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PRINTING PLATE HAVING A WATER REPELLENT SURFACE
AND METHOD OF PREPARING SAME
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Fig. 1.

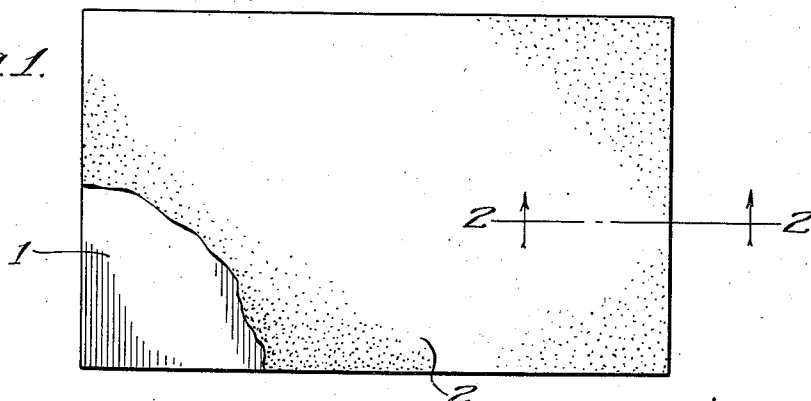


Fig. 2.

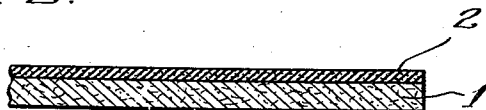
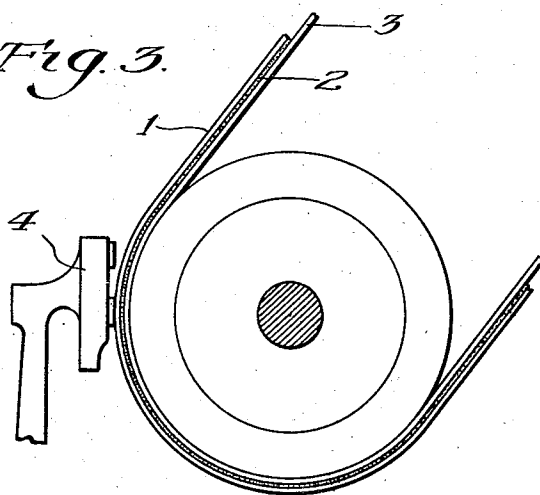


Fig. 3.



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UNITED STATES PATENT OFFICE

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PRINTING PLATE HAVING A WATER REPEL-
LENT SURFACE AND METHOD OF PREPAR-
ING SAMEHerbert L. Davis and Edward A. Reineck, Apple-
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6 Claims. (Cl. 41—41.5)

The invention relates to an improvement in plane surface printing plates and to a method of preparing the same for printing, whereby copies having images or designs formed of water soluble inks may be obtained from the plates.

The planographic printing plate heretofore known consists of a plate having a printing surface of which the ink receptive image portion is an oily or other water-repellent ink receptive material, and the non-image portion is water sensitive so that it will retain a film of water which will prevent adherence of oily ink. In making copies from such plates the image on the plate must be inked and re-inked while the non-image portion is repeatedly moistened with water.

The printing plate embodying this invention has a printing surface of which the ink receptive image portion consists of an aqueous-ink receptive material, and the non-image portion consists of a water repellent material.

An advantage of the printing plate of the invention is that moistening is not necessary.

Another advantage is that it can be used for producing copies in water colors.

Other objects and advantages will become apparent as the following detailed description progresses, reference being had to the accompanying drawing, in which

Fig. 1 is a plan view of the printing plate of this invention prior to the treatment for making portions aqueous-ink receptive, showing the coating partly broken away from the backing.

Fig. 2 is an enlarged sectional elevation taken along line 2—2 of the printing plate of Fig. 1.

Fig. 3 is a diagrammatic view showing the coated printing plate of Figs. 1 and 2 assembled in a typewriter against a sheet for producing water-ink receptive images on the coated plate.

