June 5, 1951 D. A. NEWMAN 2,556,144

PLANOGRAPHIC MASTER PLATE

Filed July 12, 1946

Fig. 1

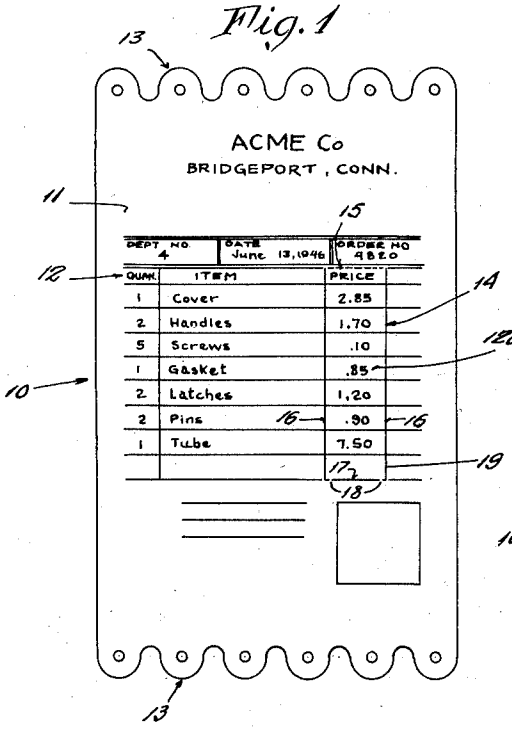


Fig. 2

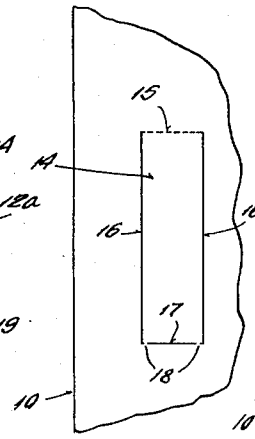


Fig. 3

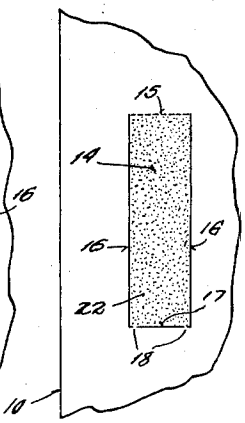


Fig. 4

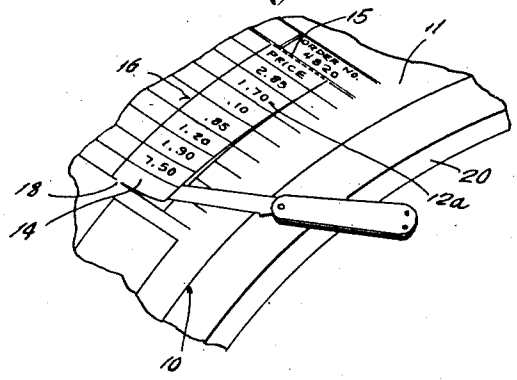
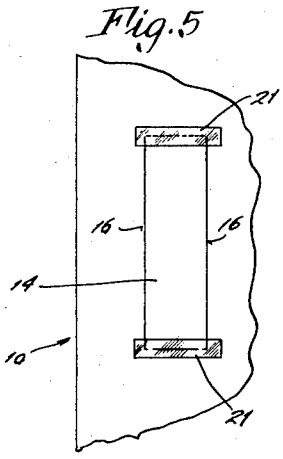


Fig. 5



INVENTOR.
Douglas A. Newman
BY
Johnson, Kline and Hensel
ATTORNEYS

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PLANOGRAPHIC MASTER PLATE

Douglas A. Newman, Port Washington, N. Y., assignor to Columbia Ribbon and Carbon Manufacturing Company, Inc., Glen Cove, N. Y., a corporation of New York

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10 Claims. (Cl. 101—149.2)

1

This invention relates to improvements in planographic printing plates, their manufacture and their use in planographic printing.

The art of planographic printing, referred to herein, comprises the preparation of a master plate having on its printed surface an ink-receptive water-repellent image, usually formed of some oleophilic material, surrounded by a non-printing hydrophilic background which is moistened with aqueous fluids during use, and is thereby rendered repellent toward the printing inks employed. In use, the master plate is moistened with an aqueous fountain fluid to render the background ink-repellent, inked with an inking roller, thus depositing ink solely on the ink-receptive image, and the ink is then transferred from the image to a copy sheet, either through the medium of an offset blanket or cylinder, or, if the master image is formed in reverse, by direct impression on a copy sheet; the moistening, inking and transferring operations being repeated for as many copies as desired.

