

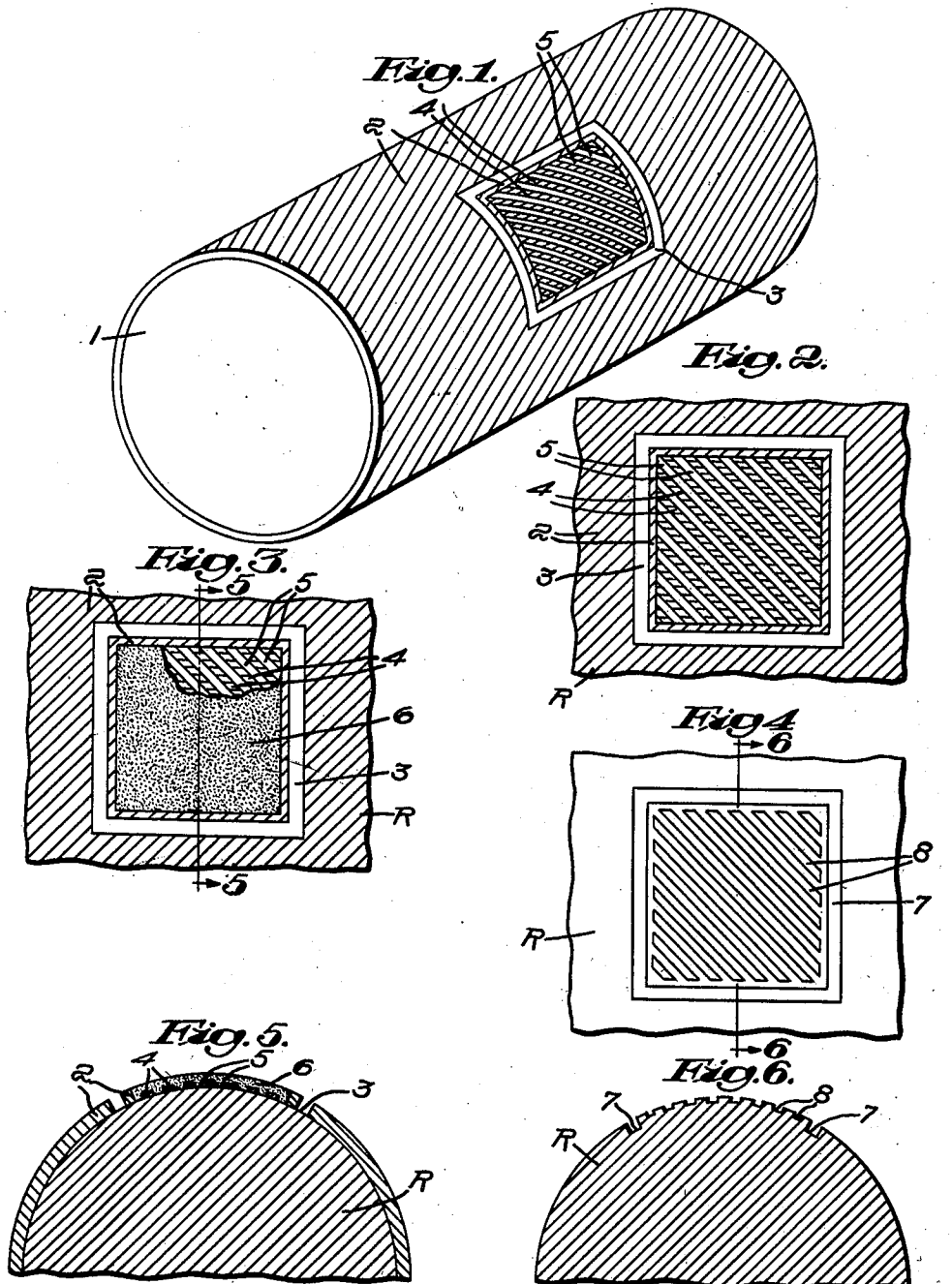
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J. J. ORMOND

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PROCESS OF ENGRAVING

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Inventor:

John J. Ormond

Mumma A. Hamilton

Attorney

by

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PROCESS OF ENGRAVING

John J. Ormond, Boston, Mass., assignor of two-thirds to Joseph D. Ramsey, Boston, Mass.

