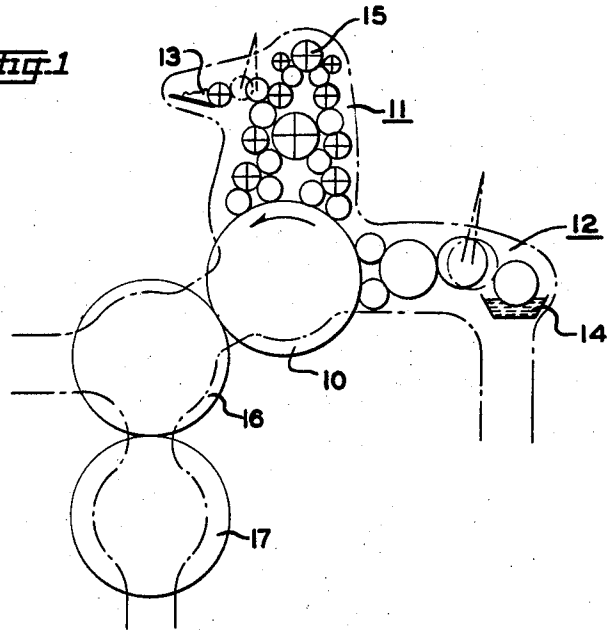
May 24, 1960 C. B. MIESSE, JR 2,937,594

LITHOGRAPHIC PRINTING

Filed May 3, 1955

Fig. 1



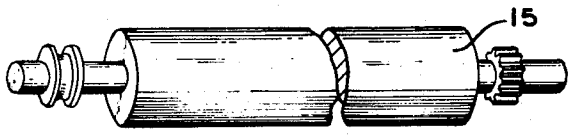


Fig. 2

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LITHOGRAPHIC PRINTING

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One of the serious problems in lithographic printing is the tendency of the dampening solution to react with the steel ink rollers in a way that causes them to reject the greasy ink. This is called stripping; and obviously it interferes with proper mixing and conveying of the ink down through the inker to the lithographic plate. When this difficulty occurs, the customary procedure is to clean the inker and chemically treat the steel roller so as to remove the offending surface layer.

While perhaps not so marked, the same difficulty is encountered even where the ink roller is provided with a copper surface, applied either by electroplating techniques or deposited from a chemical solution. What is said with regard to ink rollers is of course equally applicable to ink-scavenging rollers in the dampening system.

More particularly, in a conventional lithographic printing process, a cylinder carrying a lithographic plate is associated with a train of ink-feeding rollers and a train of water-feeding rollers, the latter being called the dampening system, as illustrated for example in U.S. Patent No. 2,690,119. As the cylinder rotates, the ink-feeding rollers ink the image areas of the plate, while the water-feeding rollers dampen the non-image areas in a manner known in the art. The rotating cylinder engages a rotating blanket roller and transfers to it an image corresponding to the inked areas. The blanket roller in the offset type of printing similarly transfers the image to paper or the like passing between the blanket roller and a third, impression roller.

In the present invention, a roller having a surface prepared as hereinafter described may constitute one of the ink-feeding rollers which passes the ink to the lithographic plate, or, as above noted, a roller having a surface of the present invention may also be used as an inscavenging roller in the dampening system which, because of its ink receptive nature, collects ink which may be picked up from the plate by the rollers of the dampening system.

Also related to the foregoing difficulty is that encountered in the use of lithographic plates themselves where the base of the plate is metal sheet or foil that should normally present an ink-receptive surface. I have discovered that a metallic ink-transfer surface, such as any one of those above referred to, and particularly a steel ink roller, can be rendered ink-receptive and water-repellent by coating the surface in question with copper selenide. I heave further discovered that such a coating can be readily formed by treating the metallic surface with a suitable solution. Where the surface already is formed of copper, the selenide coating may be formed directly by treatment with a dilute aqueous solution of selenious acid. However where the surface is of steel, I preferably employ a dilute aqueous solution of reagents yielding a concentration of cupric ions sufficient to deposit a film of copper by galvanic action and include in such solution a selenious compound capable of reacting

stoichiometrically with such film to produce the desired copper selenide coating.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

In the accompanying drawing:

Figure 1 is a diagrammatic sectional view of printing apparatus, and

Figure 2 is a perspective view of a roller having a surface prepared in accordance with the present invention.

Referring to the drawing, the printing apparatus includes a lithographic cylinder **10** cooperating with a train of ink feeding rollers generally shown at **11**, and a train of water feeding rollers generally shown at **12**. Ink is transferred from an ink duct **13** to the rollers of train **11** and then to the cylinder **10** in a conventional manner, the cylinder **10** carrying the lithographic plate. Similarly, water is transferred from a trough **14** to the rollers of train **12** and then to the cylinder **10**. In particular, an inking roller such as that shown at **15** may have a surface prepared in accordance with the present invention. Also, the lithographic plate on the cylinder **10** may have printing areas so prepared. A blanket roller **16** and an impression roller **17** pass paper or the like therebetween which receives an impression from the cylinders **10** and **16** in a well known manner.

The following description sets forth in detail certain approved compositions of matter and methods of employing the same, such disclosed composition and steps constituting, however, but one of various ways in which the principle of the invention may be used.

