

(No Model.)

J. L. YOUNG.

METHOD OF AND APPARATUS FOR PRODUCING STENCILS.

No. 478,675.

Patented July 12, 1892.

Fig. 1.

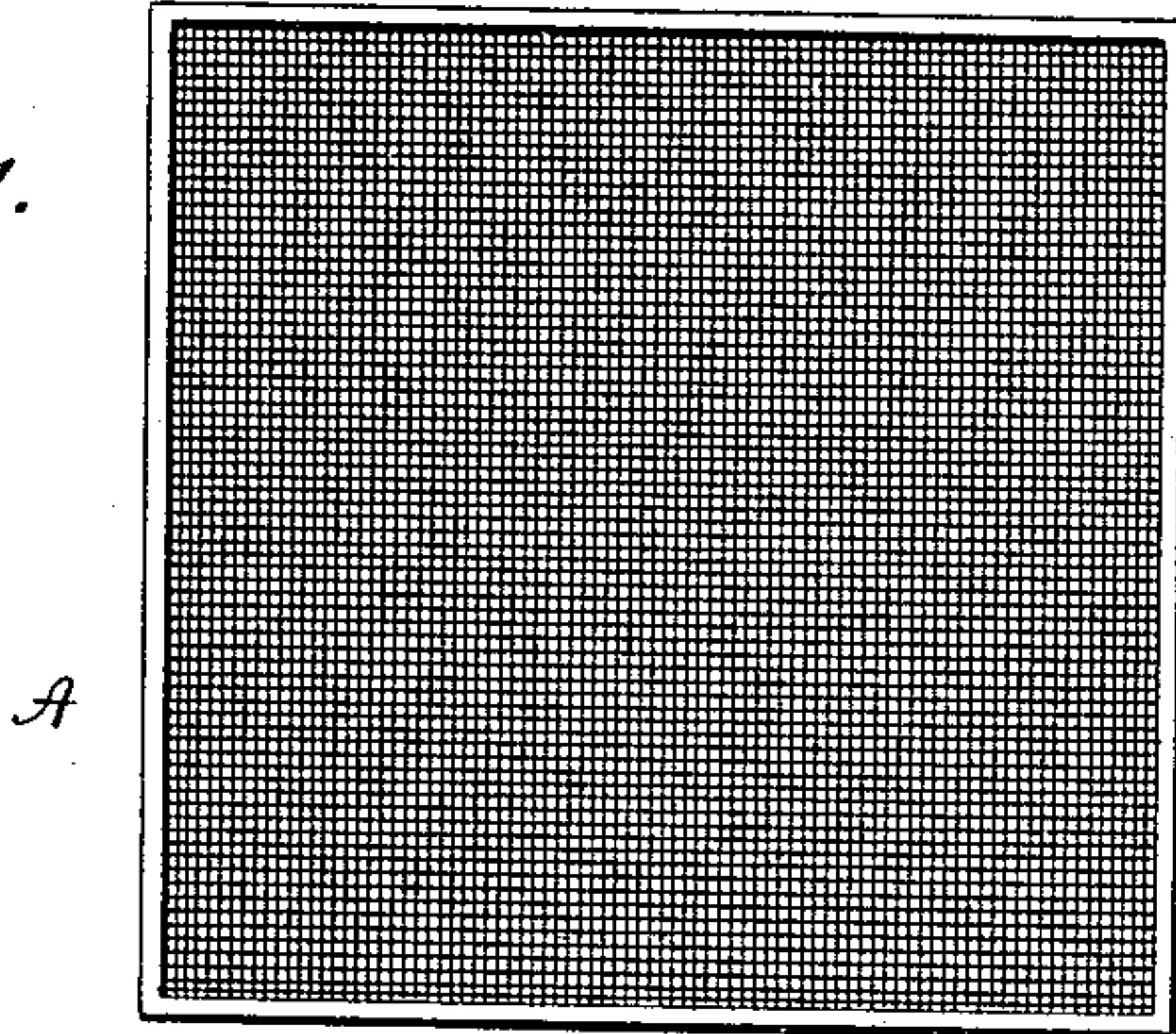


Fig. 3.

