

(No Model.)

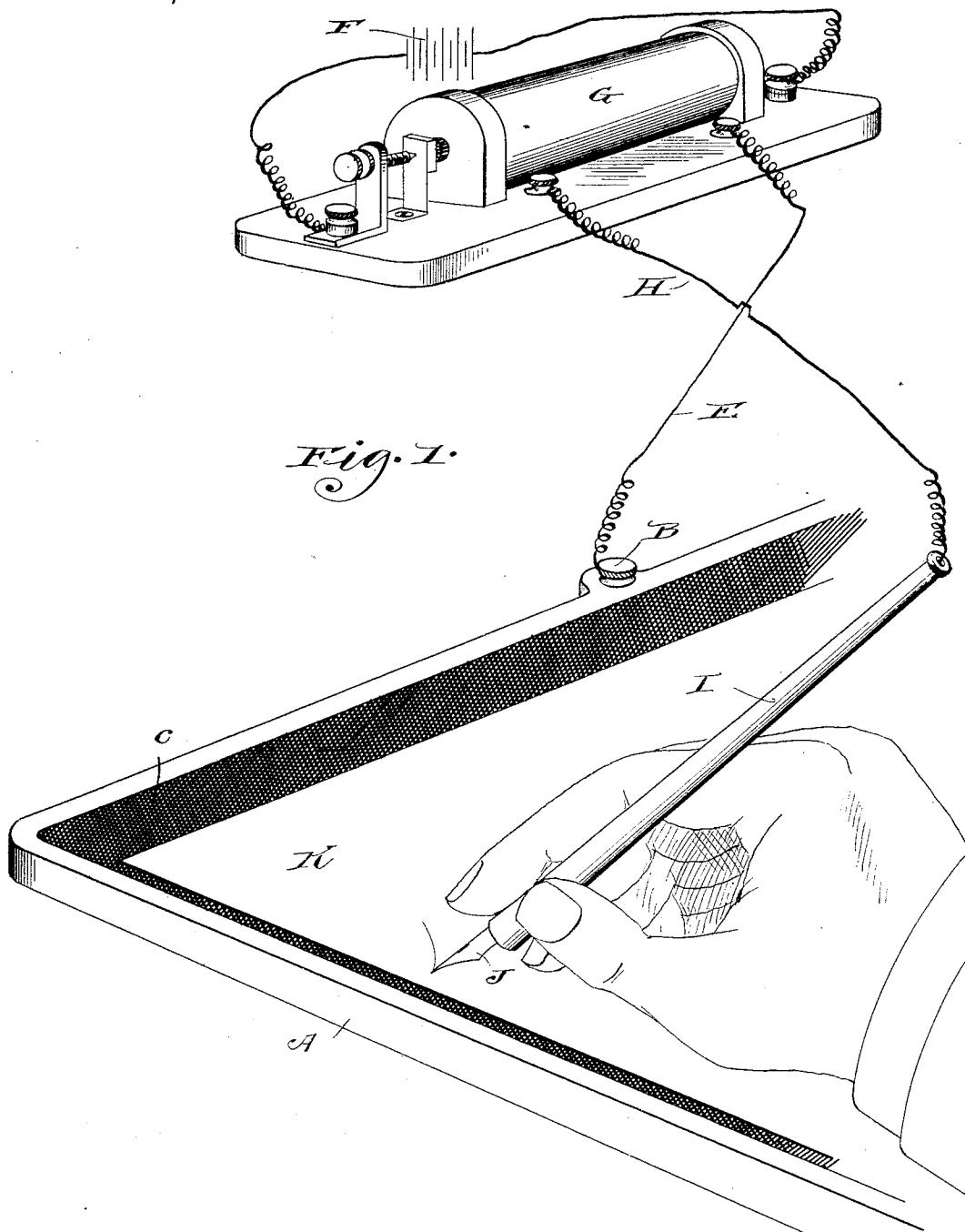
2 Sheets—Sheet 1.

D. M. & J. H. GARNETT.

METHOD OF AND APPARATUS FOR ELECTRIC PERFORATING.

No. 498,973.

Patented June 6, 1893.