In general, in carrying out the invention, I may use an aqueous solution consisting essentially by weight of less than 2% of an inorganic copper salt, less than 1% of hydrochloric acid and approximately 2% of selenious acid.

The following is a particular formula which has been found quite satisfactory for use as an anti-stripping solution for steel ink rollers, viz.:

Example A

	Parts
Cupric sulphate pentahydrate	1.21
Selenious acid	1.93
Hydrochloric acid spg=1.19	0.42
Water (deionized)	96.50
Wetting agent	.07

The proportion of the foregoing constituents may be varied within rather wide limits, provided the following principles be observed. The solution should be in a pH range such as to give an adherent copper layer deposited by chemical action on the base metal concerned, this being different for different base metals. The solution should contain no compound which would react with the $SeO_3^=$ radical. The solution should contain a copper compound yielding the desired concentration of cupric ions and a selenum compound yielding the desired concentration of $SeO_3^=$. The concentration of cupric ion should be such as to deposit on the metal a continuous film of copper by galvanic action. The concentration of $SeO_3^=$ ion must be such as to react stoichiometrically with the deposited copper to produce copper selenide.

The amount of wetting agent should be such as to reduce the surface tension of the solution to a point where the metal being treated is readily wetted by the solution. A reduction of the surface tension of the solution into a range of 40–50 dynes per square centimeter is sufficient. The chemical composition of the wetting agent must be resistent to the oxidizing action of the selenite radical. Numerous such wetting agents are available in the anionic, cationic or non-ionic types. The preferred type for this use is a non-ionic wetting agent which might

be an aromatic polyglycol ether condensate such as Neutronyx 600 produced by the Onyx Oil Company.

It is desirable to include an agent which will limit the number of cupric ions available in solution so as to improve the adherence and density of the deposited layer. A convenient material for this purpose is hydrochloric acid.

A solution made up according to the example just given may be applied to the surface of the roller in any suitable way, e.g. by dipping, spraying, or even brushing, so long as adequate uniform treatment is obtained. The following are additional examples of solutions effective in producing the desired copper selenide surface on steel, although the cost thereof would be somewhat higher than the example first given above, viz.:

Example B

	Parts
Copper sulfamate	1.23
Selenious acid	1.96
Hydrochloric acid spg=1.19	0.42
Water (deionized)	96.40
Wetting agent	.07

Example C

	Parts
Copper fluoborate	1.15
Selenious acid	1.92
Hydrocloric acid spg=1.19	0.42
Water (deionized)	96.30
Wetting agent	.07

The comments previously made in connection with Example A as to the range of proportions will of course apply equally to the ingredients entering into Examples B and C. Moreover, it will be understood that in any case, where the metallic ink-transfer surface is already of copper, the copper compound and reacting acid ingredient may be omitted and the solution in such case will consist only of the selenious acid of approximately the indicated concentration, together with the relatively small amount of a suitable wetting agent.

Other modes of applying the principle of my invention may be employed instead of those explained, change being made as regards the products and methods herein disclosed, provided the step or steps stated by any of the following claims or the equivalent of such stated step or steps be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A method of transferring ink to a receiver therefor comprising the steps of applying ink to a surface of a transfer member consisting essentially of copper selenide, and pressing the copper selenide surface against said receiver to transfer the ink thereto.

2. An improved method of transferring ink to a receiver therefore by means of a transfer member comprising the steps of forming on said member a coating of copper selenide to enhance the ink-attractiveness thereof and overcome stripping, applying ink to said coating, and then transferring the ink from said coating to the receiver.

3. An improved method of transferring ink to a receiver therefor by means of a member having a copper surface comprising the steps of treating said surface with a dilute aqueous solution of selenious acid to deposit thereon a coating of copper selenide and enhance the ink-attractiveness thereof and overcome stripping, applying ink to said coating, and then transferring the ink from said coating to the receiver.

4. An improved method of transferring ink to a receiver therefor by means of a member having an iron surface comprising the steps of depositing on such surface a continuous film of copper, reacting the latter with selenious acid to form a coating of copper selenide to enhance the ink-attractiveness thereof and overcome stripping, applying ink to said coating, and then transferring the ink from said coating to the receiver.

5. A method of transferring ink from a first member to a second member having a surface of copper selenide comprising the steps of applying ink to the first member, and then placing the first member against the second member to transfer ink to the copper selenide surface thereof.

6. A method of accumulating ink on a scavenging roller comprising the steps of forming on such roller a surface of copper selenide to enhance the ink-attractiveness thereof, and then depositing ink on such surface to accumulate the ink thereon.

7. In a printing press having an inking system provided with an ink transfer member and having a plate member to receive and transfer ink, the improvement wherein at least one of said members has an ink-contacting surface of copper selenide.

8. In a lithographic printing press having an inking system provided with ink transfer members and a dampening system, the improvement wherein at least one of said ink transfer members has an ink-contacting surface of copper selenide to enhance the ink-attractiveness thereof.

9. In a lithographic printing press having an inking system provided with rollers and a dampening system provided with rollers, the improvement wherein at least one of the rollers of said inking system comprises a steel surface united with a layer of copper selenide to improve the ink-attractiveness and overcome stripping of said roller.

10. In a lithographic printing press having an inking system provided with rollers and a dampening system including a scavenging roller, the improvement wherein at least one of said rollers has an ink-contacting surface of copper selenide to improve the ink-attractiveness of said roller.

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