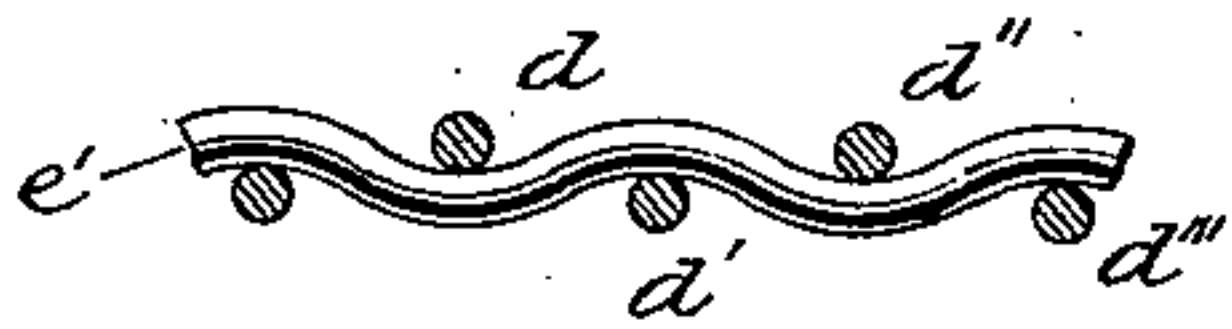


Fig. 2.

