

A. B. DICK.
METHOD OF MAKING STENCILS.
APPLICATION FILED SEPT. 26, 1914.

1,146,853.

Patented July 20, 1915.

3 SHEETS—SHEET 1.

Fig. 1.

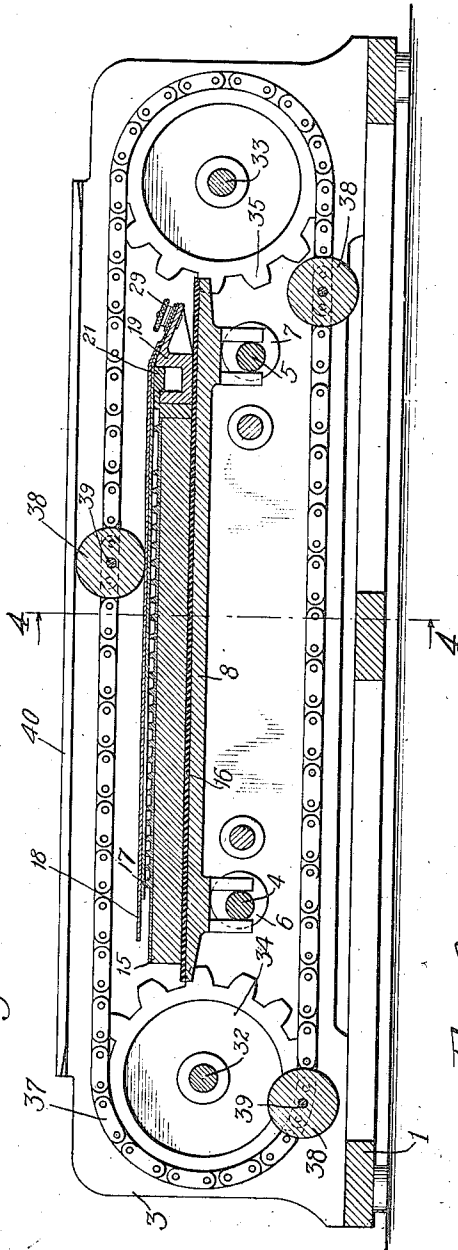
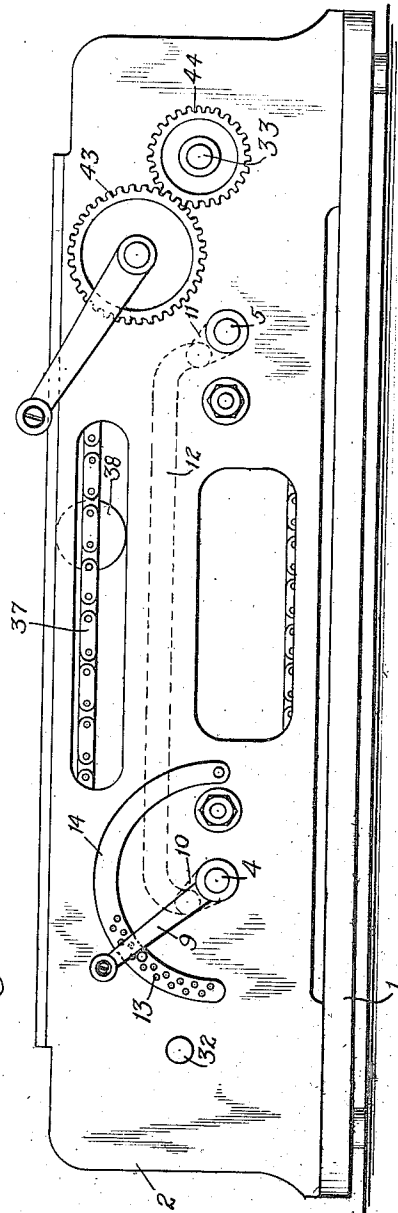


Fig. 2.