While metal plates were principally used in the past for planographic printing, more recently, planographic plates have been made to an increasing extent of paper, parchment, or similar flexible fabrics forming the body or foundation of the plate, and having a printing surface of appropriate material to provide the required image-retaining and hydrophilic background properties. The present invention relates particularly to improvements in plates having a flexible fabric body or foundation of the latter kind.

An important field of use for planographic printing plates in business organizations lies in the reproduction of business records in which form matter to be duplicated such as headings, titles, addresses, and ruled lines or spaces are preformed on the master plate, while additional data is subsequently inserted in appropriate areas for reproduction on the copies. Ordinarily the form matter is preprinted with image-forming material, and the remaining data is inscribed in the appropriate spaces by typing, printing, or the like, with image-forming material before the plate is used.

Often it is desired to make a number of copies from a plate reproducing the entire image thereon, as well as some copies in which part of the image, particularly portions specially inscribed such as price extensions, quantities, confidential or interdepartmental communications, and the like are to be deleted. Deletion of such image-forming matter presents a problem not

2

satisfactorily solved heretofore in the planographic printing art. Thus, erasure by mechanical or chemical treatment of part of the data on the plate after use thereof for printing complete copies, is unsatisfactory or exceedingly inconvenient, since it is difficult to remove the last traces of the image to be deleted so that no trace thereof will be reproduced on subsequent copies. Moreover, it is difficult to limit erasure or eradicating treatment to the desired area, without forming unsightly partial reproduction of borderline areas of the image thereon or adjacent thereto. Furthermore, it is inconvenient or impossible to carry out such eradicating treatment while the plate is moistened with the aqueous fountain fluid and the image is still coated with wet printing ink.

Expedients for deletion which have been used with reasonable success in other methods of duplication, for example, in hectograph processes involving application of a masking strip or patch to cover the area on a master plate which is to be deleted, can not be used successfully on planographic plates because the thickening of the plate caused by such masks prevents reproduction of the adjacent image around the area to be deleted. Satisfactory planographic reproduction requires uniform thickness of those portions of the plate which come in contact with the image-receiving or transfer surface.

In accordance with my invention I have been able to construct a planographic plate of flexible fabric such as paper, parchment, or laminated structures made up of such fabrics wherein predetermined areas of the image-bearing portions of the master plate can be rapidly and conveniently deleted so as to eliminate entirely the image-forming matter inscribed therein and to leave a sharply defined blank space on the copies without affecting reproduction of the surrounding image in any way. Moreover, in using a plate according to my invention, deletion of the desired area can be carried out at any time, regardless whether the plate is wet or dry, and regardless whether it has been used or not; and the deletion can be made without removing the plate from the printing press.

As a further aspect of my invention, the image can not only be deleted but can also be replaced, if desired, or a substitute image inserted for reproduction on some of the copies.

In accordance with my invention, a planographic plate having a flexible fabric foundation as its body, e. g. paper, parchment, cellulose derivatives or similar materials, laminated or not, having a planographic printing surface

which can be formed of material having the required properties, or treated, for example, by coating, impregnating or otherwise incorporating hydrophilic materials in the printing surface of the plate to provide the desired printing properties, and advantageously including structural elements or materials which tend to resist stretching, curling or other deformation under the condition of tension and moisture to which the plate is subjected during use, is provided with a removable area corresponding to a preselected portion of the plate which carries, or is adapted to receive, portions of the image to be deleted during the production of at least some of the copies made from the master plate. The removable area is formed by outlining it with weakened severance lines, formed, for example, by a series of perforations and preferably including substantial portions along which the edges of the area are completely severed from the adjoining portions of the plate. Preferably, the upper or leading edge of the removable area is formed by a series of perforations or relatively short slits, separated by readily severable points of attachment, so that this edge will be relatively firmly attached to the adjacent portion of the plate prior to removal of the area. The lower or trailing edge of the area is advantageously severed substantially along its entire length, except a few relatively widely spaced points of attachment, preferably a pair of such points adjacent the corners of the area. The side edges of the area can be completely severed from the adjacent portions of the sheet the lateral severance lines being constituted by continuous slits. The terms "leading edge" and "trailing edge" refer respectively to the edges of the area in their relation to the direction of relative movement of the plate when used on a planographic printing press, the leading edge being that end of the area which initially contacts the moistening, inking and printing elements of the press, and the trailing edge being the opposite end of the area which is last brought into contact with these relatively movable parts of the press. Since the plate is ordinarily attached to a printing press with its top margin constituting the leading edge of the plate, the top edge of the removable area is likewise its leading edge.

