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F. H. BEROLD

PRINTING PLATE AND METHOD OF MAKING THE SAME

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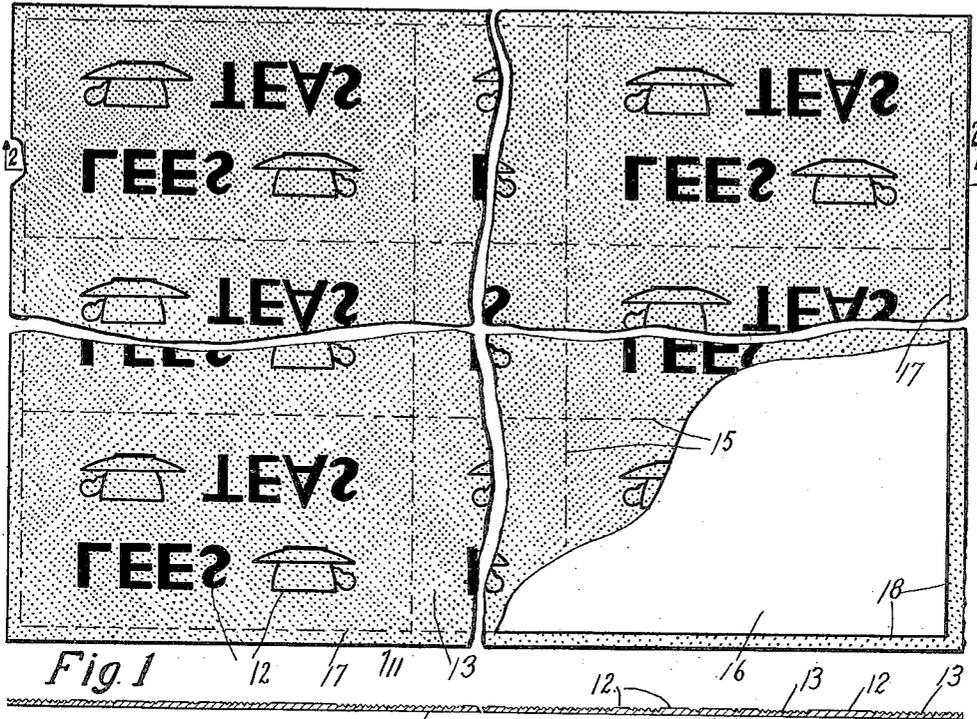


Fig. 1

Fig. 2

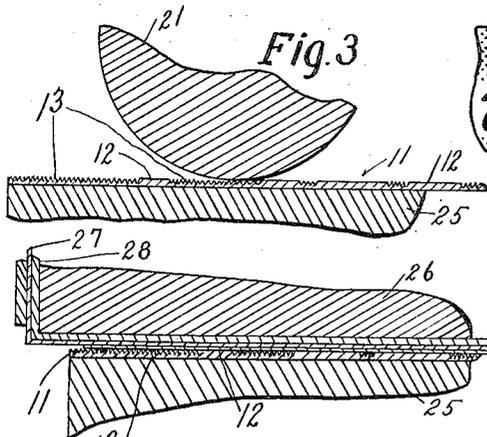


Fig. 3

Fig. 4

Fig. 7

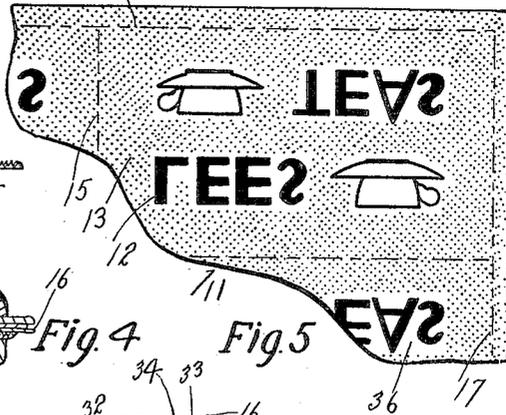


Fig. 5

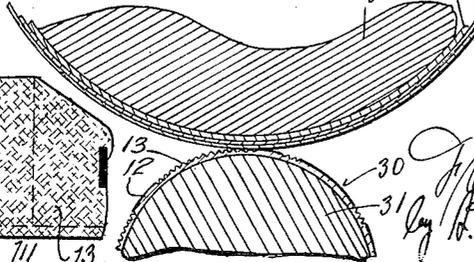
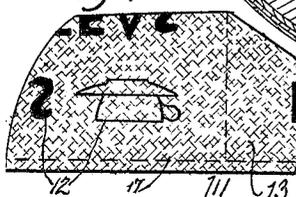


Fig. 6



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UNITED STATES PATENT OFFICE.