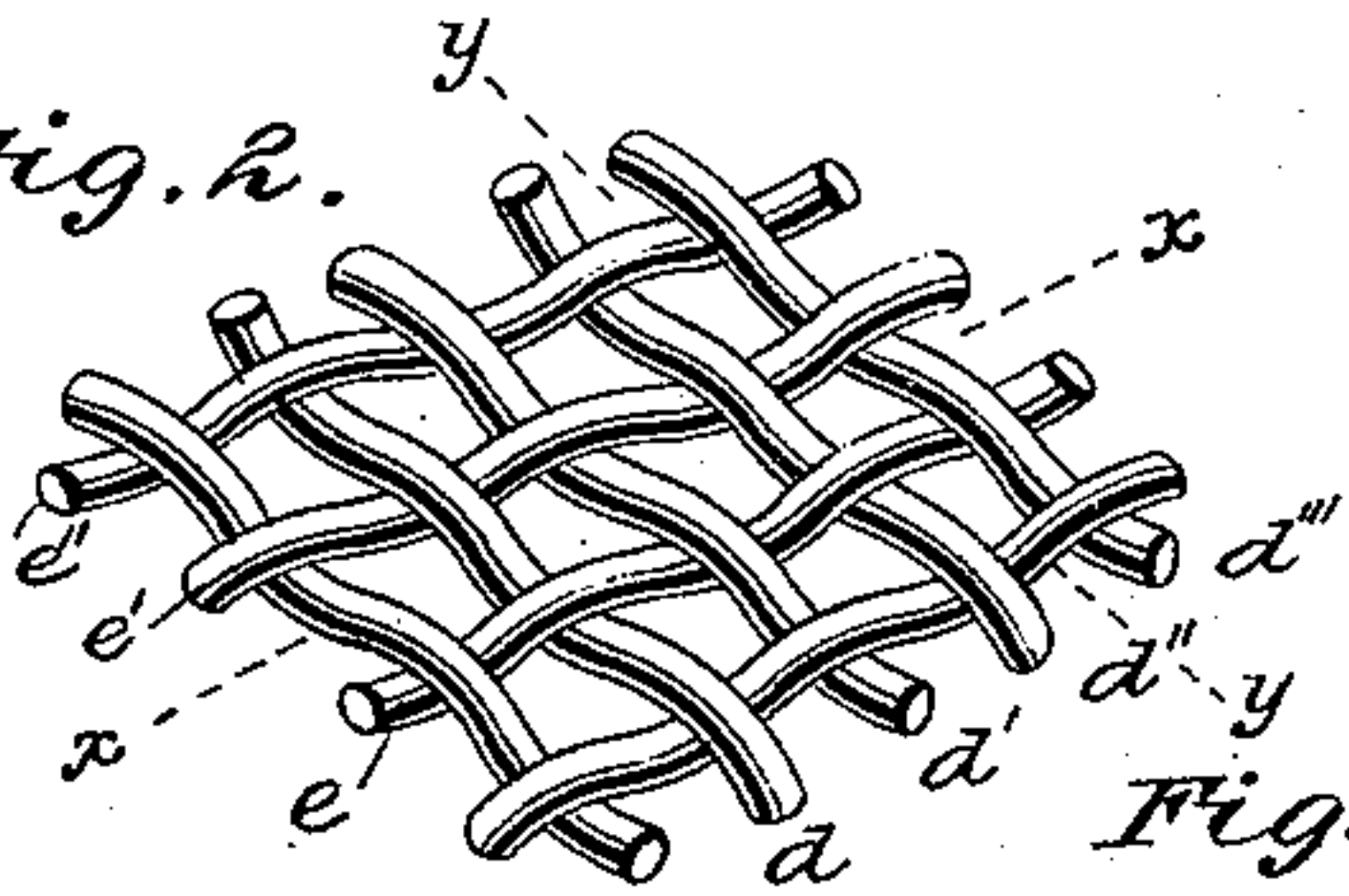


Fig. 4.



Fig. 5.

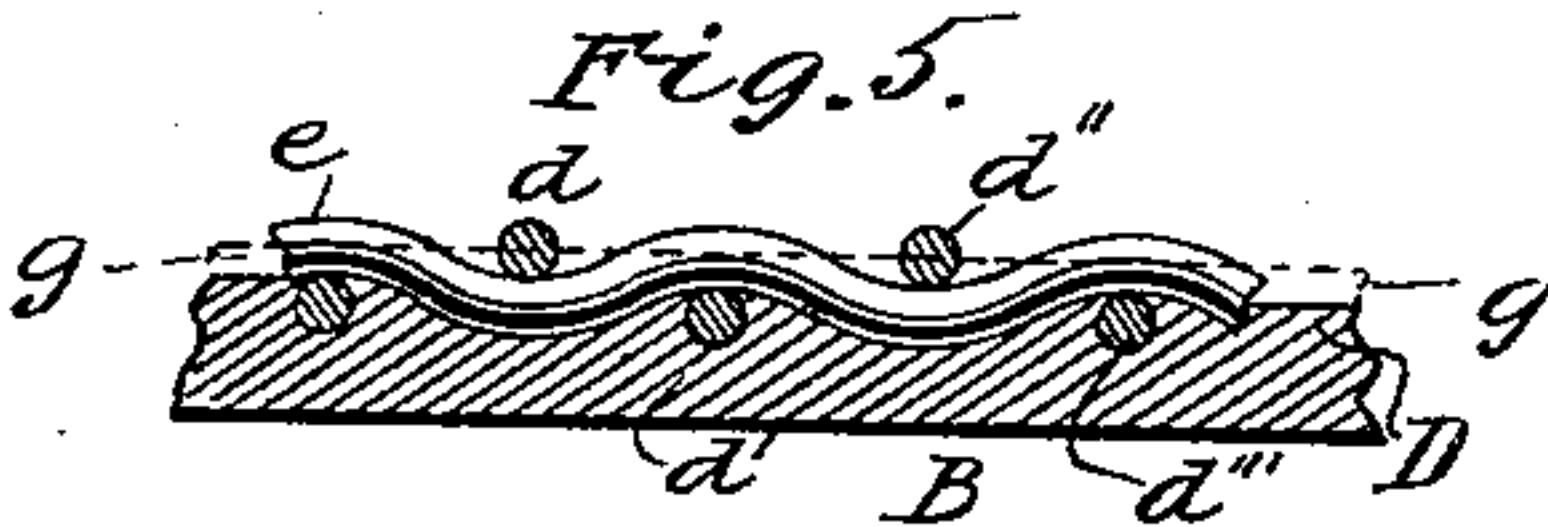


Fig. 12.

