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PLANOGRAPHIC PRINTING PLATE

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Fig. 1.

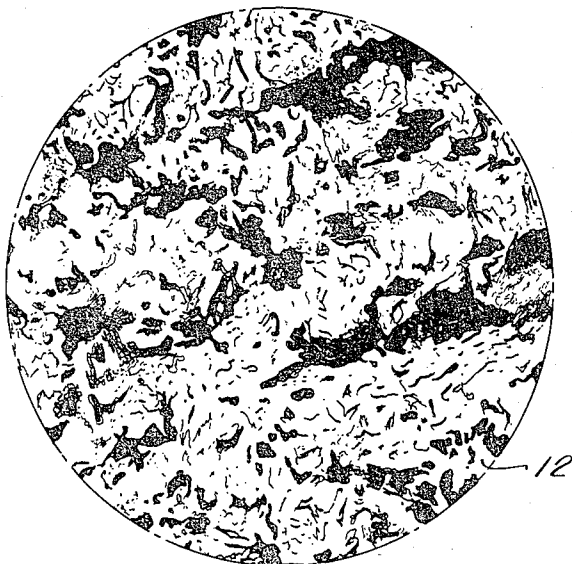


Fig. 3.

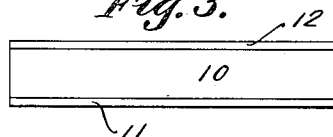
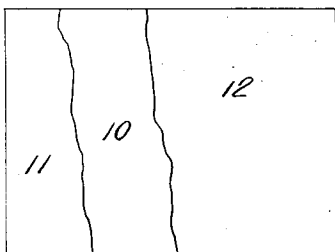


Fig. 2.



Fig. 4.



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PLANOGRAPHIC PRINTING PLATE

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7 Claims. (Cl. 101—401.1)

This invention relates to improvements in planographic printing plates and more particularly to plates destined to receive directly a type-written printing image, and it comprises a non-metallic plate core or body retentively faced on opposite sides with a thin filmiform layer of a metal suitable for planography, as zinc.

The problem of forming a printing image on a planographic plate by direct typewriting presents several difficulties which, so far as I am aware, have never been satisfactorily eliminated in respect of any given prior plate.

Sheet metal, usually zinc and as thin as five-thousandths of an inch, has been proposed and used for the stated purpose; but such sheet metal, by reason of its inherent springiness, cannot be held in close contact with the cylindrical typewriter platen by the usually available means provided for the purpose of so holding paper. As a result the type face hits the metal plate at a point where the latter is out of contact with, and at some distance from, the typewriter platen and causes a highly objectionable relatively deep embossing of the metal. This difficulty is not obviated by the use of very soft metal, for when the metal is sufficiently soft to admit of cylindrical deformation to contact with the typewriter platen by the usual means, embossing will ensue because of lack of support due to the resilient deformability of the substance of the platen itself and the further fact that, under the stated conditions, the very softness of the metal itself favors ready deformation.

The use of a fairly dense paper as a backing for thin metal foil, cementitiously attached thereto, or derived in situ either by spraying or electrolytically, has been heretofore suggested; but such paper backings, while sometimes effective to diminish the tendency to embossing, leave much to be desired in several respects. Unless the interstices of the paper are satisfied with some inert material, the paper, being hygroscopic, varies in moisture content with the prevailing relative humidity and the resultant expansion or contraction of the paper causes extremely objectionable buckling of the composite. Moreover, for offset planographic printing, a variation in thickness of even less than one-thousandth of an inch may have a disastrous effect upon the life and/or sharpness of the printing image, and hence paper backed plates, the backing of which is susceptible to expansion by atmospheric moisture, are inherently unsatisfactory. The paper may of course be rendered inert to moisture but this introduces other difficulties.

In order effectively to prevent embossing, the paper back must be relatively dense or non-bibulous, and in consequence, is not readily absorptive of waterproofing agents. Even when satisfactorily treated, from the standpoint of waterproofing, the paper is either rendered so stiff as to be objectionable on that score or, if the waterproofing agent be such as to maintain the desired flexibility, the product is so soft as to permit ready embossing of the supported metal foil, which, as stated above, is objectionable. Because of the tension strains to which planographic printing plates are subjected in the printing press, the metal facings of prior plates have been made thicker than the paper backings, which increases the tendency to embossing.