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PRINTING PLATE AND METHOD OF MAKING THE SAME.

Application filed November 19, 1919. Serial No. 339,040.

To all whom it may concern:

Be it known that I, FREDERICK H. BEROLD, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Printing Plates and Methods of Making the Same, of which the following is a specification.

In ordinary printing from printing plates or from type, one of the principal objections present is the contact of the inking roller with portions of the form which are not intended to print, and the contact of the paper with such undesirably inked portions, resulting in smutting of the paper. This is especially noticeable when employing thin plates now in general use, being plates of about one-sixteenth inch thick, where the open spaces between the subject-matter portions to be printed are of any material size. Under present methods it is necessary to rout out or cut away the bottoms of these spaces to a depth to avoid contact of the inking rollers with said bottoms.

Under present methods it has been found that, where spaces of this character are of comparatively great extent, the contact of the inking rollers with the bottoms of the spaces and the contact of the paper with such bottoms can not be avoided without routing entirely through the printing plate and into its support.

In other methods of printing, for instance in lithography, the portion that is not desired to be printed is provided with a suitable ink-resist, thereby avoiding the adhesion of ink to such portions so provided with the ink-resist.

The former of these methods of printing is known as "relief" printing, and the latter of these methods is known as "lithographic" printing. In the lithographic method, the surface portion from which the printing is done, which carries on it the subject-matter to be printed, and the surface portion which is treated with an ink-resist, are in substantially the same plane. The surfaces are in substantially the same plane, but the presence of the ink-resist prevents the adhesion of the ink to the ink-resist portion and the consequent printing of the same, although it is subjected to a printing pressure.

It is the object of my invention to provide an arrangement of subject-matter and inking roller and paper supporting surfaces in substantially the same plane, for employment in relief printing; and, further, to provide a relief printing plate with a subject-matter portion, and to form the balance of the printing plate as an inking roller and paper supporting portion, which I shall also hereinafter term the distancing portion, and to print all said portions.

It is the object of my invention, further, to provide a new and improved method of imposing printing surfaces, and providing printing surfaces extending throughout the area of the finished trimmed paper on which the subject-matter is imposed, these surfaces being in substantially the same plane.

It is the object of my invention, further, to impose these surfaces on a thin readily bent plate capable, for instance, of being bent about a cylinder of a printing press, or to be readily stretched on a plane surface for use in flat bed printing.

It is the object of my invention, further, to provide a printing plate provided with inking roller or paper supporting sharp proturbances, such as points or edges, preferably spaced-apart to print the paper in the form of dots or dashes or fine separated lines, the contacted points or edges being of extremely small area and spaced apart to comparatively substantial extent. The points or edges are sufficient in number, preferably, to prevent the sinking of the surface of the inking roller or ink thereon to the bases of these points or edges, whereby the points or edges only are inked, and printed.

The representation of the subject-matter of the printing is imposed on the printing plate preferably prior to the actual formation of the points or edges, or the representation of the subject-matter portion is surrounded by the representations of the points or edges in such manner that the surface of the subject-matter portion and the surface of the distancing portion of the plate, are substantially in the same plane when using a flat plate, or in the same surface or arc of the cylinder when using the plate on a cylinder.

The invention will be further readily understood from the following description and

claims, and from the drawings, in which latter:

Fig. 1 represents a plan view of a printing plate made according to my invention and having thereon a number of forms of an exemplified label for printing a plurality of labels simultaneously, part of the plate being broken away, the plate having thereon subject-matter portions and also distancing portions in the spaces between the margins of the subject-matter portions and throughout the spaces between labels, and throughout the trimmed margins of the paper being printed.

Fig. 2 is a cross-section of the same, partly broken away, taken on the line 2—2 of Fig. 1.

Fig. 3 is a similar cross-section, showing a portion of the printing plate enlarged and in connection with the action of an inking roller thereon.