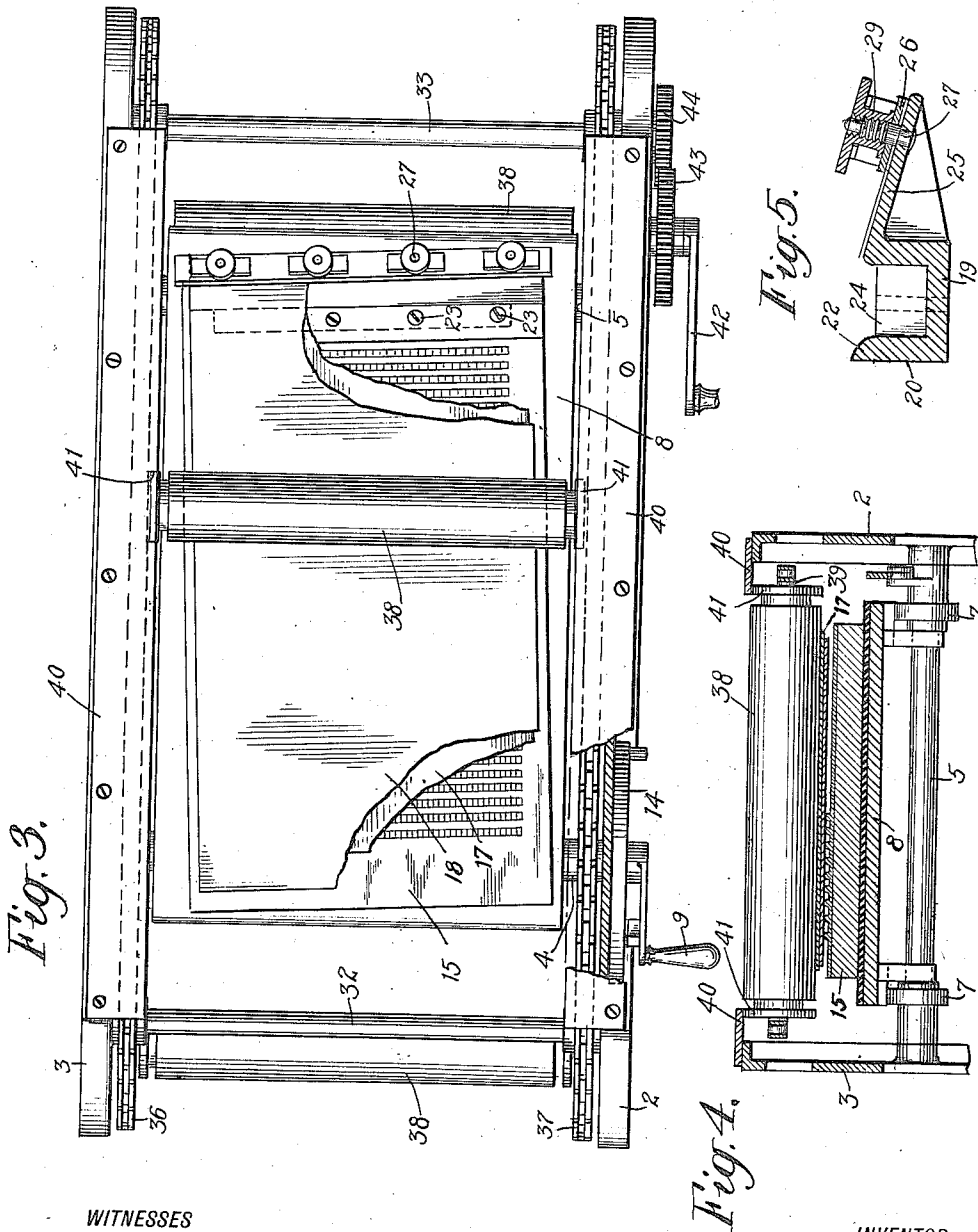
WITNESSES
Ezer Smith
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WITNESSES
Dyer Smith
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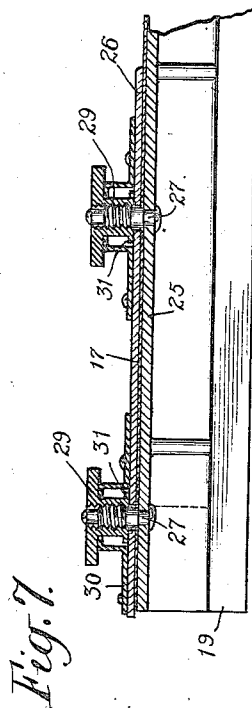
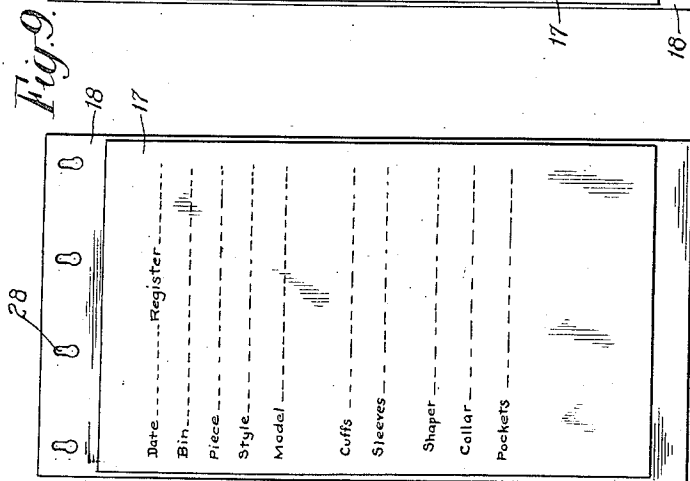
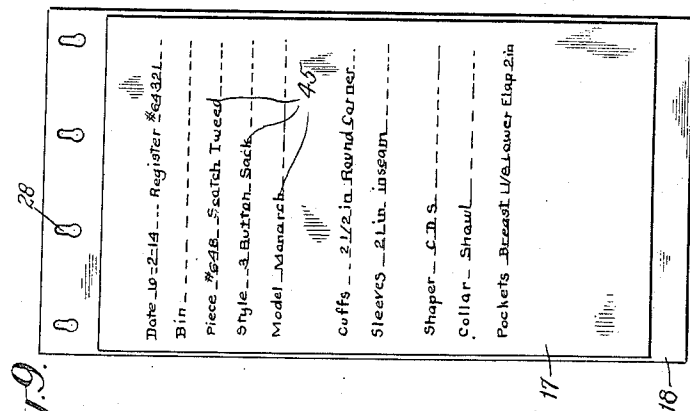
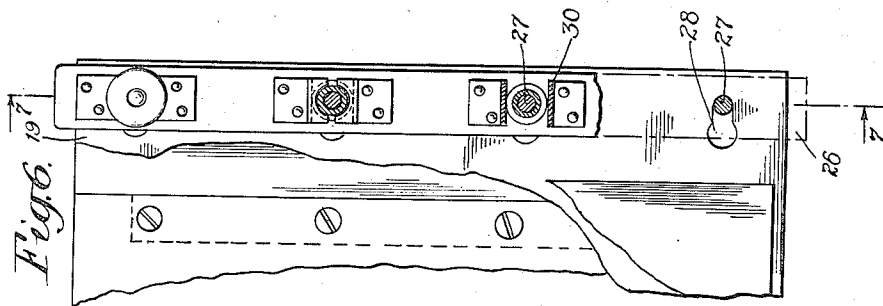
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3 SHEETS—SHEET 3.