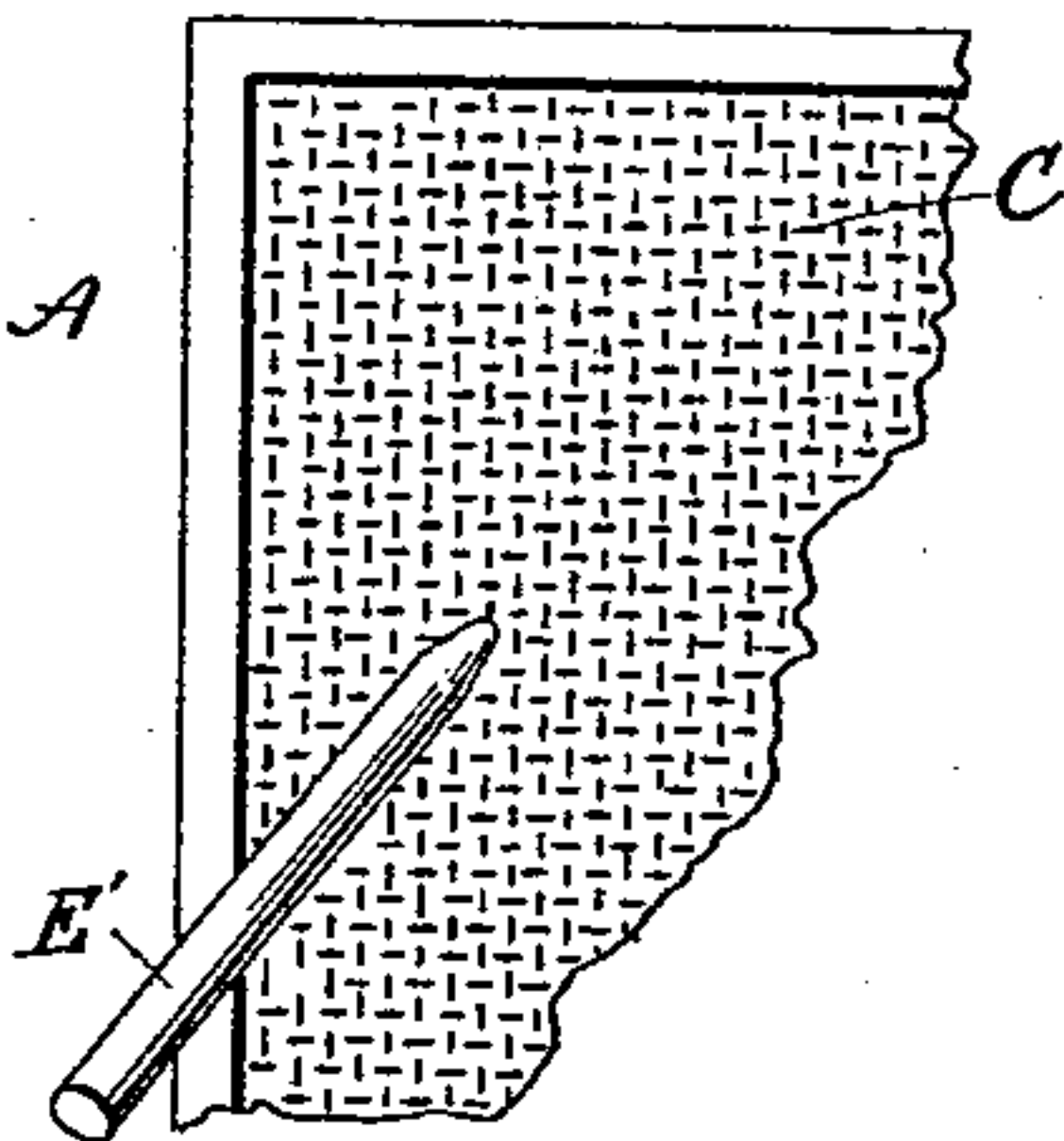


Fig. 10.



Fig. 7.



Fig. 8.