Fig. 4 is a similar cross-section, shown in connection with the paper being printed and pressed thereon by a printing platen.

Fig. 5 is a plan view of a printing plate, partly broken away, showing the distancing portion of the plate slightly spaced from the subject-matter portion thereof.

Fig. 6 is a detail in cross-section showing the printing plate bent on a plate-cylinder, an impression cylinder coating therewith, the parts being partly broken away.

Fig. 7 is a plan view detail of a small portion of a printing plate made according to my invention, and having the separating portions thereof represented as edges.

The printing plate may be of suitable material which is preferably capable of being bent and of receiving treatment whereby to provide its surface with a subject-matter portion arranged to be printed, and an inking roller and paper distancing portion outside the margins of the subject-matter portion, the distancing portion extending preferably throughout or greater than the area of the size of the finished and trimmed printed sheet.

In this connection it may be stated that the size of the printing plate may be such that the plate extends either to or beyond the edge of the paper being printed, when trimmed, the subject-matter being, however, imposed on this printing plate within the trimmed margin of the paper being printed.

The printing plate is exemplified at 11. The subject-matter portions of this plate are exemplified at 12 and the distancing portions at 13.

The printing plate is shown as a plate having the printing portions of a plurality of reproductions, shown as labels, imposed thereon. The positions of the marginal edges of these labels when printed and trimmed, and assumed as laid on the printing plate, are indicated by the dash lines

15, and the marginal edges of the printed sheet 16, when trimmed, are indicated by the dash lines 17 and full lines 18, although the marginal edges of the paper may extend beyond the marginal edges of the printing plate, if desired, while being printed, for providing for proper holding of the paper, by grippers or other devices, and for providing sufficient waste at the edges for trimming purposes, the trimming being accomplished in usual manner by means of a usual paper cutting or trimming machine.

The printing plate, see Fig. 1, is shown as partly broken away, the forms of the corner labels and adjacent labels being shown. The printing portions of any number of labels, for instance one hundred or more, may be on the plate, which may be of a size to simultaneously print a whole sheet of paper of folio, double cap or larger size.

The printing plate may be of zinc, copper or other material, capable of being etched or otherwise receiving a relief printing surface. It may, further, be a thin plate of flexible zinc, copper, or other suitable material, which is capable of being bent to conform to the curvature of a plate-cylinder of a printing press. It is understood that suitable fastening means are provided for securing the printing plate to the flat-bed of a flat-bed printing press, or to the plate-cylinder of a rotary printing press, such means however not being shown as they are no part of my present invention.

Fig. 3 exemplifies an inking roller applying ink to the printing plate. The inking roller 21 rides on top of the subject-matter portions 12 and on top of the points or edges of the distancing portions 13, the latter preventing the inking roller from sinking to the bottoms of the spaces between subject-matter portions of the printing plate, and preventing the application of the ink in undesirable places, and consequently preventing the transfer of ink in undesirable places to the paper, or smutting of the paper 16, when the latter is being printed.

The printing of the paper is exemplified in Figs. 4 and 6, Fig. 4 representing flat-bed printing and Fig. 6 representing plate-cylinder printing. Referring to Fig. 4, the printing plate is supported by a suitable bed 25, to which it is suitably secured. A suitable tympan 26, provided with suitable cushioning tympan sheets 27, 28, coats with the printing plate in the printing operation. The spaced points or edges of the distancing portions 13, of the printing plate prevent the paper sinking into the spaces outside the margins of the subject-matter portions 12.

In Fig. 6 the printing plate 30, is exemplified as bent to conform to the curvature of the plate-cylinder 31, to which the printing plate is suitably secured, an impression cylinder 32 provided with suitable cushion-

ing sheet 33, 34, suitably secured thereto, co-acting with the curved printing plate, for printing the sheet 16.

The subject-matter portion for the printing plate may be applied thereto by a transfer method, similar to the old methods of lithography, namely, printing the subject on transfer-paper with an ink which resists etching acid, and then transferring the same to the printing plate, or by photographically applying the subject-matter direct on the printing plate, the surface of which has been sensitized for the purpose. The distancing portion may be similarly applied on the printing plate.