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Fig. 8.

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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING STENCILS.

1,146,853.

Specification of Letters Patent.

Patented July 20, 1915.

Application filed September 26, 1914. Serial No. 863,654.

To all whom it may concern:

Be it known that I, ALBERT B. DICK, a citizen of the United States, residing at Lake Forest, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Methods of Making Stencils, of which the following is a specification.

My invention relates to the art of making stencils and particularly to the art of preparing a stencil for use upon a duplicating machine in making multiple copies. By my invention, stencils may be made expeditiously and accurately from an electrotype, block of type, or other form of printed matter, or other matter having sharply defined surfaces from which it is desired a stencil should be cut to be subsequently used in making duplicate copies.

The objects of my invention are to provide a novel method of preparing stencils.

My improved method consists, primarily and broadly, in pressing the stencil lightly against the stencil-making member a plurality of times, as by placing the stencil in position upon the electrotype or other stencil-making member and forming the stencil from this member by the cumulative effect of a considerable number of applications of pressure upon the stencil-sheet, the impacts of the pressing body being light and insufficient individually to form a stencil of the desired sharpness and depth.

More specifically, the method preferably comprises laying the stencil-sheet upon the stencil-making member, securing the stencil-sheet at one extremity and then applying pressure lightly as described a plurality of times in such a manner, as to constantly hold the stencil-sheet under tension, the pull of the sheet upon its securing devices being, however, insufficient to cause the sheet to creep or move relatively to the stencil-cutting member.

I have found that when a stencil-sheet is laid upon an electrotype or other member from which it is desired to form a stencil from which, for example, a page of printed matter is to be duplicated, and the stencil-sheet is held at one end and a roller passed over the sheet with a sufficient amount of pressure to cause the stencil to be cut at a single operation, the pressure required is sufficient to injure the roller and also the electrotype or type surface used for cutting

the stencil as well as the backing of the type matter. Such an operation also results in the formation of a poor stencil. If a stencil is attempted to be made by passing a roller or rollers over the stencil-sheet a number of times with comparatively heavy pressure, a blurred effect will be caused because of the creep of the paper, due to the considerable tension exerted lengthwise upon the same, so that such a stencil is unfit for commercial use. I have found, however, that the roller may be passed over the stencil-sheet with a light pressure a number of times, for example, from nine to twelve times, with the result that a perfect clearly defined stencil is produced, the pressure exerted being insufficient to cause the creep of the paper and insufficient to injure the type surface or the roller, the stencil being cut by the cumulative effect of the repeated applications of the pressure.