The printing surface of prior planographic printing plates have been commonly conditioned for use by abrasive attritional graining of the surface under the combined influence of a fine abrasive and gyrating marbles. So far as I know planographic printing plates have always been grained on but one side only. This is because it is practically impossible to grain the reverse side without so damaging the obverse or first grained side as to render it substantially unfit for use.

It is an object of this invention to produce a dual-faced composite planographic printing plate comprising a non-metallic core or body and retentively adherent filmiform metallic surfaces; at least one and preferably both of the said surfaces being initially provided with a suitable "tooth" or grain. It is another object of this invention to provide a planographic printing plate comprising a non-metallic body and two waterproofing adherent filmiform layers of metal co-extensive therewith; whereof a printing surface is constituted by the outer surface of at least one of said layers suitably grained for planographic purposes. Another object of this invention is to provide a composite planographic printing plate, as herein described, capable of being cylindrically deformed to the radius of typewriter platens by the means usually provided to guide paper about and to hold the same in contact with said platens. Still another object is to provide a composite planographic printing plate whereof the central portion and the major volumetric proportion is a non-metallic material characterized by a density substantially less than that of its metallic exterior portion and a substantially greater recoverable deformability than has the metal of the said exterior portions, and wherein the said non-metallic material is waterproofed throughout its major surface by an adherent filmiform

layer of metal on and coextensive with each of said surfaces; and sometimes but not always further waterproofed by the imbibition of a suitable waterproofing agent at the exposed edges of the non-metallic material.

As an example of one mode of preparing a plate exemplifying my invention, a thin sheet of metallic foil, and by preference zinc, of a thickness which may be conveniently of the order of one thousandth of an inch is cemented to one face of a sheet of cellulosic material, as paper for instance, of appropriate thickness and density, and then another like metallic film is cemented to the opposite side, or both surfaces of the paper may be brought into cementitious contact with respective metal films simultaneously. In general, and particularly when both surfaces are metal-coated simultaneously, I prefer to use a heat sensitive adhesive; that is, an adhesive which is rendered tacky by heat and does not depend on the dissipation of moisture or a volatile solvent to develop a strong adhesive bond. As the art of laminating paper and metal foil is well understood and forms, as an operation, no part of this invention, no further explanation thereof is here deemed necessary.

Planographic printing plates are retained on the form roll of the press under considerable tension and hence it is essential that the plates be substantially non-extensive under this tension and it is obviously necessary that they have sufficient mechanical strength to withstand the tensions normally encountered in planographic printing machines. It is an advantage of the dual-faced plates of this invention that, by reason of the two-metal facings and relatively dense non-metallic core, the said plates have a sufficient mechanical strength for the purpose and are still much more flexible than a single metal plate of equal strength.

For the non-metallic core, I prefer to use a fairly long fiber cellulose paper which may be an alpha cellulose, cotton shearings, or even a rope paper. I have found an over-all thickness of about ten thousandths of an inch to be generally suitable for my purpose when the filmiform layer of metallic facing is of the order of one thousandth each. The cementitious binding agent may be asphaltum or certain heat reactive artificial resins of the condensation type and of high flexibility such as those produced by the condensation of phenol and formaldehyde in the presence of a siccativ oil, tung oil for instance, and which readily wet and adhere to metal with great tenacity. Whatever the adhesive may be, it should be very thin and non-plastic in the dry state.

While I prefer to use paper, as stated, for the intervenor or body of my improved planographic plate, other non-metallic bodies may be used. Pyroxylin, for instance, and particularly when rendered highly flexible as by a plasticizer, is suitable, though not as desirable as paper from the standpoint of cost. It will be apparent that many other non-metallic materials may be used, for example a close woven fabric impregnated with a heat reactive artificial resin, suitable for the adhesive retention of the metallic surfaces and occlusion of the interfiber pores, may be used with advantage where relatively large plates under more than usual tension are required.