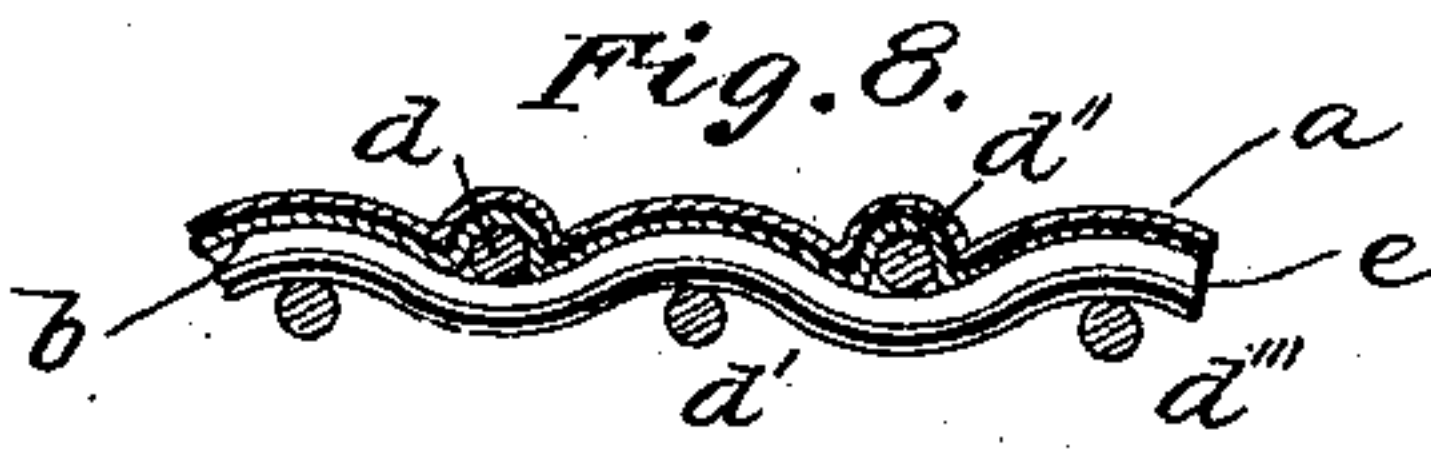
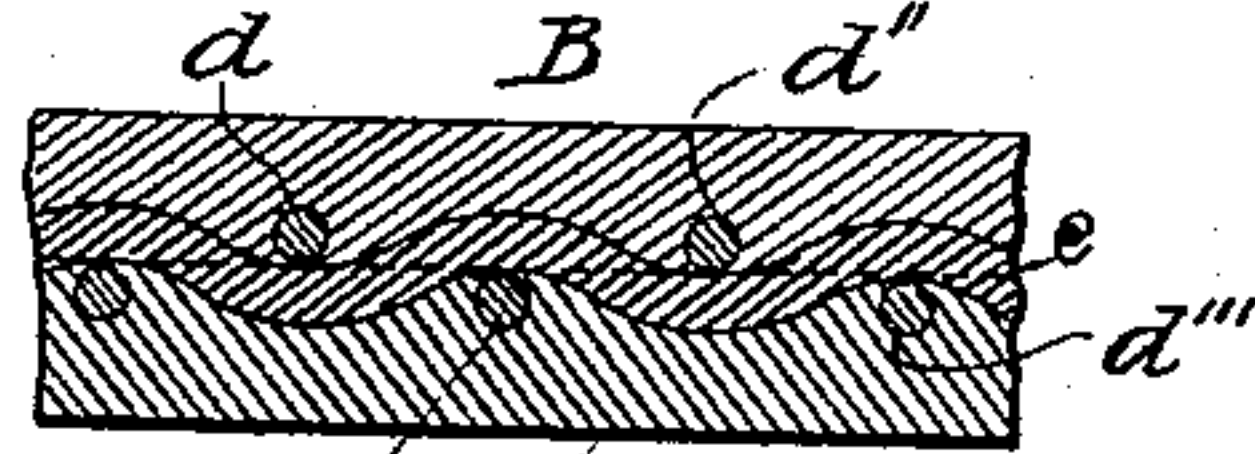


Fig. 9.



Fig. 11.



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METHOD OF AND APPARATUS FOR PRODUCING STENCILS.

SPECIFICATION forming part of Letters Patent No. 478,675, dated July 12, 1892.