The machine or apparatus which will be described herein constitutes an effective and rapid means for practising the method briefly described above. In this apparatus, a plurality of pressure rollers are carried by endless carriers to pass continuously in operation over the surface of the stencil-sheet, the rollers passing over the sheet from the direction of the end of the sheet at which the latter is secured to its support and one or another of the rollers preferably constantly being in contact with the stencil-sheet. Means are provided for regulating the pressure exerted by the rollers upon the sheet and type matter under the same, this regulating means preferably consisting in mechanism for raising or lowering the support on which the type matter and stencil are carried toward or away from the plane in which the rollers move above the stencil-sheet. Preferably the electrotype or other stencil-cutting member and the stencil sheet thereon are mounted so that the lines of type in the stencil-cutting member are disposed at a slight incline to the axes of the impression rollers, which results in a more uniform and clearly defined stencil than if the lines of type were parallel to the axes of the pressure rollers.

A particular field of usefulness of the process and machine briefly described lies in the making of stencils to be used for duplicating printed forms. According to my invention a stencil of a standard printed form

having spaces therein to be subsequently filled in by individual data may be prepared by the method above briefly described from an electrotype or other printing member.

5 The stencil is then removed from the printing member and the spaces left in the printed form filled in on the stencil as by inserting the stencil-sheet in a typewriting machine where the remainder of the characters to be printed are cut in the stencil by operation of the typewriting machine in the usual manner, care being observed to secure exact registrations of these characters with the matter previously cut in the stencil from the electrotype. The stencil may then be applied to the drum of a stencil-duplicating machine for use in printing multiple copies from the stencil in the usual manner. By this process, work may be done by stencil duplication which previously was chiefly carried out by other methods. In many classes of work it has been common to use printed forms for various purposes and to fill in the blanks of these forms with a typewriter which is often an exceedingly laborious method. It has not been practicable to fill in the blanks of these forms with a stencil-duplicator for the reason that proper registration of the new matter with the matter of the printed form has not been commercially attainable. By my method, a stencil of the completed form with the spaces filled in may be obtained in an efficient, economical and clear cut manner, as stated, by making the stencil of the electrotype or printed form in the manner described and then filling in the spaces on a typewriter, whereby a stencil is obtained from which as many copies as desired may be printed of the completed form.

40 In order that my invention may be more fully understood, attention is hereby directed to the accompanying drawings, forming part of this application and illustrating a manner of carrying out my improved method and preferred or suitable mechanism which may be employed.

In the drawings, Figure 1 represents a longitudinal section of a preferred machine to be used in practising the process, Fig. 2 is a side elevation of the same, certain parts being omitted, Fig. 3 is a plan view of the machine, broken away and sectioned in part, Fig. 4 is a transverse section taken on line 4-4 of Fig. 1, Fig. 5 is an enlarged transverse section of the bar by which the stencil-sheet is secured in position, Fig. 6 is an enlarged partial plan view of one end of the stencil-sheet secured in position above the printing member, Fig. 7 is a partial section of the same, taken on line 7-7 of Fig. 6, Fig. 8 is a plan view of a stencil-sheet which has been formed by the machine and process described and Fig. 9 represents the same sheet in which various blanks of the same

have been filled in by cutting the appropriate characters on the stencil-sheet on a typewriter.

Referring to drawings, the machine is represented as having a base 1 from which rise side-frames 2 and 3. The shafts 4 and 5 mounted in the side-frames carry cams 6 and 7 on which the support 8 is mounted. The shaft 4 is provided with a crank-handle 9, and shafts 4 and 5 are provided with cranks 10 and 11, connected by a rod 12, so that rotation of the handle 9 results in an equal rotation of the cams 6 and 7 and a consequent raising or lowering of the table 8. Crank handle 9 may be held in any adjusted position by the coaction of a pin thereon with one of the holes 13 in a sector 14 secured to the side-frame 2.