In using a plate made in accordance with my invention, the plate which is usually preprinted with image-forming form matter, is inscribed with an image of the desired information, inserting the data to be deleted from some of the copies within a removable area formed as aforesaid within the limits of the plate. The plate is then secured to the support, for example, the cylinder ordinarily provided therefor, in a planographic printing press and copies are made of the entire image in the conventional manner. In the preferred construction in which a line of perforations constitutes the leading edge of the removable area, and the trailing edge is secured to the plate adjacent its corners, any tendency of the area to curl or deform or to bulge or flap outward during operation of the machine during use of the plate for printing is avoided. Attachment of opposite ends of the area to the surrounding portions of the plate thus prevents deformation or disalignment of the side edges even though they are completely severed from the adjacent portions of the plate.

When copies are to be made with the image on the removable area deleted, the area is removed by severing it from the remainder of the plate along the surrounding weakened severance lines. This can be done without removing the plate from its support in the press, or at any time, e. g. after the plate has been removed and dried for subsequent use.

In accordance with one aspect of my invention, the removable area can be replaced, for reproduction of the entire image, after copies have been made with the image on the removable area deleted. For example, the plate can be removed from the printing press and, in the absence of other provisions for holding it in place, the removed area can be secured in its original position by strips of adhesive ribbon, for example, with pressure-sensitive "Scotch tape" applied to the rear surface of the plate. Preferably however, a coating of inactive adhesive is formed on the rear surface of the removable area, either covering its entire surface or applied in spots or stripes. The adhesive, which is preferably waterproof, can be activated after the area is removed by moistening with an appropriate solvent or swelling agent and the removed area adhered to the plate support in the same position which it originally occupied with relation to the plate as attached to the support. In the same manner a substitute area of the same shape and size can be inserted in the space left in the plate by removal of the removable area to make copies having a different inscription within the limits of the removable area.

If the removable area is so wide as to permit contact of the inking roller with the surface underlying the plate after the area is removed, various means may be employed to prevent deposition of ink thereon and consequent formation of blotches on the copies. For example, a second planographic plate having ink repellent properties when moistened by the fountain fluid used on the press can be positioned on the plate support under the plate with the removable area, or the plate-supporting surface itself can be made so as to have such properties. Thus, when the removable plate area is detached, the surface thereby exposed will reject ink from the inking roller, and no deposition of ink on the copies will result. A similar result can be obtained by replacing the removed area with a blank area of planographic plate material secured in place by adhesive as described above for the replacement of the original area.

My invention will be more fully understood from the following description of a number of embodiments thereof, illustrated in the accompanying drawings, wherein

Figure 1 is a front elevation of a planographic printing plate in accordance with my invention;

Fig. 2 is a rear elevation of a portion of said plate including a removable area;

Fig. 3 is similar to Fig. 2, but illustrates a modification in which an adhesive is applied to the rear surface of the removable area;

Fig. 4 is a fragmentary perspective view of the plate of Fig. 1 attached to the support or cylinder of a planographic printing press and illustrates the manner in which the removable area is removed;

Fig. 5 is a fragmentary detail showing one manner of replacing, or providing a substitute area for the removable area of Fig. 2 after its removal.

Referring to the drawings, in Fig. 1, the printing surface of a planographic plate 10 of flexible fabric such as paper, parchment or the like, lami-

nated or not, is shown, having on its printing surface 11 preprinted form matter 12 constituting an ink-receptive water-repellent image for reproduction by the planographic method, and specially inscribed image-forming matter 12a inserted in the appropriate spaces on the preprinted form.

The plate may include means for securing it to the supporting surface of a planographic printing press, as for example apertured tabs 13 for engaging hooks or clamps. The printing surface 11 is made of or prepared with materials which render it receptive toward oleous ink-receptive image-forming compositions when dry, but hydrophilic and ink-repellent when moistened with an aqueous liquid to form a non-print background around the image.

The plate 10 comprises a removable area 14 corresponding for example to a column of the printed form 12, for insertion of data or information which is to be deleted from some of the copies made from the plate. The area 14 is bounded by weakened severance lines best illustrated in Fig. 2, including a line of perforations 15 extending across the top of the area 14, continuous slits 16 at the sides of the area along which it is completely severed from the adjacent portions of the plate 10, and a slit 17 extending across the lower end of the area and interrupted by widely spaced points of attachment 18, for example, a pair of such points adjacent the corners of the area 14.