Referring to the drawing in which a preferred embodiment of the invention is illustrated, the reference character 1 represents a flexible paper sheet having a mobile water repellent greasy coating 2. In preparing this coated sheet for printing purposes the sheet is placed with its coated side against another sheet 3 hereinafter called a transfer sheet which is either uncoated on the side next to the greasy coating 3 or coated on this side with a substance which is compatible both with oil and water. In the form shown in Fig. 3 the transfer sheet is a blank piece of paper 3. The matter to be copied is impressed on the exposed surface of the coated printing plate by means of some pressure or im-

typewriter, a pencil or the like. In this manner portions of the water repellent surface of the printing plate are rendered receptive of aqueous inks, the aqueous ink receptive portions being in the form of the mirror reverse image of the matter to be copied. The surface of the printing plate so made is contacted by means of rollers or the like with a water soluble or water bodied ink, whereby the image receptive portions of the plate receive and retain the water-ink and the other portions of the plate repel the ink. The inked printing plate is then used as a master copy sheet for making copies by contacting it with copy sheets in a similar manner as an ordinary planographic plate except that moistening is not necessary, and a water soluble ink is used for inking and re-inking instead of the usual oily ink. A large number of copies are obtained having water color images, or designs, instead of the oily ink designs obtained with an ordinary planographic or lithographic plate.

The non-image portions of the printing plate of this invention must present a surface possessing a high degree of water-ink repellency and must be capable of standing, without breakdown, continued treatment involving inking and printing. When the surface of the printing plate is a coating, the coating must not only be water repellent but must be tenaciously retained by the backing and not be picked off by the inked rollers.

A suitable printing plate is a paper sheet having a coating of a viscous, mobile, water-repellent substance. As a base sheet there is contemplated tablet paper, Kraft wrapping paper, glassine, Cellophane and wax-coated papers. As a coating for such base sheets there is contemplated various water-repellent materials, including petrolatum, castor oil, soya bean oil, cotton seed oil, linseed oil, lard, suet, and paraffin wax.

One of the most satisfactory printing plates consists of a paraffin-wax paper coated with petrolatum. "Wet wax" sheets possessing a heavy surface coating of paraffin are more suitable as base sheets than "dry wax" sheets in which the coating is thinner.

Another suitable printing plate which is particularly valuable when an uncoated paper transfer sheet is used to create the image receptive portions of the plate, consists of tablet paper impregnated and coated with suet.

The transfer sheet for rendering portions of the master sheet ink receptive may suitably consist of a sheet of paper or other flexible material coated with a substance which is both water-

soluble and oil-soluble. It also may suitably consist of a sheet such as uncoated or blank paper which has a surface capable of absorbing water-repellent material from the surface of the printing sheet to such an extent as to expose the underlying fibers. When a coated transfer sheet is used it is imperative that the coating material be fairly strongly held on the base sheet in order that only where a definite pressure is exerted, such as that supplied by a pencil or typewriter key, will any of this material be transferred to the printing sheet or master sheet. On the other hand adherence of the coating to the transfer sheet must not be so great that a sufficient quantity is not picked off on impression and retained by the surface of the printing sheet or master sheet. Adhesion then to the surface of the master or printing sheet must be sufficient to prevent the removal of the transfer coating during the process of inking and printing. Suitable coating materials satisfying these requirements include wetting agents such as sulfonated castor oil and mahogany soap. Of these, sulfonated castor oil or turkey red oil is preferred. However, while satisfactory results were obtained by the use of a coated transfer sheet, it was discovered that similar and in some respects even better results were obtained by using simply a blank or uncoated sheet of paper for the transfer sheet.

In applying the water soluble or water bodied ink over the surface of the printing plate the ideal arrangement is to have a considerable quantity of ink retained by the design on the master sheet while none remains on the ground. In other words the cohesive forces within the ink must be greater than the adhesive forces between the ink and the ground surface, but less than those between the design material and the ink. If the ink is too tacky there is danger that the design will be picked off the master sheet by the roller. An ink prepared from 100 parts by weight of ethylene glycol, 50 parts of gum arabic and 10 parts of Victoria blue dye proved to be satisfactory, except that some tendency to adhere to a paraffin ground was shown. A similar ink prepared with glycerine rather than ethylene glycol showed a lesser tendency to adhere to a paraffin ground. The addition of one part of Stacol, an inorganic resin obtainable from the Glycol Products Co., resulted in increased tackiness and in general gave improved results.

The mechanism by which ink repellency occurs in the printing plates of this invention has been studied. It appears that the mobility of the ink repellent coating is a prime factor, since the effect seems to depend on the splitting of the grease coating; a thin film adhering to the inking roller and the remainder retaining its position on the surface as a protection against subsequent inkings. For the production, therefore, of a large number of copies, replenishment of the protective water repellent substance should be made. The effect of mobility is particularly well shown in the difference between using a master sheet coated with paraffin wax alone and a master sheet coated with paraffin wax having over the paraffin wax another coating of petrolatum. In the latter case a much more effective ink repellency is obtained.