The printing plate is then etched in the usual manner for forming the subject-matter portions and distancing portions in relief on the printing plate.

If desired, the surface of the printing plate or such portion thereof preferably of as large an area as the paper being printed, when trimmed, may, if desired, first have representations of the distancing portions imposed thereon, lithographically by imprints or transfer, or photographically, and the imprints or transfers of the subject-matter portions, may, lithographically or photographically, be superposed on the surface thus previously provided with the imprints or transfers for the distancing portions, or the order of imposing these respective portions may be reversed, the imposing of the representations of the distancing portions in this method of treatment preferably extending throughout the area of the size of the trimmed paper being employed, or if desired, of a greater area.

The imprints for the distancing portions, instead of being applied lithographically or photographically, as hereinbefore described, may be provided by printing directly on the printing plate with a suitable ink or substance, by means of a suitable surface provided with points or edges, arranged for instance, on a roller for printing the entire surface of the printing plate, or so much thereof as may be desired, with the representations of the dots or dashes of the distancing portions.

It may be here stated that the imposing on or transferring to the printing plate of the representations of the subject-matter portion and the representations of the distancing portions take place so as to provide the printing plate with both these representations prior to the acid etching thereof.

The imposing of the subject-matter portions and the distancing or spacing portions may also take place simultaneously, for instance by photographically printing through a mesh screen, and the photographic plate or film containing the subject-matter, for instance by photographing through these plurality of plates upon the previously prepared

sensitized surface of the printing plate, when a sensitized surface is employed, the printing plate being thereupon etched by a suitable acid and treated in usual manner of zinc or acid etching.

In certain examples of printing by means of my improved method, for instance in printing subject-matters which have no great extent of inner open space in the printed matter, merely a margin of the distancing or separating portions may be employed, or the subject-matter may be merely surrounded by such distancing or separating portions, the distancing or separating portions being separated from the subject-matter preferably by a suitable space 36.

The plate is etched in the usual manner of acid etching zinc or copper, or the material employed, so as to maintain the surface desired to be printed, in relief, the separating or distancing portions extending in the same plane throughout the plate for forming supporting sharp protuberances such as points or edges, for the inking rollers to avoid the sinking of the inking rollers to the bottoms of the spaces between the edges of the subject-matter portions of the plate, and to prevent the sinking of the paper below these points or edges during the printing.

As an example it may be stated that these supporting points or edges may be dots, for instance of a size of two or three thousandths of an inch in diameter, and spaced-apart about forty-five to the inch, these being given as instances and not as limitations, as it is understood that any other size of dots or spacings of dots may be employed.

Reproductions of my improved printing plate may be made in usual manner by the well-known electrotype process, or in other usual or well-known manner.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A thin flexible sheet printing plate for relief printing having on its printing face a plurality of duplications of the same subject-matter portions for simultaneous printing a plurality of the same article, and distancing portions of the character described to distance the inking rollers and paper from the bottoms of the spaces between said duplications of subject-matter portions, said distancing portions extending continuously between said duplications of said subject-matter portions for continuously supporting the inking rollers and the sheets of paper being printed between said subject-matter portions.

2. A thin flexible sheet relief printing plate arranged to be bent about a plate cylinder and having a relief printing surface thereon comprising a plurality of duplications of the same subject-matter for adjoining duplications of the same article, and

comprising spaced-apart duplicated subject-matter portions, and continuous fields of distancing portions consisting of sharp protuberances of the character described extending continuously throughout the area of said printing plate between said subject-matter portions for distancing the inking rollers and paper being printed from the bottoms of the spaces between said subject-matter portions for adjoining duplications of the same article, so that when said duplications of the same article are printed and severed from each other, the lines of severance are in the printed continuous fields of said continuous distancing portions.

3. A printing plate for relief printing having thereon the printing portions for numerous reproductions of the same printed article and comprising a plurality of spaced-

apart duplications of the same subject-matter portions for said respective printed articles and supporting portions for the inking rollers and paper being printed comprising sharp protuberances of the character described extending continuously between said subject-matter portions so that the inking rollers and paper being printing are continuously supported along the lines of severance between said articles during coaction with the printing plate.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

FREDERICK H. BEROLD.

Witnesses:

EDITH V. CONNER,
JAMES J. FITZPATRICK.