Witnesses,
J. M. Mamm,
J. C. Goodwin

Inventors,
Dexter M. Garnett,
John H. Garnett,
By *Field, Fowler & Latham*, Attys.

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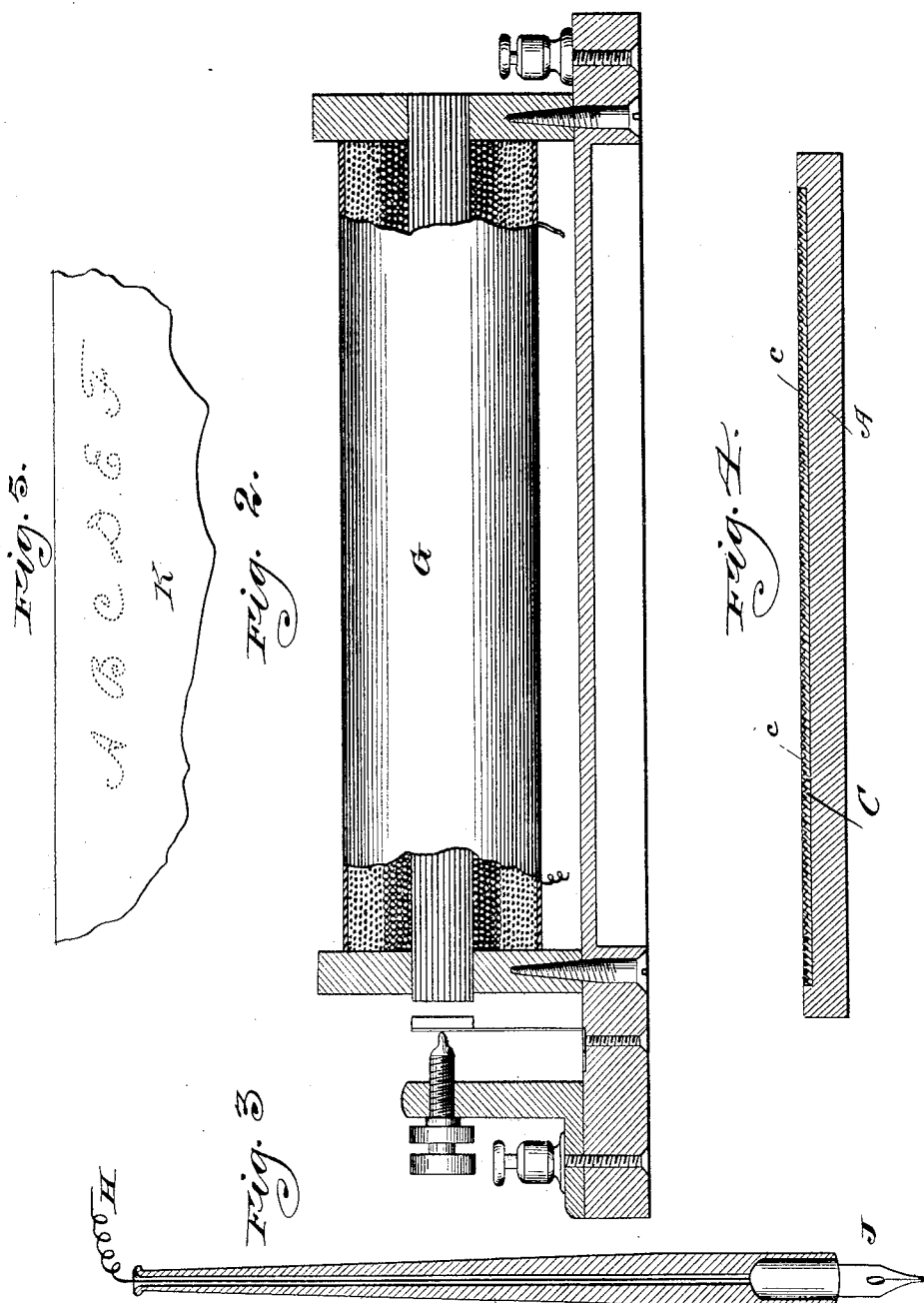
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D. M. & J. H. GARNETT.

METHOD OF AND APPARATUS FOR ELECTRIC PERFORATING.

No. 498,973.

Patented June 6, 1893.