The relatively secure attachment of the area 14 provided at its upper edge by the line of perforations 15, and the attachment provided by points of attachment 18 at its lower end facilitates handling of the plate for inscription of desired data thereon, for example, in a typewriter in which the plate is fed around a rotary platen, in that it prevents the area 14 from springing outward as the plate curves around the platen. Moreover, the attachments to the plate at opposite ends of the area 14 prevent displacement of the latter when the plate 10 is secured to a support in a planographic printing press, and is used for printing copies of the entire image.

The severance lines 15, 16 and 17 sometimes pick up a small amount of ink during use of the plate, before as well as after removal of the area 14, thus causing a light trace of the outline of the area to be formed on the printed copies. While this is ordinarily not objectionable, it is advantageous to form these severance lines coincident with one side or the other of ruled lines 19 of the preprinted image-forming form matter 12. In this way any traces which may be formed between severance lines merges with the reproduction of the ruled lines 19 so that the presence of the severance lines in the plate is not visible on the resulting copies. For example, the severance lines can be formed along the inside of the ruled lines 19 so that the latter will be reproduced not only before but also after the area 14 is removed. This can be readily carried out by forming the weakened severance lines outlining area 14 in the course of printing the form matter 12 on the plate.

When the plate 10 is used, it is secured in the conventional manner to the supporting cylinder 20 of a planographic printing press and used for making copies in a conventional manner, involving maintaining the non-print background moistened with aqueous fountain fluid, repeatedly inking the image by contact of the plate with an inking roller, and transferring the ink deposited on the image to a copy sheet, for example by an offset cylinder or by direct contact of the plate with the copy sheet. The plate 10 is preferably attached to the support 20 so that its upper edge (with reference to the image) is the leading edge in the direction of operation of the printing press. In this way the line of perforations 15 at the top and the slit 17 at the lower end of the area 14, including points of attachment 18, constitute respectively the leading and trailing edges of the area 14, and any tendency of the said area to curl, bulge, flap outward or become misaligned under the conditions of moisture and tension encountered in the printing operation is effectively prevented.

When it is desired to delete that portion of the image which is inscribed on the area 14, the latter can be removed as illustrated in Fig. 4, without removing the plate 10 from the support 20. For example, one side or one corner of the area 14 is raised with a knife or other sharp instrument so as to sever the points of attachment 18, and the area 14 is then torn away from the remainder of the plate along perforated severance line 15 at its leading edge. Of course, if the plate is removed from the support 20, the area 14 can be severed at any time prior to further use of the plate.

If it is desired to replace the area 14 after its removal, in order to make additional copies including the data inscribed on said area, the latter can be reinserted in its original position before making the additional copies by removing the plate from the support 20 and fastening the area 14 in the corresponding aperture by strips of adhesive ribbon 21, applied to the rear surface of the plate. However a more convenient means for effecting replacement of the area, without removal of the plate 10 from the support 20 is provided by coating the area 14 on its rear surface with an adhesive 22 suitable for securing it to the surface of the support 20. For example, such a coating may comprise a layer of normally inactive waterproof adhesive which can be activated by application of a suitable solvent or swelling agent. After the area 14 is removed, the adhesive on its rear surface is activated in the aforesaid manner and the area 14 reapplied in its original position in the corresponding aperture of plate 10, the adhesive holding the area in position by adhesion to the surface of the support 19. Materials of rubbery or more or less elastic properties are advantageously used as adhesives for this purpose, for example, polyvinyl or methacrylate resins, natural or synthetic rubber or similar materials which can be swollen or activated by appropriate organic solvents. Or, if desired, a pressure-sensitive adhesive can be used which may be active or not during initial use of the plate, the area 14 being replaced simply by positioning it in the area left by its removal and pressing it against the surface of the support 20.

Instead of replacing the original area 14 a substitute area of a planographic sheet material of the same size or slightly undersized and of the same thickness as plate 10, having, if desired, other image-forming inscriptions thereon, can be similarly applied in the space left by removal of the area 14. In this way additional copies can be made having substitute data in the space corresponding to the removed area 14, and a number of different images can be formed within the removable area 14 for reproduction with the remainder of the image on the original plate. In order to remove the adhesively held pieces of

planographic material from the support 20 after completion of the desired copies, an instrument is inserted under one corner of the adhesively held sheet material and the piece of material peeled off the plate support 20.

