Nov. 22, 1932. K. WOLFSOHN 1,888,303

METHOD OF PRODUCING INTAGLIO PRINTING FORMS

Filed Dec. 30, 1929

Fig. 1

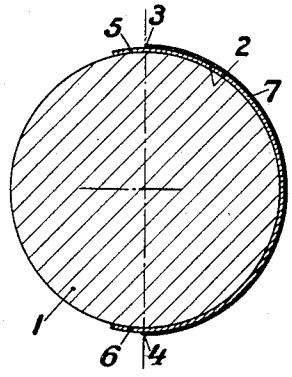


Fig. 3

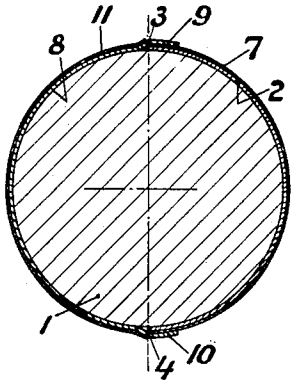
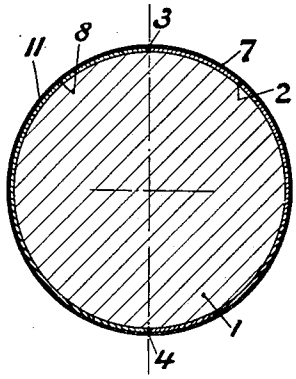


Fig. 5



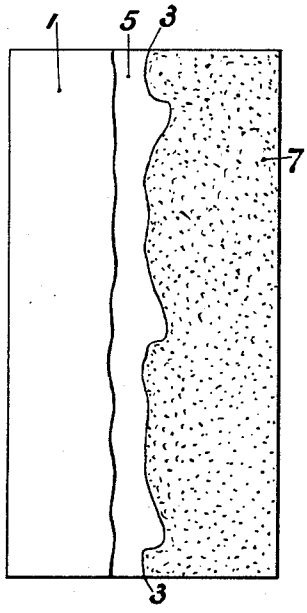


Fig. 2

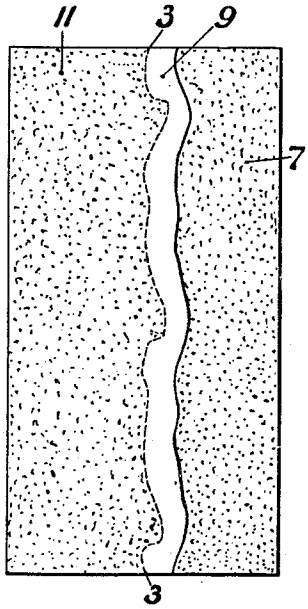


Fig. 4

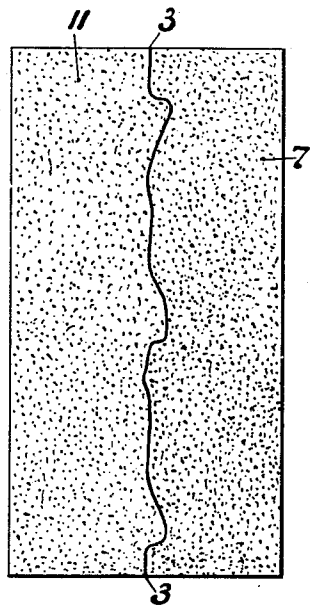


Fig. 6

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UNITED STATES PATENT OFFICE

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METHOD OF PRODUCING INTAGLIO PRINTING FORMS

Application filed December 30, 1929, Serial No. 417,603, and in Germany June 21, 1929.