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This invention relates to a method of making printing members and more especially to a method of engraving intaglio printing rolls for textile printing.

In printing colored designs on textile materials, it is customary to employ vat dyes and engraved printing rolls. Each of the several colors making up a desired design is separately applied from individual rolls. In the preparation of these intaglio printing rolls, it is further customary to etch outlines of design portions to be engraved on the roll surface, and then to etch a series of parallel lines within each portion included by the outlines. The lines are disposed angularly with respect to the axis of the roll to constitute a grain for retaining satisfactory amounts of the vat dyes or other inking material used to proper weight of color. The apparatus and materials required to etch design portions in this manner are expensive, require considerable time and great care in their use, and fail to produce as desirable quality as is desired.

It is a principal object of the present invention to improve methods of making printing members, and to devise new steps for engraving textile printing rolls with a view to eliminating some operations now employed and to facilitating others, whereby very considerable saving in time and materials is effected, and better quality of printing is obtained. It is a further object of the invention to provide a simple and cheap method of engraving particularly suited to the preparation of printing rolls for printing on textile materials.

A more complete understanding of the invention and its objects will be had from the following description of the drawing and discussion relating thereto.

In the accompanying drawing:

Fig. 1 is a perspective view illustrating a step in the method of the invention.

Fig. 2 is a fragmentary plan view of a printing roll illustrating another step in the method.

Fig. 3 is a fragmentary plan view of a printing roll illustrating still another step.

Fig. 4 is a fragmentary plan view of an etched printing roll.

Fig. 5 is a view in cross section taken on the line 5-5 of Fig. 3; and

Fig. 6 is a view in cross section taken on the line 6-6 of Fig. 4.

In accordance with the invention, I apply resist materials on a printing member by mechanical printing means. An offset member is preferably employed in conjunction with relief print-

ing plates which are formed with a design desired to be etched.

Referring more in detail to the drawing, Figs. 1-6 inclusive illustrate a method of offsetting resist materials, to a copper roll R in which an offset roll 1 is selectively covered with a background 2 of acid resist material to leave an outline 3 of bare metal in a square design. Within the outline 3 are also provided a plurality of spaced-apart lines 4 of resist material which leave spaced-apart lines 5 of bare metal adapted to be etched to form ground lines. Preferably an inner border, or margin of the resist material making up the background 2, is applied as shown with the ground lines 4 of resist material being thereby maintained from crossing the outline 3.

Within the inner border of resist 2 and over the ground lines 4 of resist material, as well as bare metal lines 5, is applied a layer 6 of another special resist material. The layer 6 is characterized by being resistant to penetration of etching reagents for a limited time only, after which the reagent passes through and etches in the usual manner.

The roll R is subjected to an acid reagent as for example perchloride of iron, by some suitable method such as immersion in a bath of this etching reagent. Etching begins at once on the roll surface in the bare metal outline 3 and continues in this area only, for a predetermined period, during which the etching reagent penetrates through the coating 6. Thereafter etching in both the outline 3 and the lines 5 is carried out until a desired depth of etch is obtained. At this point the resist materials and coatings may be removed by washing in turpentine or other suitable solvent, leaving an etched roll, as shown in Figs. 4 and 6, containing a relatively deep etch outline 7, of a square design, and relatively shallow etched ground lines 8 within the square outline.

An important aspect of the method consists in mechanically applying resist material in selective amounts on a roll surface to form a bare metal outline, and at the same time to apply ground lines of resist material so that only one etching procedure is necessary. This is important since it improves the conventional method of first cutting an outline, by cumbersome pantograph methods, in a resist coating, etching, then filling in the etched lines, and repeating the entire operation to obtain etched ground lines. Greater accuracy, speed of etching and fineness of detail are thus obtained.

