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[54] METHOD OF MAKING ENGRAVED PRINTING PLATES

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[58] **Field of Search** 204/17; 101/401, 459, 463

[56] **References Cited**

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[57] **ABSTRACT**

An engraved printing plate for steel or copper plate printing machines, includes an engraved part made of a material which accepts a coloring or inking material and a non-engraved part spaced from the engraved part and having a layer of porous material impregnated with hygroscopic substance. The porous material can be black chromium or be made from nickel phosphide or alumina. The hygroscopic substance can be made from lithium chloride.

11 Claims, No Drawings

METHOD OF MAKING ENGRAVED PRINTING PLATES

BACKGROUND OF THE INVENTION

This invention relates to engraved printing plates for steel or copper plate engraving or printing machines, the engraved parts of which accept a coloring or inking material and the non-printing surface of which, spaced from the engraved part, repels the coloring material.

An engraved printing plate is known (French Pat. No. 1,564,653) which enables the usual wiping of the printing plates intended to remove the ink from the non-printing surfaces of the plate, to be eliminated.

However, these known special engraved printing plates, require that the non-printing areas of the plate must accept a wetting agent, while the printing areas, in the case of the engraved parts, accept the coloring or inking material. The printing plate, before being inked must be moistened by a wetting device in such a way that, when inked, only the engraved part accepts the ink while the wet areas spaced from the engraved parts are not inked.

In this way, an economy is made, since the usual wiping devices are omitted and only sufficient coloring or inking material is applied to the printing plate.

A process for the production of an engraved printing plate is known. This process is based on a plate having the desired engraved parts, preferably, in copper. These engraved parts are filled with a filling material repelling any metallic deposit. A metallic layer for example chromium is deposited on the surface of the plate thus prepared, which accepts the wetting agent. Finally, the filling material of the engraved part is removed by means of a solvent, a chemical agent or mechanically.

It is also known to provide a layer of a second material repelling the ink and accepting the wetting agent which is deposited on the whole of the surface of an engraved printing plate on which the covering layer is of a material accepting the inking material. A second material is then provided which repels the inking material and accepts the wetting agent. Finally, the second material is removed from the engraved part.

AIMS OF THE PRESENT INVENTION

An object of the present invention relates to the production of an engraved printing plate in which the non-engraved or non-printing surfaces spaced from the engraved part, repels a coloring or inking material without the necessity of constantly depositing a wet film on the surface of the plate during printing. In this way, the engraved printing process is simpler and more economical, since the device dispensing the wetting agent can be omitted.

According to one aspect of the present invention a method of treating an engraved printing plate for steel or copper plate printing, comprises the steps of coating the engraved part of the engraved printing plate with a layer of material which accepts a coloring or inking material, and coating the non-engraved part of the engraved printing plate with a layer of porous material impregnated with a hygroscopic substance, which layer of impregnated porous material repels the coloring or inking material.

According to a further aspect of the present invention an engraved printing plate for steel or copper plate printing machines, comprises an engraved part having a surface which accepts a coloring or inking material and a non-engraved part, spaced from the engraved part, having a surface which repels the coloring or inking material, the surface of the non-engraved part including a layer of porous material impregnated with a hygroscopic substance.

This porous material can consist of black chrome, or be made from nickel phosphide or alumina, while lithium chloride can be used, as the hygroscopic substance. These layers of materials, on The non-printing surface of the plate, can be formed at the same time, in particular by galvanic precipitation and, next, impregnation of the hydroscopic substance. Given that there is always a certain humidity in the environmental air, the hygroscopic substance results in the non-printing surface of the plate being always covered by a certain wet film. This film repels the ink when the plate is being inked in such a way, that only the engraved part constituted by a material accepting the inking material is inked. Should it be necessary, a humidifying apparatus can be installed in the area where the printing machine is working, in order to maintain a sufficient level of humidity of the air.

DESCRIPTION OF PREFERRED EMBODIMENT

One embodiment of an engraved printing plate according to the invention will now be described.

