in whole or in part through the said basic layer.

15. A lithographic printing form the water-carrying parts of which consist of a granular basic layer and an outer electrolytically deposited water-carrying protective layer of harder metal the characteristic of which as to grain is secured in whole or in part through the said basic layer.

16. A lithographic printing form the water-carrying parts of which consist of an electrolytically deposited granular basic layer and an outer electrolytically deposited water-carrying protective layer of harder metal the characteristic of which as to grain is secured in whole or in part through the said basic surface.

17. A lithographic printing form the ink-carrying and water-carrying parts of which consist of a granular basic layer and an outer electrolytically deposited protective layer of harder metal the characteristic of which as to grain is secured in whole or in part through the said basic layer.

18. A lithographic printing form the ink-carrying and water-carrying parts of which consist of an electrolytically deposited granular basic layer and an outer electrolytically deposited protective layer of harder metal the characteristic of which as to grain is secured in whole or in part through the said basic layer.

19. A lithographic printing form, the operative surface of which includes a part or portion consisting of a granular basic layer and an outer electrolytically deposited protective layer, the characteristic of which as to grain is secured in whole or in part through the said basic layer.

20. A lithographic printing form consisting of a granular basic layer and an outer electrolytically deposited protective layer, the characteristic of which as to grain is secured in whole or in part through said granular surface, said outer layer being removable and renewable upon the basic layer.

21. A lithographic printing form consisting of a granular basic layer and an outer electrolytically deposited protective layer of metal, the characteristic of which as to grain is secured in whole or in part through said granular surface, said outer layer being removable and renewable upon the basic layer.

22. A lithographic printing form consisting of an electrolytically deposited granular basic layer and an outer electrolytically deposited protective layer, the characteristic of which as to grain is secured in whole or in part through said granular surface, said outer layer being removable and renewable upon the basic layer.

23. A lithographic printing form consisting of an electrolytically deposited granular basic layer and an outer electrolytically deposited protective layer of metal, the characteristic of which as to grain is secured in whole or in part through said granular surface, said outer layer being removable and renewable upon the basic layer.

24. A lithographic printing form, consisting of a base or support of brass and a water-carrying surface, consisting of a granular basic layer and an outer electrolytically deposited water-carrying protective layer, the characteristic of which as to grain is secured in whole or in part through the said basic layer.

25. A lithographic printing form, consisting of a base or support of brass and a water-carrying surface system, consisting of a granular basic layer and an outer electrolytically deposited water-carrying protective layer of metal, the characteristic of which as to grain is secured in whole or in part through the said basic layer.

26. The process of making lithographic printing forms, which consists in preparing a porous or granular basic surface and then applying a protective coating or layer to the water-carrying parts of the basic surface without decomposing the material of which the basic surface is constituted.

27. The process of making lithographic printing forms, which consists in preparing a porous or granular basic surface of metal and then applying a protective coating

or layer of a different metal to the water-carrying parts of the basic surface without decomposing the material of which the basic surface is constituted.

28. The process of making lithographic printing forms, which consists in preparing a porous or granular basic surface of metal and then applying a protective coating or layer of a harder metal to the water-carrying parts of the basic surface without decomposing the material of which the basic surface is constituted.

29. The process of making lithographic printing forms, which consists in preparing a porous or granular basic surface of copper and then applying a protective coating or layer of nickel to the water-carrying parts of the basic surface without decomposing the material of which the basic surface is constituted.

30. The process of making lithographic printing forms, which consists in preparing a porous or granular basic surface and then electrolytically depositing a protective coating or layer on the water-carrying parts of the basic surface.

31. The process of making lithographic printing forms, which consists in preparing a porous or granular basic surface by the electrolytical deposition of a suitable material and then applying a protective coating or layer to the water-carrying parts of the basic surface without decomposing the material of which the basic surface is constituted.

32. The process of making lithographic printing forms, which consists in preparing a porous or granular basic surface by the electrolytical deposition of a suitable metal and then applying a protective coating or layer of a different metal to the water-carrying parts of the basic surface without decomposing the material of which the basic surface is constituted.

33. The process of making lithographic printing forms, which consists in preparing a porous or granular basic surface by the electrolytical deposition of a suitable material, and then electrolytically depositing a protective coating or layer of a suitable material on the water-carrying parts of the basic surface.

34. The process of making lithographic printing forms, which consists in preparing a porous or granular basic surface by the electrolytical deposition of a suitable metal and then electrolytically depositing a protective coating or layer of a different metal on the water-carrying parts of the basic surface.

35. The process of making lithographic printing forms, which consists in preparing a porous or granular basic surface by the electrolytical deposition of copper and then electrolytically depositing a protective coating or layer of nickel on the water-carrying parts of the basic surface.

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

GEO. G. MURRAY.

Witnesses:

GEO. H. BARNES,  
JACOB MILLER.