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PLANOGRAPHIC PRINTING PROCESS

No Drawing. Application filed December 9, 1929. Serial No. 412,916.

My prior Patent No. 1,741,758 describes a process of dry lithography using a grained aluminum plate to which a greasy image is applied, and treating it with a solution of material selected from a group containing nitrates or sulphates, and printing from such plate with an ink which contains material from such group. Suitable specific examples of nitrates are nickel or iron or copper nitrate as given in the said patent, or ammonium nitrate as hereinafter set forth. As an example of a suitable sulphate, we may assume aluminum sulphate in accordance with the prior patent. Apparently the nitrate or sulphate forms, on the non-image portion of the plate, a crystalline coating which will not take ink. Such solution however, does not interfere with the fatty image on the plate, and accordingly this fatty image can receive and hold ink for printing. The ink on the inking roller, by reason of the chemicals added to that ink, will not adhere to the coated non-image portion of the plate, but will adhere to the image, so that an indefinite number of copies may be printed.

The exact theory of operation of the process above mentioned is at present unknown. It seems as if the solution of nitrates or sulphates form a protective coating over the non-printing areas of the plate, but that the ink has a certain small affinity for such nitrates or sulphates so that ordinary printer's ink alone would take off the protective coating from the plate, while by mixing a substance similar to the coating with ink itself in sufficient quantity to satisfy the affinity of that ink, the ink becomes neutral and does not disturb the coating on the plate. There is apparently enough affinity of the greasy image for the solution, so that the solution which overlies the image is absorbed by it, and the image, therefore, presents simply a greasy face which receives the ink from the inking roller. Another theory which has been advanced is that the nitrates or sulphates in the ink replenish such nitrates or sulphates on the plate as are wiped off by the friction of the inking roller, so that the plate is maintained constantly in condition with the non-printing areas protected.

I have found that while the system above described is operative for a large number of copies with an aluminum plate, it is not so satisfactory with a zinc plate, as only a few copies can ordinarily be obtained with the zinc plate with the substances mentioned. It is the object of this invention to enable the use of the process for an indefinite number of copies with a zinc plate or plate of other material which readily oxidizes.

I have discovered that I can accomplish the desired result on a zinc plate by adding one of the phosphates to the nitrate or sulphate solution with which the plate is originally treated, and also to the nitrates or sulphates in the ink. While I have obtained good results with various phosphates (for instance any of the three phosphates either of ammonium or of potassium or of sodium, represented by the formulas X_3PO_4; X_2HPO_4; XH_2PO_4). I may mention, by way of illustration, ammonium acid phosphate, and as the coating and ink-treating substance, ammonium nitrate. When these substances are used, I may employ for instance, for the solution, water with about two and one-half percent of ammonium nitrate and about two and one-half percent of ammonium acid phosphate, and in the ink an addition of from one and one-half to four percent of ammonium nitrate (depending on the composition of the ink) and about one and one-half to four percent of ammonium acid phosphate, it being understood that the ammonium acid phosphate and the nitrates and/or sulphates in the ink continue to treat the plate during the printing operation, to prevent oxidation thereof and to maintain the plate in an ink repellent condition on the non-image surfaces. I have demonstrated that with such materials I may produce an indefinite number of satisfactory copies from a suitably grained zinc plate.

Moreover, the addition of this phosphate does no harm with the carrying out of the process on the aluminum plate, and accordingly, when the ink is treated with such phosphate in addition to the material set out in the prior patent, my process becomes at once utilizable for an indefinite number of copies

with either an aluminum plate as formerly, or with a zinc plate.

Apparently the action of the phosphate is to form a protective film over the plate, which, in the case of a zinc plate, prevents the gradual oxidization thereof and thus allows the process to be carried on continuously.

I claim:

1. The process of printing, comprising forming on a plate an image which will retain a fatty ink, and treating the plate with a solution of materials which will form an ink repellent coating over the non-image surface of the plate and with an additional substance to prevent oxidization of the plate, and repeatedly printing from such plate by using an ink treated in such manner that it will adhere to the image without adhering to the coating on the non-image portion of the plate.

2. A process of printing from a zinc plate according to claim 1, wherein the ink is also treated with means to prevent corrosion or oxidization of the plate.

3. A planographic printing process comprising providing the plate with an image to be printed and with a substance carrying a material selected from the group containing metallic or ammonium nitrates and aluminum sulphate, and printing from such plate with an ink carrying a material selected from such group, an oxidation preventive adapted to form a protective film on the plate having been added to one of such materials prior to the printing step.

4. A process according to claim 1, wherein the aforesaid oxidation preventive is of the chemical family which includes ammonium acid phosphate.

5. A process of printing, comprising forming on a plate, an image of a material which will retain a fatty ink, and treating the plate with a solution containing a material which will form an ink repelling coating over the non-image surface of the plate, said solution containing also a phosphate, and inking the plate with an ink which has been treated to prevent its adherence to the non-image portion of the plate without preventing its adherence to the image.

6. A printing process comprising the following steps, namely: preparing a printing plate with an image to be printed and with a substance carrying a material selected from the group containing metallic and ammonium nitrates and aluminum sulphate, and carrying also a phosphate, and printing from such plate with an ink carrying a material selected from said group.

7. The process of printing, comprising providing a text on a plate by means of a fatty ink, treating such plate with a solution of a material selected from the group containing metallic and ammonium nitrates and aluminum sulphate, and printing by means of a fatty ink containing material selected from such group and containing also a phosphate.

8. A printing process comprising the following steps, namely: preparing a printing plate with an image to be printed and with a substance carrying a material selected from the group containing metallic and ammonium nitrates and aluminum sulphate and carrying also a phosphate, and printing from such plate with an ink carrying a material selected from said group and carrying also a phosphate.

9. A printing process consisting of providing text on a plate by means of a fatty ink, treating said plate with a solution of ammonium nitrate and ammonium acid phosphate, and printing from such plate by a fatty ink containing ammonium nitrate and ammonium acid phosphate.

10. The process of printing by means of a zinc plate, comprising forming on the plate an image of a material which will retain a fatty ink, and treating said plate with a solution containing approximately two and one-half percent of a metallic or ammonium nitrate or aluminum sulphate and approximately two and one-half percent of phosphate, and printing from said plate by means of an ink containing about the same percent of nitrate or sulphate and phosphate.

11. A process according to claim 3 wherein the aforesaid oxidization preventative is of the chemical family which includes ammonium acid phosphate.

In testimony whereof, I hereunto affix my signature.

VALENTIN DIETZ.