The electrotype or other printing member 15 is mounted upon the table 8 and may be secured thereto in any desired manner as by screwing the same to the face of the table. Preferably a sheet of somewhat yielding rubber 16 is interposed between the printing member and the table. The stencil-sheet 17 with its backing sheet 18 is placed upon the face of the printing member and secured as will be described. Preferably, a bar 19 is made use of for securing one end of the stencil-sheet adjacent to one end of the printing member, this bar resting upon the table 8 with its vertical face 20 contacting the forward face of the electrotype, if an electrotype be used as the printing member, or contacting the forward face of the chase if the printing member comprises a form of type set up in a chase. The bar 19 may be screwed to the table or it may be secured to the printing member which is secured to the table. In this case, a projection or lip 21 upon the forward edge of the electrotype or chase of type extends over the curved forward edge 22 of bar 19 and is secured to the bar by screws 23, passing through the lug 21 and into webs 24 in the bar. Bar 19 is provided with an upper rear surface 25 which slopes downwardly to the rear and on which is mounted the button-bar or device 26 for securing the end of the stencil-sheet. Bar 19 is provided with a number of upwardly extending screw-threaded pins 27 over which the openings or buttonholes 28 at the end of the backing-sheet are slipped, after which bar 26 is positioned upon the end of the stencil and the nuts 29 carried by bar 26 are screwed tight upon pins 27 to tightly hold the end of the stencil-sheet. It is understood that the stencil-sheet 17 is secured at its end to the backing-sheet 18, as by adhesive, and securing the backing sheet at one extremity thereby secures the stencil-sheet. Bar 26 is provided with flanged members 30 which coact with flanges 31 on nuts 29 to prevent the nuts being separated from the bar and

lost. Surface 25 on which bar 26 is located is given the downward inclination referred to so that the devices for securing the stencil-sheet will be substantially below the plane in which the face of the printing member 15 is located to prevent the heads of the thumb nuts 29 being struck by the impression members in their movement.

The impression rollers are carried, as stated, by a flexible carrier or carriers, one flight of which will carry the rollers into coaction with the stencil-sheet. As illustrated, the machine is provided with shafts 32 and 33 extending between the side-frames on which are mounted sprocket wheels 34 and 35 over which pass sprocket chains 36 and 37 one inside of each side-frame of the machine. The impression rollers 38 are carried by the chains 36 and 37 in parallel relation, the rollers being rotatably mounted on shafts 39 carried by links of the chain. The rollers are preferably three in number, although my invention is not limited in this respect and are preferably formed of hard rubber and are spaced at equal distances apart on the chains. The side-frames 2 and 3 are provided with horizontal guides 40 extending inwardly and the shafts 39 on which the rollers are mounted are provided adjacent their ends with disks 41 which contact the under sides of guides 40 as the rollers travel in their upper flight above the stencil-sheet, so that movement of the rollers in a horizontal plane above the stencil-sheet and printing member is assured. The pressure which is exerted between the rollers 38 and the stencil-sheet and printing member on which the same is carried is regulated by raising the table 8 by means of hand-crank 9 until the desired light impact of the rollers upon the stencil-sheet is secured. The machine may be operated in any desired manner, such as the hand-crank 42, which is connected by gears 43 and 44 to the sprocket shaft 33.

In operation, the stencil-sheet is positioned as described above the printing member, the pressure between the rollers and the stencil being adjusted so that the desired light impact of the rollers with the stencil is secured, the pressure being insufficient to injure the rollers or the type and insufficient to cause lengthwise moving or creeping of the stencil-sheet relative to the printing member as the rollers pass over the stencil-sheet, the stencil being formed by the cumulative effect of the repeated light applications of pressure. As the rollers pass over the sheet, they contact the latter first adjacent the edge at which it is secured, and as preferably there is always one roller in contact with the sheet, the latter exerts a constant slight pull upon its securing devices.

Preferably, the printing member 15 with the stencil-sheet thereon is disposed at a

slight angle to the vertical axis of the machine, or, to put it differently, so that the lines of type on the printing member are disposed at a slight angle to the axes of the impression rollers. By this means, less pressure need be exerted upon the pressure rollers than if the latter contacted the whole of the first and each subsequent line of type at the same instant, and accordingly, sharper definitions of the characters cut on the stencil are obtained when the printing member is mounted in the angular member described and the tendency to injure the stencil, at points corresponding with the type lines, is minimized.