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UNITED STATES PATENT OFFICE.

DEXTER M. GARNETT, OF EVANSTON, AND JOHN H. GARNETT, OF CHICAGO,
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METHOD OF AND APPARATUS FOR ELECTRIC PERFORATING.

SPECIFICATION forming part of Letters Patent No. 498,973, dated June 6, 1893.

Application filed February 14, 1893. Serial No. 462,291. (No model.)

To all whom it may concern:

Be it known that we, DEXTER M. GARNETT, of Evanston, Illinois, and JOHN H. GARNETT, of Chicago, Illinois, have invented certain new and useful Improvements in the Method of and Apparatus for Electric Perforating, of which the following is a specification.

This invention relates to a method of and means for perforating sheets of material, such as paper, card board and the like, in the production of writings and drawings, and which may also be applied to the perforation of sheets of other material—as, for example, cloth, in the production of designs which are to be embroidered or otherwise worked.

The invention is also applicable to other uses which will suggest themselves to those skilled in the art to which the invention pertains.

In carrying out the invention, we employ a base or bed plate which is provided upon its surface with a number of closely set points which may be produced by grooving or scoring the surface of the plate so that the lines of grooves shall intersect and provide sharp points at regular intervals. The interstices are then filled with a cement or other material which is a good non-conductor of electricity, thus furnishing a smooth surface upon which the sheet to be perforated is placed, the points being bare. This plate is joined in an electrical circuit which includes a source of electricity and induction coil, whereby is furnished a constant current of high tension. The sheet of material in which the perforations are to be made is then placed upon the plate and the writing, tracing or drawing is made by passing over the sheet what may be termed an electric pen or other instrument, whose point or contacting surface forms one of the terminals of the electric circuit. By moving this instrument over the surface of the paper the circuit will be completed whenever the contacting portion of the perforating instrument is brought immediately over one of the points of the plate below, and interrupted as the instrument is passing above the non-conducting material. The electrical current passes through the interposed sheet from the pen to the points, and

the passage of the current will result in the production of a perforation through the sheet. As the instrument is moved rapidly over the sheet the current is rapidly formed and broken, and a series of perforations in the line in which the instrument is moving results. The perforating instrument or pen is preferably adapted to supply a semi-fluid ink which finds its way through the perforations which are of course minute, and the result of a stroke of the pen is to produce a line of these minute perforations which are filled with ink.

This device may be used for making the original sheet of letters or documents of which a number of duplicates are desired and accurate copies may be produced by laying the original sheet on the copy sheet, and running an inked roller over the same.

The principal object of the invention is, of course, to provide an efficient safe guard against the altering of writings, and will be particularly useful in writing upon commercial paper, paper money, tickets, passes, or other papers or documents which are likely to be altered.

In the accompanying drawings, Figure 1 is a diagrammatic view showing an embodiment of the invention, a part of the bed plate and sheet being broken away. Fig. 2 is a broken sectional elevation of the induction coil. Fig. 3 is a longitudinal section view of a tubular pen holder. Fig. 4 is a sectional view of a plate upon which the points are formed by surface grooving; and Fig. 5 is a specimen of the work.

In the drawings, A is a tray which is made of suitable non-conducting material and which is provided with the binding post B. This tray contains a plate C which is of metal or other material of high conductivity, and which is provided upon its surface with a number of sharp points *c* arranged preferably equi-distant from each other. A simple means of producing this part of the invention is to take a copper plate and traverse its surface by a series of V-shaped grooves to a suitable depth and in a line parallel to a line drawn across the plate from diagonally opposite corners thereof and then a second series