The present invention relates to a process for the manufacture of endless intaglio printing formes or plates for printing paper, textile materials, oil-cloth, linoleum and similar materials. Endless intaglio formes or plates for printing paper and similar materials are already known. The pattern to be reproduced has heretofore been copied on a light-sensitive, preferably screened pigment gelatine paper, such as carbon tissue backed with paper and the copy was then transferred to the metal support and developed. Since the transference was not possible without a so-called securing edge, the pattern could not be applied to the periphery of the endless intaglio forme without a break. The transfer of the pattern by means of the above-mentioned pigment gelatine etching process must therefore take place in at least two successive operations; first the one half of the pigment paper had to be applied to the intaglio forme developed and this part etched and finished, and then the other half had to be applied to the endless intaglio forme and treated in a similar manner. The half of the cylinder which was etched and finished first was covered with a protective coat of varnish before the second half was etched. When carrying out the process it was found to have a serious disadvantage namely that the two etchings were almost always not uniform. The process was particularly difficult to carry out in the case of patterns exhibiting a long range of shades covering the entire surface of the intaglio forme and having a uniformly bright tone which forms as it were the ground work of the pattern to which the remaining elements of the pattern are applied. Even if the successively etched portions were subjected to a subsequent etching process which was difficult to carry out, complete uniformity in the portions of the etchings was hardly ever obtained, so that in most cases several etchings had to be rejected, before two etchings which matched after a fashion were obtained.

In contra-distinction thereto the novel feature of the present invention consists in combining the parts of the etching ground or resist on the endless forme or cylinder before either part is etched and then carrying out the etching in a single operation. In order to produce the endless resist covering the securing edge of each part of the resist covering is removed, for example by cutting it off, before the application of any further adjoining part of the resist covering and the securing edge of the last part which completes the resist covering is also removed. Before removing their securing edges the pertaining parts of the resist covering are preferably covered by a medium, for example varnish, which protects their surface. After the application of the last portion which completes the endless resist covering the edge of which is also removed, preferably after it has been covered with a protecting coating, the protecting medium is removed from the endless resist covering, for example by the use of a solvent for the varnish, and the etching of the endless resist which has been prepared in this manner is carried out in a single operation.

The accompanying drawing illustrates the manner of carrying out the present invention; in said drawing,

Fig. 1 shows a printing cylinder having one-half of a film applied thereto;

Fig. 2 is a top plan view of Fig. 1;

Fig. 3 shows a cylinder on which the first half of the film has been cut and trimmed, and the second half of the film positioned upon the other half of the cylinder;

Fig. 4 illustrates in plan the cylinder shown in Fig. 3;

Fig. 5 is a view showing the cylinder with the two halves of the film in proper position thereon and ready for the etching treatment; and

Fig. 6 shows a plan view of the finished cylinder shown in Fig. 5.

The numeral 1 indicates a copper cylinder which is to be provided with an endless intaglio pattern for the printing of paper, textiles, oilcloth, linoleum, and similar materials. In accordance with the present invention the cylinder 1 is provided with a continuous endless pattern free of breaks or irregularities in the following manner. A

pigment gelatine film 2 which contains any desired portion of the pattern, for example, a half of such pattern, is transferred in known manner to the copper printing cylinder 1. The film is then developed and dried and the part to be etched is covered exactly with a protecting coat of varnish 7. The varnish may, for example, be composed of a solution of asphalt resin in benzol. The film transferred to the cylinder includes, in addition to the part 2, which corresponds to the selected portion of the pattern, two securing edges 5 and 6. The part 2 of the film, which, as stated, contains a definite portion of the pattern, is then bounded by two curved or irregular lines 3—3, 4—4. These bounding or limiting lines are clearly shown in Figs. 2, 4 and 6, which illustrate plan views of the cylinder at the various stages of the process, only the lines 3—3 being visible, the lines 4—4 being at the underside of the cylinder as shown in Figs. 1, 3 and 5. Figs. 1 and 2 show the steps of the process in which the part 2 of the film is covered with the protecting varnish 7. After the application of the varnish, the securing edges 5 and 6 of the developed, protected film are either lightly cut off with a sharp knife without injuring the cylinder, and the superfluous film pulled off dry, or they are moistened and then pulled off. It is of advantage to coat the varnish layer 7 with a solution of a colloid (chromate-albumin, gelatine, dextrin), to which metallic salts, such as aluminum sulfate, may be added, in order to secure a better adhesion of the second transfer.