Application filed March 18, 1892. Serial No. 425,446. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH L. YOUNG, formerly of Tarrytown, county of Westchester, and State of New York, now of Buffalo, in said State, have invented new and useful Improvements in Methods of and Apparatus for Producing Stencils, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a front view of an operating-surface of my improved apparatus. Fig. 2 is a perspective view of a small portion, enlarged, of woven threads or filaments of wire, linen, silk, or other material from which has been constructed the plate Fig. 1 in the manner hereinafter stated. Fig. 3 is a section of Fig. 2 at lines $x x$. Fig. 4 is a section of Fig. 2 at lines $y y$. Fig. 5 is a view of Fig. 3, showing sectional view of backing or filler applied thereto. Fig. 6 is a front surface view, enlarged, of a portion of woven threads, filaments, or wires, showing the extent of their projection from the backing, and interstitial filling D. It is also the same as a front view of one style of my finished plate and shows the dotted outline of point of a stylus E of such relative size as may be used with good results on projections of this size. Fig. 7 is an outline sectional view of Fig. 6 at $x x$. Fig. 8 is a section of woven filaments of thread, silk, or other material, showing layer of plumbago b and also layer of electroplate a thereon. Fig. 9 is a sectional view of such electroplate removed. Fig. 10 is a sectional view of said electroplate provided with permanent backing c . Fig. 11 is a sectional view of a wax or other mold C, showing impression therein for electrotyping purposes of a portion of woven wire like Fig. 4. Fig. 12 is a front view of a finished bed-plate C, showing stylus E'.

My invention relates to those platens, plates, or beds which are used in the making of stencils out of paper or other soft material overlying them by the pressure thereon in the line of the letters of a stylus.

The object of my invention is to produce a

plate or bed which shall be so shaped as to facilitate freedom of movement in the stylus in all directions and to secure greater ease and accuracy in the formation of characters written upon the stencil. I attain these objects by an arrangement of projections and depressions of such a character and bearing such relation to each other that the stylus is thereby enabled to move freely in every required direction while making a perfect perforation or maceration of the material in the lines of the letters, and by which arrangement and shape I am also enabled to produce my improved beds or plates with great accuracy, ease, and cheapness.

As is well known in the practice of the art of making stencils by the use of a stylus and underlying bed, as aforesaid, such bed is necessarily constructed of some relatively hard material, preferably of metal, hardness being an advantage both to resist wear and also in order that the plate may present a rigid resistance to pressure of the stylus upon the overlying stencil-sheet. Such plates are preferably made of metal hard enough to resist such wear and pressure. The production of a proper stencil in the manner described requires a certain degree of roughness or unevenness in the underlying bed or plate. If the plate were smooth and the point of the stylus uniformly pressed upon soft paper overlying the same in the act of transcribing the desired characters thereon, it is apparent that the stylus would have a tendency to cut completely through the paper and thus detach the inner portions of letters. This result is obviated by said unevenness in the surface of the plate.

I am aware that plates have heretofore been made whose surfaces are a collection of sharp points upon which the sheet to be stenciled is laid, and superimposed upon this again is laid a sheet of soft thick paper to receive the impact of said points after they have penetrated the stenciled sheet and to prevent them from arresting the progress of the stylus; but this method is undesirable, both because the characters produced in the

stencil thereby consist of lines of uniform pin-holes making a letter-line of dots merely and the use of the overlying soft blotting-paper prevents the operator from watching his work as he proceeds. I am also aware that such plates or beds have been made of uneven surfaces by constructing them of wires laid and held side by side in the same plane; but this species of bed-plate is impracticable for ordinary writing, because the end of the stylus in making the curves pertaining to chirography is usually caught and deflected in the longitudinal depressions between the wires and is with difficulty withdrawn therefrom, whereby the writing-stencil and impression are distorted and disfigured.