The efficiency of a blank or uncoated transfer sheet has also been investigated. If a waxed paper master sheet or printing plate is written on while its back is in contact with a blank sheet of tablet paper and thereafter turned over and inked, it will be found that the design made

by thus disturbing the paraffin surface is more capable of taking ink than is the surrounding ground surface. A coating of such a substance as lard renders the ground surface repellent to a glycerine gum arabic ink while the design takes up enough ink to produce a very good printing plate. Using suet impregnated master sheets, printing plates have been produced in this way which are quite the equivalent of those prepared with a specially designed material, such as turkey red oil. If a glass plate is substituted for the blank transfer sheet the effect produced on the back of the master sheet is not the same. No preferential adsorption of ink on areas corresponding to the design will occur on the side of the master sheet formerly in contact with the glass surface, although such an effect will be shown by the disturbed areas on the front of the master sheet. These observations suggest a theory to which we do not care to be limited, that in producing a printing plate when using a waxed master sheet and a blank transfer sheet the pressure exerted in making the impression breaks loose fragments of paraffin and forces them into contact with the underlying sheet of paper to which they adhere upon subsequent separation of the sheets. Some of the fibers of the master sheet are thereby exposed and enabled to catch and retain the ink. A basis for this explanation is found in the fact that the fiber length existing in the base of the master sheet has an influence on the regree and nature of ink retention displayed by the design. Greatest ink receptivity is found in the case of the long fibered lightly beaten paper stock.

One of the most satisfactory printing plates is prepared by dipping a sheet of tablet paper in melted suet, draining off the excess while cooling and writing or typing thereon while in contact with a blank transfer sheet. This printing plate inked with a glycerine gum arabic ink gives a large number of legible prints.

By the term "water absorbent material" used in the claims, is meant a material such as paper, cellulose and fiber materials which have the property of soaking up water as opposed to materials such as rubber or grained metals which are merely wetted on the surface by water.

While there have been shown and described certain embodiments of the invention, it is to be understood that it is capable of many modifications. Changes, therefore, may be made without departing from the spirit and scope of the invention as described in the appended claims, in which it is the intention to claim all novelty inherent in the invention as broadly as possible, in view of the prior art.

We claim:

1. The method of preparing a printing plate adapted for use as a master copy sheet in reproducing copies of images formed of aqueous inks which comprises placing a flexible master sheet having a water repellent greasy surface against a transfer sheet having a coating of a water and grease compatible material, the greasy surface of the master sheet being in contact with the coating of the transfer sheet, and impressing the matter to be copied on the exposed surface of the master sheet whereby ink receptive portions which may be inked and reinked with an aqueous ink are formed on the other side of the sheet.

2. The method of preparing a printing plate adapted for use as a master copy sheet in re-

producing copies of images formed of aqueous-inks which comprises placing a flexible master sheet having a water repellent greasy surface against a transfer sheet having a coating of wetting agent, the greasy surface of the master sheet being in contact with the coating on the transfer sheet and impressing the matter to be copied on the exposed surface of the master sheet, whereby ink receptive portions which may be inked and reinked with an aqueous ink are formed on the other side of the sheet.

3. The method of preparing a printing plate adapted for use as a master copy sheet in reproducing copies of images formed of aqueous-inks which comprises placing a flexible sheet of waxed paper having a coating over the wax of water-repellent greasy material against a transfer sheet having a coating of sulfonated castor oil, the greasy coating of the master sheet being in contact with the sulfonated castor oil coating of the transfer sheet, and impressing the matter to be copied on the exposed surface of the master sheet, whereby ink receptive portions which may be inked and reinked with an aqueous ink are formed on the other side of the sheet.

4. A planographic printing plate comprising a flexible sheet containing water absorbent material coated on its printing surface with a water

repellent material, design portions on the printing surface substantially free of water repellent material and containing water absorbent material whereby the exposed surface of the design portions is adapted to soak up aqueous inks, and portions of the material of the plate below the surface design areas adapted to block free passage of the aqueous ink.

5. A planographic printing plate comprising a flexible fibrous sheet coated on its printing surface with a water repellent material, design portions on the printing surface substantially free of the water repellent material whereby the exposed fibers in the design portions are adapted to soak up aqueous inks, and portions of the material of the plate below the surface design areas adapted to block free passage of the ink.

6. A planographic printing plate comprising a flexible sheet coated and impregnated with a water repellent material, design portions on the printing surface substantially free of the water repellent material whereby the exposed surface of the design portions is adapted to soak up aqueous inks, and portions of the material of the plate below the surface design areas containing water repellent material whereby free passage of the aqueous ink through the plate is prevented.

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