The film section containing the rest of the pattern is now positioned upon the cylinder 1. This second film is composed of a portion 8 which contains the remainder of the pattern, and the two securing edges 9 and 10. As the portion 8 of the second film is bounded by the curved or irregular lines 3—3 and 4—4, like the portion 2 containing the other section of the pattern, it is only necessary so to position the film 8, 9, 10 upon the cylinder that the lines 3—3 and 4—4 of the parts 2 and 8 coincide in order properly to join up the two parts of the pattern. The second part of the pattern is now developed and after drying is covered with a coat of varnish 11. This phase of the process is illustrated in Figs. 3 and 4. The overlapping securing edges 9 and 10 which cling to the first varnish coating 7 with the aid of the colloidal solution, are now removed. In this way the two film portions 2 and 8 are joined into a continuous film lying upon the surface of the cylinder and containing an endless pattern. This step in the process is illustrated in Figs. 5 and 6. The cylinder which has been provided in this manner with an endless resist covering is then freed from varnish by washing with a solvent for the varnish, such as benzol after which the etching of the cylinder is carried out in a single operation. Any differences in the height of the relief, as are always possible owing to variations in light or the influence of weather, can at once be equalized by the employment of suitable etching solutions, since the progress of the etching on the periphery of the printing cylinder which has been prepared in accordance with the invention can be controlled continuously. The result of the process is an endless intaglio printing forme or plate which is quite uniform in the gradations of tone, such as could not be obtained by the hitherto usual method of successive partial etchings.

It will be understood that, while I have described my invention in connection with a cylindrical printing form, my invention is equally applicable to any other body of revolution, such as a cone or a frustum of a cone. When, therefore, I employ in the claims the expression "circular intaglio printing forms", I intend to include thereby all types of bodies of revolution.

I claim:—

1. Process for the manufacture of circular intaglio printing forms which comprises transferring parts of a picture or pattern to a light-sensitive screened, pigment film, applying the pigment film to the surface of the printing cylinder, developing it, coating it with a medium which protects its surface, removing its securing edge, combining this portion of the resist covering similarly with further portions which fit on to and adjoin the adjacent portion so as to form an endless resist, removing the protecting medium from the endless resist and then etching in a single process of operation.

2. Process for the production of circular intaglio printing forms which comprises transferring portions of the picture or pattern on to a light-sensitive, screened pigment gelatine film, applying the film to the surface of the printing cylinder, developing it, coating its surface with a protecting film of varnish and the film of varnish with a colloidal solution, removing the securing edge of the said pigment gelatine film, combining this portion of the resist covering in a similar manner with further portions which fit on to the adjacent portion so as to form an endless resist, removing the varnish and colloidal films from the endless resist and then etching in a single process of operation.

3. In a process for the production of circular intaglio printing forms, the steps which comprise applying to the form in succession a plurality of resist covering sections each provided with a securing edge, removing the securing edge of each part before the application of the next adjoining section of the covering, then removing the securing edge of the last section applied and thereby complet-

ing the endless resist covering, and then etching the cylinder in a single treatment.

4. In a process for the production of circular intaglio printing forms, the steps which comprise applying to the form in succession a plurality of resist covering sections each provided with a securing edge, coating each part of the resist covering with a medium which protects its surface and removing its securing edge before the application of the next adjoining section of the resist covering, removing the securing edge of the last portion applied and thereby completing the endless resist covering, removing the protecting medium, and then etching the cylinder in a single treatment.

5. In a process for the production of circular intaglio printing forms, the steps which comprise applying to the form in succession a plurality of resist covering sections each provided with a securing edge, coating each section of the resist covering with a medium which protects its surface and removing its securing edge before the application of the next adjoining section of the resist covering, coating the last section of the resist covering with such protecting medium and removing its securing edge, removing the protecting medium and then etching the cylinder in a single operation.

6. In a process for the production of circular intaglio printing forms, the steps which comprise producing a resist photographically upon a plurality of transfer sheet sections whose total effective length along any line is equal to the circumference of the form along a corresponding line, mounting such sections in succession upon said form to form an endless covering, and subsequently etching the whole form simultaneously.

7. In a process for the production of circular intaglio prnting forms, the steps which comprise producing a resist photographically upon a plurality of transfer sheet sections whose total effective length along any line is equal to the circumference of the form along a corresponding line, mounting each section separately and developing the same before the next section is mounted, until an endless resist covering is produced, and subsequently etching the whole form simultaneously.

In testimony whereof I have signed my name to this specification.

KURT WOLFSOHN.