I have discovered that in order to completely and successfully construct a plate upon which the point of the stylus may be driven in every direction with uniform ease and accuracy it is necessary that such surface should be provided with minute projections curving in numerous different directions, not only upward and downward, but also sidewise, diagonally, &c. A plate thus constructed presents in every direction a brief obstacle of resistance to the onward passage of the stylus, which resistance, however, is not prolonged in any one direction; but it is constantly shifting and changing its direction relatively to the moving stylus and so as to admit of the stylus moving in all directions easily and at the same time constantly and with very brief intermissions varying its contacts with and pressures against the plate in whatever direction the stylus may be guided. In this way a stencil-sheet may, in the lines of the letters, be uniformly and at close intervals thickly punctured, cut, macerated, or torn sufficiently to admit the passage of the ink. As such bed-plates are often required of large size, as for the purpose of producing stencils of maps or plans, it is commercially of great importance to devise some method of producing the species of roughness on their surface which I have devised with economy and speed. It is manifest that the expense of cutting such a surface by hand would be very great; nor am I aware of any cutting or chasing machinery which is capable of producing the same at all, except at very great delay and expense. I have obviated these obstacles and succeeded in producing my plates with the greatest ease and economy in the following manner: I weave together threads, filaments, or wires so as to produce a continuous fabric or woven material, the thread of which is preferably of uniform diameter and of circular cross-section, though hexagonal, square, triangular, or octangular, or other cross-sections might be used without departing from my invention. This weaving may be accomplished in any of the well-known ways and in any desired style of arranging the threads; but I prefer the arrangement shown in Fig. 3, in which each thread, as $e e'$,

&c., passes alternately under and over and is alternately passed under and over by each of its neighboring threads, as $d d'$. A fabric of this woven material being thus produced of sufficient size, I next stretch it in a frame A, Figs. 1 and 2, in any convenient manner so that it shall lie and be sustained rigidly in substantially one plane. The sheet of woven fabric will then present substantially the appearance shown in Fig. 1. I prefer after this to apply to one side of the stretched fabric a backing B, of softened paper or any other material sufficiently plastic to pass to a certain extent, at least, through the interstices between the woven threads—as, for instance, as shown in Fig. 5, in which B shows a section of a portion of such backing brought to bear against one side of a section of the woven threads—and the dotted line $g g$ shows a level to which the said backing may be raised, if desired, according to the degree of roughness wished in the bed-plate. When the backing B is thus raised so as to partially embed the fabric, it fills the interstices between the strands and may be called an “interstitial filling.” I have thus by the steps which I have described in my improved process of producing a bed-plate obtained a surface of the required size possessing the form which I have described as desirable in a bed-plate, and, if made of wire or sufficiently-hard thread, already adapted to produce a good stencil; but the production of this surface involves a very considerable amount of expense, even though wire-cloth or already-woven materials should be used in its production, and is not as hard and durable as is desirable. I prefer, therefore, to utilize this backed and stretched frame of woven fabric as a matrix upon which or from which, according to the material, I produce my permanent finished bed-plate by electrotyping, etching, casting, or any other well-known process. I prefer, however, if my stretched matrix is composed of wire, to embed its unbacked or open side in wax or any other suitable plastic material from which as a mold I can, as will be readily understood, derive as many electrotypes as I desire, as shown in the sectional view, Fig. 11, in which C is the wax, $d d' d'' d''' e$ a section of a portion of the woven wire, and B is a backing, showing the extent of the impression or molding of the wire in the wax. The wax mold thus constructed is treated in the usual manner and an electrotype thereof in copper or any other desired metal taken, a , Fig. 9, showing a sectional view of a small portion thereof removed from mold, which electrotype-plate I afterward back in any well-known way by a permanent substantial rigid backing, as shown by c in section, Fig. 10, and, if desired, the exterior or operating-surface, in order to increase its durability, may be covered in any well-known way by a coating of nickel or other harder material.

Should my stretched frame or woven fabric

be constructed of ordinary threads—such, for instance, as silk or linen strands—I prefer to back it, as already described, after which I cover the exposed surface with a coating of plumbago in the usual manner (see *b*, Fig. 8) and electrotype from it directly in the ordinary manner, and the resulting electrotype, being same as *a*, Fig. 9, already described, is treated afterward to a backing *c* in the same manner. The frame of stretched fabric may be repeatedly used in producing the bed-plates. The result is a bed-plate, Fig. 12, the surface of which is covered with a quantity of closely-approximated curved, tapering, or angular protuberances of peculiar shape and relation to each other. Each of these protuberances is of circular or other uniform angular cross-section, like the thread or wire from which it originated, and each presents at every part thereof a constantly-varying curved surface or surface of small inclined planes all at varying angles to each other, as will be understood and must necessarily follow from the construction thereof as per the foregoing description.