When a plate is used for making copies after removal of the removable area 14 in accordance with my invention, and the surface of the support 20 underlying the plate is not of such character as to be ink-repellent, it is necessary to avoid contact of the exposed surface of the plate support 20 with the inking rollers of the planographic printing press. Otherwise, ink deposited on the surface of the support 20 will be transferred to the copies, forming unsightly blotches. Whether or not the inking roller or other device will come in contact with the support area depends mainly on the width of the removable area 14 of the plate, the thickness of the plate 10, the yielding qualities of the inking roller, the thickness of the layer of ink carried thereby, and the pressure under which the ink is applied to the plate 10. Since the areas to be removed in business forms are ordinarily relatively narrow columns or small rectangular areas, the width thereof is usually small enough to avoid the possibility of ink being deposited on the support 20 after the area 14 is removed, the adjacent portions of the plate 10 on opposite sides of the area 14 holding the inking roller out of contact with the underlying surface of said support. To this end, the area 14 is preferably entirely surrounded by other portions of the plate 10. Under ordinary conditions of practice the area 14 can have a width up to about five inches without serious danger of contact of the inking roller with that portion of the plate support exposed by removal of the area 14.

Since the plate 10 is ordinarily secured at its ends by clamps, hooks or similar holding devices, to the support 20, it is practically never necessary to extend the area 14 to the end of the plate. However, when the area 14 extends to one edge of the plate, the plate holds the inking roller out of contact with that part of the support 20 exposed by removal of area 14 at only one side of said area after its removal, and thus there is a relatively greater tendency for the inking roller to come in contact with the exposed portion of the plate support 20. Accordingly, when the removable area 14 is formed so as to extend to a lateral edge of the plate, the width of the area under ordinary conditions should not substantially exceed two and one-half inches, or about half the usual maximum width when the area is bounded on both sides by the remaining parts of the plate.

When the removable area 14 is of substantially greater width than the approximate limits set out above, so that it would be possible for the inking roller to come in contact with the underlying supporting surface after the area 14 is removed, it is preferable to provide a planographic surface within the limits of said area, such surface being moistened by the aqueous fountain fluid employed for printing and repelling ink when so moistened. A convenient method of providing such a surface is to position a second planographic plate under plate 10 on the support 20, the second plate being hydrophilic and therefore susceptible to moistening with the aqueous fountain fluid used in printing and being ink-repellent when so moistened. In this way, removal of the area 14 exposes only a surface having the same character as the non-print background portions of the plate 10, and contact of the inking roller with the exposed surface fails to deposit any ink thereon. The underlying plate may be made of flexible fabric material similar to plate 10, or it may be of different material. For example, it may be a thin plate of metal such as zinc, or aluminum, having a surface of the type conventionally employed in metallic planographic plates.

Alternatively, the support 20 can be provided with a surface (e. g. of metal) having hydrophilic ink-repellent character, whereby the same result is obtained without interposing a second planographic plate between the plate 10 and the support 20.

Still another method for avoiding unwanted deposition of ink on the surface exposed by removal of the area 14 in plate 10 is to replace the area 14 by a similar piece of planographic sheet material, the latter being fastened adhesively in the opening left by removal of the area 14 as described above, e. g. by securing it with adhesive ribbon to the rest of the plate, or by adhering it to the supporting surface of the plate support 20. Such substitute area, when uninscribed, presents an ink-repellent non-print surface when moistened, within the limits of the deleted portion of the image and thus prevents deposit of ink on the copies. However, if reproduction of a substitute image is desired, the substitute area can be inscribed with the matter to be reproduced employing a suitable image forming composition.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. In a planographic master sheet having a flexible fabric foundation and a printing surface for receiving an ink-receptive water-repellent image and for providing a hydrophilic nonprint background which is ink-repellent when moistened with aqueous fountain fluids, a portion of the sheet being outlined at its leading edge by a perforated severance line, at its sides by slits along which it is completely severed from the remainder of the sheet, and at its trailing edge by a slit interrupted by widely spaced points of attachment to the remainder of the sheet adjacent the corners thereof.

2. In a planographic master sheet having a flexible fabric foundation and a printing surface for receiving an ink-receptive water-repellent image and for providing a hydrophilic nonprint background which is ink-repellent when moistened with aqueous fountain fluids, a portion of the sheet being outlined at least in part by weakened severance lines and removable from said sheet by severance therefrom along said severance lines, to delete a portion of an image formed on said sheet and included within the outlined portion of the sheet, said portion having on its rear surface an adhesive for securing said area to a supporting surface to which the sheet is secured during use for printing.