of grooves of the same conformation are cut in the surface of the plate at right angles to the first series whereby is produced the sharp metallic points. Any equivalent method of producing the sharp points—as, for example, by uniting the bases of numerous small wires set closely together in an upright position, may be followed. After the plate is thus provided with points I fill the interstitial spaces with a non-conducting cement which produces a perfectly smooth and hard surface to write upon and yet leaves the points bare. This plate is joined in an electrical circuit which includes the binding post B, the wire E, the battery F, an induction coil G, and a wire H leading from one terminal of the induction coil to the movable writing instrument or pen I. The latter is preferably of tubular form and made from a non-conducting material, such as hard rubber and its hollow is adapted to receive one end of the wire H which is electrically connected with the pen J. The latter will be adapted to hold and deliver, as the writing or drawing progresses, a semi-fluid ink. Now, as the pen is moved over the surface of the sheet K, which may be paper or cloth or other material, which it is desired to perforate and which is laid upon the surface of the table, the electric circuit will be completed whenever the point of the pen passes over one of the points *c* of the plate. The passage of the current through the paper will produce a minute perforation therein and as the pen is moved a line of these perforations will be produced, adjoining perforations being separated a distance equal to the distance between the points *c* of the plate. The ink will flow into these perforations and thus an ineffaceable and unalterable writing, drawing or design may be rapidly produced. It will thus be seen that the current is interrupted as the pen passes from one point to the next, but as these points are only slightly separated, the perforations are close together. If now it be desired to use this device for an original writing, the operation of writing is complete when the pen has traced the desired matter upon the sheet, but if it be desired to use the original as a stencil sheet from which to obtain a number of duplicate copies, this may be done by placing such sheet upon the copying sheet and passing an inked roller over the surface. The ink will pass through the perforations and leave an exact duplicate of the written matter upon the copying sheet.

We are aware that, what is termed, an electric perforating pen is not new, and we are also aware that it has been proposed to make stencil sheets by pressing paper upon a plate provided with sharp points, but so far as we are aware, our method of producing a perforated sheet by passing a current of electricity from the writing instrument to the base plate through an interposed sheet is new, and constitutes the vital and distinguishing characteristic of our invention. The particular con-

struction of the plate whereby it is provided with a number of closely set points, the interstitial spaces between which are filled with a non-conducting material is also new.

While we have shown the invention as embodied in an electric writing pen and described its adaptation mainly to the production of writings, we do not, of course, intend to limit our invention thereby or thereto. Obviously any writing, tracing, picture or design may be delineated upon the sheet and the material of which the sheet is composed may be of any character capable of being thus treated. The source and manner of supplying the current may be other than that shown, but it is important to employ a constant current of high tension.

The use of the ink in the production of an original writing is simply for the purpose of making the writing more legible, but our invention can be employed without the use of ink, the lines of perforations being sufficiently distinct so that the matter is readily discernible by holding the perforated sheet in proper position with reference to the light. The hollow pen-holder is merely a convenient instrument. The wire H may take its place or a roller, stylus or other instrument capable of conducting the current may be used.

Having thus described our invention in a practicable form and indicated the useful purposes to which it may be put, without limiting ourselves to precise structural details, we claim—

1. The herein-described method of writing, printing, drawing, &c., which consists in perforating the sheet upon which the writing, &c., is to be produced by the passage of a current of electricity through said sheet when interposed between the terminals of an electric circuit one of which is made up of numerous points and the other of which is capable of movement over the sheet, substantially as described.

2. The herein-described method of writing, tracing or drawing, which consists in perforating a sheet of paper or equivalent material by interposing it between the terminals of an electric circuit, one of which is composed of numerous fine points and the other of which is capable of being moved over the sheet by hand.

3. The herein-described plate or bed for use in an electric perforating appliance, said plate or bed having its surface composed of numerous closely proximate bare points adapted to serve as current conductors, a non-conducting material interposed between the points and the latter being electrically connected beneath the non-conductor, substantially as described.

4. The herein-described plate or bed for use in an electric perforating appliance, said plate or bed being composed of conducting material having its surface scored or grooved to provide numerous closely proximate points,

and a cement filling the interstitial spaces between the points while leaving them bare, substantially as described.

5 5. The herein-described electric apparatus for writing, &c., which comprises in combination a plate having numerous points through which a current of electricity may be passed and forming one terminal of an electrical circuit including a source of electricity, and a
10 movable writing instrument forming the other terminal of said circuit and adapted to be moved over the sheet to be perforated, when the latter is interposed between the points of the plate and the movable instrument, sub-
15 stantially as described.

6. The herein-described electric writing apparatus comprising in combination the bed or plate having bare points separated from each other by a suitable non-conducting cement, a battery, an induction coil and a movable writing instrument and connections whereby the plate and the writing instrument are joined in the electrical circuit; substantially as described. 20

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