Fig. 6 is a top view, enlarged, of the operating-surface of a portion of one of my improved plates or, what is the same in form, of a portion of my stretched woven threads or wires provided with backing. Here surface projections resulting from the wire or thread *d* of Fig. 2 would correspond to *h h*, and projections resulting from the wire or thread *e''* are represented by projections *m m*. The operative end of the stylus passing over a surface having such projections finds no continuous depression by which it can be deflected or diverted, but is, on the contrary, constantly met in every direction by curved or inclined cross-surfaces inclined so as to raise or divert it from the depressions, and against the apexes of which it readily perforates or macerates the stencil-sheet in the lines of the letters, and which minute surfaces curve and incline in various directions, so as to admit of the stylus-point passing on in the direction in which it is being urged by the hand of the writer.

The extent to which the backing *B* or filling *D*, referred to, shall be applied is to be regulated according to the requirements of each plate and the degree of roughness therein required. Were the filling entirely excluded, interstices would be left in the surface, or at least very deep recesses between the projections. I do not for ordinary uses regard these deep depressions as desirable, as they may serve to catch the point of the stylus, and therefore I dispense with them to a considerable extent by the use of the backing, as aforesaid. The interstices or deep cavities are sometimes useful for the purpose of retaining the wax or other friable material with which the stencil-sheet may be covered; but in the form of bed-plate which I produce by the use of the backing, as described, I find that for

ordinary uses the depressions are sufficient to contain the wax, and the plate is more readily cleaned than it would be if the depressions were deeper.

What I claim as new, and desire to secure by Letters Patent, is the following, viz:

1. For the production of stencils, a bed-plate or platen having projections of greater length than width and arranged so that each projection extends longitudinally in a direction substantially at right angles to the longitudinal direction of the surrounding projections which are nearest, substantially as and for the purpose described.

2. For the production of stencils, a bed-plate or platen having projections extending longitudinally in directions opposite to each other and presenting curved surfaces to contact with a stylus, substantially as and for the purpose described.

3. For the production of stencils, a bed-plate or platen having longitudinal projections, all the surfaces of which are curved and the longitudinal axes of which projections are alternately substantially at right angles to each other, substantially as and for the purpose described.

4. For the production of stencils, the combination of a sheet or fabric of interwoven wires of threads with a backing *B*, substantially as and for the purpose described.

5. For the production of stencils, the combination of a sheet or fabric of interwoven wires or threads with a backing *B* and interstitial filling *D*, substantially as and for the purpose described.

6. The aforesaid method of producing a platen or bed-plate for the production of stencils, consisting in first interweaving strands or wires into a woven cloth or fabric, next stretching same into a single flat plane or surface, next combining same with a backing or interstitial filling, next taking an electrotype thereof, and next providing the said electrotype with a backing, all substantially as and for the purpose described.

7. The aforesaid method of producing a platen or bed-plate for the production of stencils, consisting in first interweaving threads into a woven cloth or fabric, next stretching and retaining same in a flat plane or surface, next combining same with a backing or interstitial filling, next covering with plumbago the surface composed of said backing or interstitial filling and portions of woven fabric therefrom projecting, next exposing same to an electrotype-bath and making an electrotype upon said plumbagoed surface, and next removing and permanently backing the said electrotype, substantially as and for the purpose described.

8. The aforesaid method of producing a platen or bed-plate for the production of stencils, consisting in first interweaving wires into a woven cloth or fabric, next stretching and retaining same in a flat plane or surface, next

combining same with a backing or interstitial filling, next impressing upon a wax or other plastic surface the said surface composed of said backing or interstitial filling and the portions of said wire fabric therefrom projecting, next taking an electrotpe from said impression, and next providing said electrotpe

with a permanent backing, substantially as and for the purpose described.

JOSIAH L. YOUNG.

Witnesses:

C. A. YOUNG,

L. M. KNAPP.

Correction in Letters Patent No. 478,675.

It is hereby certified that in Letters Patent No. 478,675, granted July 12, 1892, upon the application of Josiah L. Young, of Buffalo, New York, for an improvement in "Method of and Apparatus for Producing Stencils," an error appears in the printed specification requiring the following correction, viz.: In line 27, page 2, the word "of" should read *or*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 2d day of August, A. D. 1892.

[SEAL.]

CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:

N. L. FROTHINGHAM,
Acting Commissioner of Patents.