3. In a planographic master sheet having a flexible fabric foundation and a printing surface for receiving an ink-receptive water-repellent image and for providing a hydrophilic nonprint background which is ink-repellent when moistened with aqueous fountain fluids, a portion of the sheet being outlined at least in part by weakened severance lines and removable from said sheet by severance therefrom along said severance lines, to delete a portion of an image formed on said sheet and included within said portion, said portion having on its rear surface a normally

inactive waterproof adhesive susceptible to activation for securing said portion to a supporting surface to which the sheet is secured during use for printing.

4. In a planographic master sheet having a flexible fabric foundation and a printing surface for receiving an ink-receptive water-repellent image and for providing a hydrophilic nonprint background which is ink-repellent when moistened with aqueous fountain fluids, a portion of the sheet being outlined at least in part by weakened severance lines and removable from said sheet by severance therefrom along said severance lines, to delete a portion of an image formed on said sheet and included within said portion, said removable portion having a margin coincident with a ruled image-forming line included in pre-applied image-forming form matter on said plate.

5. The method of making a planographic master plate having a flexible fabric foundation and a printing surface which receives an ink-receptive water-repellent image and providing a hydrophilic non-print background which is ink-repellent when moistened with an aqueous fountain fluid, and including a readily removable portion for deletion of part of the image, which comprises preprinting said plate with image-forming form matter, including spaces for subsequent image-forming inscription, forming weakened severance lines therein bounding said portion of the plate at least in part, of said severance lines coinciding with a ruled line of said preprinted form matter, for facilitating removal of said portion from the plate for deletion of image-forming matter inscribed thereon.

6. The method of making a planographic master plate having a flexible fabric foundation and a printing surface which receives an ink-receptive water-repellent image and providing a hydrophilic non-print background which is ink-repellent when moistened with an aqueous fountain fluid, and including a readily removable portion for deletion of part of the image, which comprises forming weakened severance lines in said plate bounding, at least in part, the removable portion to facilitate severance thereof from the plate while the latter is attached to a plate support in a planographic printing press, and coating the rear surface of said portion with an adhesive for securing the portion to the surface of said plate support.

7. In the method of planographic printing the steps which comprise preparing a planographic master plate with a flexible fabric foundation and having a removable area therein bounded at least in part by weakened severance lines coinciding substantially with ruled image-forming form matter outlining an area on said plate, forming an ink-receptive image on said plate including portions within said removable area, printing copies from said plate by the planographic method, removing said area by severing the edges thereof from the remainder of the plate along said weakened severance lines while the plate remains attached to the plate support of a planographic printing press, and printing additional copies of said plate with said area removed.

8. In the method of planographic printing, the steps which comprise preparing a planographic master plate with a flexible fabric foundation having a removable area therein bounded at least in part by weakened severance lines, by forming an ink receptive image thereon including portions on said removable area; supporting said master plate upon a planographic surface having ink-repellent properties when moistened with aqueous fountain fluid; printing copies from said master plate by the planographic method; removing said removable area from the plate by severing it along said severance lines; and printing additional copies from said plate with said area removed, the exposed portion of said planographic surface underlying said removable area rejecting printing ink upon contact with the inking device employed in said method.

9. In the method of planographic printing, the steps which comprise preparing a planographic master plate with a flexible fabric foundation having a removable area therein bounded at least in part by weakened severance lines, by forming an ink receptive image thereon including portions on said removable area; securing said master plate to the plate support of a planographic printing press, the surface of said support having ink-repellent properties when moistened with aqueous fountain fluid; printing copies from said master plate by the planographic method; removing said removable area from the plate by severing it along said severance lines; and printing additional copies from said plate with said area removed, the exposed portion of said plate support underlying said removable area rejecting printing ink upon contact with the inking device employed in said printing press.

10. In the method of planographic printing, the steps which comprise preparing a planographic master plate with a flexible fabric foundation having a removable area therein bounded at least in part by weakened severance lines, by forming an ink receptive image thereon including portions on said removable area; securing a planographic plate having a surface which is ink-repellent when moistened with aqueous fountain fluid, to the plate support of a planographic printing press; securing said master plate to said plate support overlying said planographic plate; printing copies from said master plate by the planographic method; removing said removable area from the plate by severing it along said severance lines; and printing additional copies from said master plate with said area removed, the exposed portion of said planographic plate underlying said removable area rejecting printing ink upon contact with the inking device employed in said printing press.

DOUGLAS A. NEWMAN.

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