The density or hardness of the core or non-metallic body material is dictated by the hardness and thickness of the metal facings. As stated, I prefer a facing of about one thousandth

of an inch in thickness as a maximum, and five or six ten-thousandths as a minimum. When the facings are of zinc and between these thicknesses, paper of the density of a hard bond stock is sufficiently great to prevent embossing in a well-adjusted typewriter. When aluminum foil is used as the facing, the paper core should be of slightly greater density. The paper intervenor must be appreciably thicker than the metal of the facings, if the recoverable deformability is to be sufficient to substantially prevent embossing; and I prefer to use paper about four times as thick as the combined thickness of the metal facings. For any given metal facing, the density and thickness of the paper should be such as will effectively cushion the metal under the impact of the type face and thus prevent such embossing as would interfere with the printing of a cleancut image.

In general I prefer to use as facings metal foils which, in the process of rolling, have been given a fine crepe-like grain. In any event, and because one surface of the metal foil facing may be grained, during and by the rolling operation, or otherwise, prior to lamination with the intervening core I prefer to provide the plates of this invention with foil facings both of which are grained and in condition to receive a printing image. Sometimes, and particularly in large plates for coarse work, one surface only may be regarded as the printing surface and be provided with a medium or coarse grain, and the other surface regarded merely as a waterproofing and reinforcing backing, and hence may be constituted by an ungrained foil; but this I do not recommend. Why the dual-faced plates of this invention are more resistant to embossing than is a plate composed of a like non-metallic backing and a single metal facing is not known. It is observed, however, that there is less embossing, everything else being equal, when both faces of the plate are faced with metal foil than is obtained with prior composite plates having but one metal facing; and this is of advantage.

Other advantages accrue from the dual facings of the plates of this invention, among which may be mentioned the fact that when, as is preferred, both surfaces are grained, the plate has a double utility and there is a saving in both cost and storage space. There is also advantage in effecting waterproofness without sacrifice of the desirable characteristics of the paper core.

In the accompanying drawing which illustrates the embodiment of my invention previously described,

Fig. 1 is a greatly enlarged plan view of a portion of one and a preferred type of a face of a composite plate embodying this invention;

Fig. 2 is a similar view of a portion of another type of face of such plate;

Fig. 3 is a side view of the plate; and

Fig. 4 is a plan view with parts broken away to show the various layers of the plate.

The surfaces illustrated in Figs. 1 and 2 are fortuitously produced in the rolling of metal to a thin foil as is well understood in that art.

The reference numeral 10 designates the non-metallic core of the plate and the reference numerals 11 and 12 designate the metallic facings, the exposed surfaces of both facings being grained, and in condition to receive printing images.

It is obvious that, while I have described the composite plate of this invention as built of two exteriorly disposed metal foils and a single non-metallic intervenor, the same end may be accomplished in any one of several ways. Thus the

filmiform exterior layers may be derived in situ by electro-deposition of the metal on the non-metallic core, or two paper-backed foils may be assembled by bonding the paper backings together to produce a composite laminated core.

I claim:

1. A planographic printing plate comprising a non-metallic core and metallic facings on both sides of the core, said facings being coextensive with the core and cementitiously secured thereto to waterproof the sides thereof and the edges of the core exposed between the facings being substantially waterproofed.

2. A composite planographic printing plate comprising a non-metallic core and metallic facings on both sides of the core and cementitiously secured thereto, said plate being deformable to the radius of a typewriter platen by the means usually provided to guide paper about and hold the same in contact with the platen, said core being characterized by a density relatively less and a recoverable deformability substantially greater than that of the facings.

3. A planographic printing plate comprising a non-metallic core and metallic facings coextensive therewith and permanently secured thereto by waterproofing cement, the edges of the core being substantially waterproofed.

4. A planographic printing plate comprising a

non-metallic core and metallic facings coextensive therewith and permanently secured thereto, the surfaces and edges of the core being treated with waterproofing material whereby the body of the core is protected against the action of water.

5. A planographic printing plate comprising a non-metallic core and metallic facings coextensive therewith and permanently secured thereto, said core being characterized by having a substantially greater recoverable deformability than that had by the metallic facings.

6. A planographic printing plate comprising a non-metallic core and metallic facings on both sides of the core, said facings being adapted to receive printing images thereon and said core being of such density as to prevent the embossing of the facings by the application of the images thereon.

7. A planographic printing plate comprising a non-metallic core and metallic facings on both sides of the core and permanently secured thereto by waterproofing cement coextensive with the core, said facings being adapted to receive printing images thereon and said core being of such density as to prevent the embossing of the facings by the application of the images thereon.

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