Another feature of the invention is the step of varying the depth of the outline relative to

the depth of ground lines in a single etching operation. The use of a coating or layer of a material which functions as a resist material for a short time only permits etching to progress at the outline only of a design and subsequently to start in the ground lines, thus varying the depth of etch. This satisfactorily provides for the different degrees of etching particularly required for etching a roll for textile printing with both an outline of a design and ground lines within the design.

In carrying out the method described, I prepare relief printing plates, which in the case of textile printing correspond to the number of color sections in a given design to be printed. These plates are so prepared that the parts of the plates which take ink correspond to the areas surrounding the design outlines. A plate of this character is inked with a special resist ink material and an ink image is printed on a transfer blanket. If desired, other types of printing plates, as gravure plates, planographic plates and the like, may be resorted to.

The special resist ink material may be one of the inks usually employed with the types of plates noted, to which has been added an ingredient which is resistant to the action of etching reagents such as acids. In using relief plates, a satisfactory resist ink consists of a greasy ink formed of carbon and linseed oil of the general character of lithographic ink, to which has been added small amounts of powdered rosin. Other types of inks may similarly be rendered resistant to etching reagents and other methods of combining resist materials with ink resorted to, as for example by applying rosin powder to a wet ink image and heating.

The offset member utilized to apply resist material in accordance with the method of the invention preferably includes a blanket of rubber, as for example a thin rubber blanket such as is generally employed in a lithographic offset member. Certain other materials such as gelatin and plastic substances may also be employed as an offset roll material.

The blankets, plates and inking materials noted are effective in transferring relatively large amounts of the resist ink material to the surface of a printing roll in a smooth, uniform film adapted to present smooth design outlines. In some cases it may be found desirable, in carrying out the method of the invention, to treat the surface of the offset member and the printing plates so as to establish a film or films which are adapted to facilitate removal of resist ink materials from the printing plates, and which are further adapted to provide for release of the resist ink material from the offset member to the surface of a printing roll such as a copper roll.

Application of the resist inking material to the offset member may be carried out in any convenient manner, such as by supporting the printing plates in a chase and passing the offset member thereover while supported in a gear rack. The transfer member may then be rolled against the surface of the roll to be etched, with each of these members being held in gear in some suitable manner.

The layer 6 is preferably made up of greasy ink, such as an ink obtained from linseed oil and carbon, to which has been added predetermined amounts of rosin material, which are known to resist penetration by an etching reagent such as iron perchloride for a limited time only.

Various other materials may be used in conjunction with other resist materials noted.

Other modifications of the method may be resorted to. For example, the use of a layer of resist material of limited resisting character may be used in connection with conventional etching operations. The application of ground lines of resist material may be carried out by a separate offsetting operation. The length of time for which resist materials may be rendered resistant to etching reagents may be varied in various ways to control the variation in depth of etch obtained in forming different kinds of designs, and still other changes may be resorted to.

It will be seen that a number of advantages are obtained by the method of the invention. The step of printing a positive image of acid-resisting ink material on a copper roll surface eliminates the need of etching a separate outline of the design as effected by the conventional method above described. In the conventional procedure, it is necessary to employ a separate ground and separate etching step, and the etched outline resulting must be protected while the design surface is etched to form a grain. All of this is obviated in the present invention since the edge of the positive ink image serves as an efficient stop line for checking etching action of acid at the outline of the design, and the etching of a grained surface the outline may thus occur simultaneously. In addition the mechanical application of the outlines from a printing plate furnishes a smoothness of contour greatly superior to that obtained in the outlines which are painted in by hand. The use of printing plates and an offset roll for applying resist material provides improved register of the design portions of a number of rolls such as may be required for multicolor printing.

While I have shown a preferred embodiment of the invention, it should be understood that various other applications and modifications thereof may be resorted to, in keeping with the spirit of the invention as defined by the appended claims.