Starting from a nickel plate provided with the engraved parts which illustrate, for example, the original design for a bank note. A fine layer of copper which can have a thickness of 0.002 mm, is spread over the surface of the plate by metallization in a vacuum or by galvanization. A filling material is then spread over the surface of the plate in the form of paste and so covered that the engraved parts are completely filled by this material. Of preference, this paste is composed of a thermoplastic mixture, for example carnauba wax with a solvent agent or very fine inorganic or organic elements. The surface of the plate spaced from the engraving is carefully cleaned of the filling material by wiping so that this material only remains in the engraved parts where it is hardened by heating and becomes solid following the melting of the inorganic elements. After the plate is cooled, the surface is polished, washed, dried and then covered with a layer of porous black chromium, preferably by galvanization. The filling material is next removed from the engraved parts, for example, by means of trichlorethylene vapor, in such a way that the copper layer which accepts the inking material is exposed in the engraved parts. Finally, the layer of black chrome covering the non-printing surface apart from the engraved parts is impregnated with lithium chloride.

A second embodiment of the engraved printing plate according to the invention is as follows:

Similarly, its starts from a nickel plate provided with engravings in which a thin layer of copper is spread. Next, the whole surface of the plate including the engraved parts, is covered with a film of porous black chromium. In order to extract this film from the engraved parts the procedure is carried out in such a way, that the surface of the plate other than the engravings is covered with a protective layer which resists electrolytic or alkaline treatment, which is used to extract, finally, the layer of black chromium from the engraved parts.

This protective layer is produced in such a way that the surface other than the engraved parts is covered by an adhesive layer, for example, with the usual printers' coloring material then by bitumen powder, spread on the adhesive surface which is still damp and acting as a protective material. By heating the plate, the powder is brought to a melting temperature so that a layer of solid bitumen is formed and dried at the same time as the adhesive layer. The black chromium is then extracted from the engraved parts.

The second step consists of removing the protective layer. The bitumen is then removed by the action of naphtaline and the superimposed layer of coloring material by a solvent such as phenol. Finally, the layer of black chromium on the non-printing surface of the plate is impregnated by lithium chloride.

An advantage of the above described embodiments is that there is no need to constantly deposit a wet film on the surface of the plate during printing.

What is claimed is:

1. A method of treating an engraved printing plate for steel or copper plate printing, comprising the steps of coating the engraved part of the engraved printing plate with a layer of a material which accepts an inking material, and coating the non-engraved part of the engraved printing plate with a layer of porous material impregnated with a hygroscopic substance,

which layer of impregnated porous material repels the inking material.

2. A method of treating an engraved printing plate for steel or copper plate printing machines comprising the steps of coating the engraved printing plate with a layer of material which accepts an inking material, spreading a coating of a filling material over the engraved parts of the printing plate so that the engraved parts of the printing plate are filled with the filling material, heating the filling material so that it becomes hard, coating the printing plate with a layer of porous material, removing the filling material to expose the layer of material which accepts an inking material in the engraved parts of the printing plate and impregnating the layer of porous material with a hygroscopic substance.

3. A method as claimed in claim 2, wherein the porous material is black chromium and the hygroscopic substance is lithium chloride, the black chromium being deposited on the engraved printing plate by galvanization.

4. A method as claimed in claim 2, wherein the material which accepts an inking material is copper, the copper layer having a thickness of substantially 0.002 mm, the copper layer being deposited on the engraved plate by metallization in a vacuum.

5. A method as claimed in claim 2, wherein the material which accepts an inking material is copper, the copper layer having a thickness of substantially 0.002 mm, the copper being deposited on the engraved plate by galvanization.

6. A method as claimed in claim 2, wherein the filling material is carnauba wax with a solvent.

7. A method as claimed in claim 2, wherein the engraved printing plate is polished, washed and dried after the heating of the filling material.

8. A method as claimed in claim 2, in which the filling material is removed from the engraved parts by treating it with trichlor-ethylene vapor.

9. A method of treating an engraved printing plate for steel or copper plate printing machines comprising the steps of coating the engraved printing plate with a layer of copper, coating the layer of copper with a film of porous black chromium, coating the non-engraved parts of the printing plate with a layer of protective material which resists electrolytic or alkaline treatment, removing the porous black chromium by means of electrolytic or alkaline treatment from the engraved parts to expose the layer of copper, removing the protective material, to expose the porous black chromium on the non-engraved parts of the printing plate and impregnating the layer of porous black chromium with lithium chloride.

10. A method as claimed in claim 9, wherein the protective material includes an adhesive layer and bitumen powder spread on the surface of the adhesive layer, the adhesive layer and bitumen powder being heated so that a layer of solid bitumen is formed.

11. A method as claimed in claim 10, wherein the bitumen is removed by the action of napthalene and the adhesive layer is removed by the action of phenol.

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