I claim:

1. That improvement in methods of engraving a design on textile printing rolls which comprises applying from a printing plate, carrying an image of the design, a resist material to provide an outline of the design while maintaining a part of the area within the said outline free of resist material, applying a series of lines of a second acid-resist material from another printing member within the outline, then covering the surfaces of the roll within the design and between the spaced-apart lines with a coating adapted to resist penetration of an etching reagent for a limited period of time, and then etching the roll for a period adapted to allow acid first to attack the metal in the outline and thereafter to penetrate through the coating and attack metal between the spaced-apart lines.

2. That improvement in methods of making intaglio printing members which comprises selectively applying on a printing member a resist material in accordance with a desired design, applying another resist material in the form of spaced-apart lines within the said outline formed by the said first resist material, applying still another resist material within the design outline and overlying the said spaced-apart lines, and then etching the printing member.

3. That improvement in methods of making

printing rolls which comprises applying resist material to provide an outline within which occur spaced-apart lines of resist material, then coating the roll in those areas between the lines and that area constituting the said outline with a second resist material which resists etching reagents for a limited time only, and then etching the roll while the said second resist material, at all points therein, is maintained uniformly resistant with respect to an acid reagent, to form an outline in the surface of the roll and a series of ground lines, within the outline, which are of less depth than the outline.

4. That improvement in methods of engraving printing rolls which comprises selectively applying a resist material from a transfer member to the surface of a roll to be etched in suitable amounts to form a design outline on the bare roll surface, said outline having a resist material occurring at both the inside and outside thereof, said resist occurring inside of the outline to form a margin, applying selective amounts of a resist material in spaced-apart relation within the said margin, applying another resist material over the said spaced-apart resist material and within the said outline, said last resist material being of limited resistance to etching reagents, and then etching the roll to simultaneously obtain an outline and a plurality of etched areas within the outline suitable for constituting a ground therefor.

5. That improvement in methods of engraving a design on textile printing rolls which comprises applying on a roll, from a printing plate carrying printing portions corresponding to the design, a resist material to provide an outline of the design, and simultaneously applying a series of spaced-apart lines of resist material within the said outline, covering the spaced apart lines within the outline with a coating adapted to resist penetration of an etching reagent for a limited period of time, and then etching the roll for a period adapted to allow acid first to attack the metal in the outline and thereafter to penetrate through the coating and attack the metal between the spaced-apart lines.

6. That improvement in methods of engraving a design on textile printing rolls which comprises applying on a roll, from a printing plate

having printing portions corresponding to the said design, a resist material to provide an outline of the design, and simultaneously applying small amounts of resist material in separated relation within the said outline, then covering those portions of the roll included within the outline with a coating adapted to resist penetration of an etching reagent for a limited period of time, and then etching the roll for a period adapted to allow acid first to attack the roll surface defined in the said outline, and thereafter to penetrate through the coating and attack the roll surface occurring between the small separated amounts of resist material within the outline.

7. That improvement in methods of engraving a design on textile printing rolls which comprises applying on a roll from a printing member having printing portions corresponding to the design, a resist material to provide an outline of the design, while maintaining a part of the area within the said outline free of the resist material, and simultaneously applying a series of lines of resist material within the outline, said lines merging with inner resist material portions forming the said outline, covering the roll portions within the outline with a coating adapted to resist penetration of an etching reagent for a limited period of time, and etching the roll to provide a relatively deeply etched outline and relatively lightly etched ground lines occurring between the outline, with the extremities of the said lightly etched ground lines being preserved in spaced-apart relation with respect to the said deeply etched outline.

8. That improvement in methods of making intaglio printing members which comprises selectively applying on a printing member a resist material in accordance with a desired design, to provide an outline and spaced-apart ground lines occurring within the outline, applying another resist material over the roll and the said first resist material, and then etching the printing member while the said second resist material, at all points therein, is in a state of uniform resistance with respect to an etching agent.

JOHN J. ORMOND.