It is obvious that my invention may be carried out, by the use of a machine having different details of construction from those described, so long as a plurality of pressure-exerting members are caused to pass over the stencil-sheet in the manner described. It is also obvious that my improved process comprises broadly the sequence of operations described, in which the stencil is cut by the cumulative effect of a plurality of applications of pressure of the character described above. As a variation of the process, it may be observed that the stencil-sheet might be securely fastened on the periphery of a roller of sufficiently large diameter, and the roller passed over the stencil-making surface a sufficient number of times with the desired light pressure, which method would be included within the broadest aspect of my invention.

A stencil-sheet having form data cut thereon by an electrotype or other printing member is illustrated in Fig. 8. In Fig. 9 the same stencil is shown with further characters, such as those illustrated at 45, formed thereon by other means, such as the operation of a typewriting machine as stated, this figure illustrating the completed stencil which is adapted for use in a stencil-duplicating machine.

Having now particularly described my invention, what I claim and desire to protect by Letters Patent is as follows:—

1. The method of making stencils, consisting in laying a stencil-sheet upon a stencil-making surface, securing the sheet at one extremity, and pressing the sheet against the said surface repeatedly by causing a pressing body to pass repeatedly over the sheet from the direction of the extremity at which the sheet is secured, with a pressure insufficient to cause creeping of the sheet relative to the surface during the plurality of operations, and sufficient to make a faint impression only at one operation, the stencil being formed by the cumulative effect of a plurality of light impressions, substantially as set forth.

2. The method of making stencils, consisting in laying a stencil-sheet upon a stencil-

making surface, securing the sheet at one extremity, and pressing the sheet against the said surface repeatedly by causing a succession of pressing bodies to pass over the sheet from the direction of the extremity at which the sheet is secured, with a pressure insufficient to cause creeping of the sheet relative to the surface during the series of pressing operations, and sufficient to make a faint impression only at one operation, the stencil being formed by the cumulative effect of a plurality of light impressions, substantially as set forth.

3. The method of making stencils, consisting in laying a stencil-sheet upon a stencil-making surface, securing the sheet at one extremity, and passing a roller over the sheet repeatedly from the direction of the extremity at which the sheet is secured, with a pressure insufficient to cause creeping of the sheet relative to the surface during the plurality of operations, and sufficient to make a faint impression only at one operation, the stencil being formed by the cumulative effect of a plurality of light impressions, substantially as set forth.

4. The method of making stencils, consisting in laying a stencil-sheet upon an electro-type or similar stencil-making surface comprising a plurality of lines of type impressions or other sharply-defined raised portions, securing the sheet at one extremity, pressing the sheet against the electrotype with a force one component of which exerts a pull on the securing devices of the sheet, with an amount of pressure sufficient only to make a faint impression of the electrotype on the sheet, and repeating the operation until an impression of desired depth is made, by the cumulative effect of the plurality of light impressions, substantially as set forth.

5. The method of making stencils, consisting in laying a stencil-sheet upon a stencil-making surface, securing the sheet at one edge, and causing a succession of pressing bodies to pass over the sheet with the exertion of force thereon, one component of which exerts a pull on the securing devices of the sheet, said bodies moving in the same direction and each contacting the sheet before the previous one has left the same, each body exerting downward pressure sufficient only to make a faint impression of the said surface on the sheet, the desired stencil

being formed by the cumulative effect of the plurality of light impressions, substantially as set forth.

6. The method of making stencils, consisting in laying a stencil-sheet upon an electrotype or similar stencil-making surface comprising a plurality of lines of type impressions or other sharply-defined raised portions, securing the sheet at one extremity, moving a pressing body over the sheet at a slight horizontal angle to the lines of type matter of the stencil-making surface, with a light pressure, sufficient only to make a faint impression of said surface on the sheet, and repeating the operation until the stencil is formed by the repeated applications of pressure, substantially as set forth.

7. The method of making stencils, consisting in laying a stencil-sheet upon an electrotype or other printing member of extended area, pressing the sheet into contact with the member a plurality of times with a light pressure, to form the desired impression by the cumulative effect of the repeated applications of pressure, and then cutting additional characters individually in the stencil-sheet within the limits of the impression received from such printing member, as by placing the sheet in a typewriting machine and operating the machine so that the type on the type levers thereof strike the stencil-sheet at desired positions thereon, substantially as set forth.

8. The method of making stencils, consisting in pressing a stencil-sheet against a stencil-making surface carrying characters to be impressed on the stencil-sheet with a light impact, sufficient only to make a faint impression of said character on said sheet, and repeating the operation a plurality of times, with registration of the same portions of the sheet and surface as during the first pressing operation, until an impression of desired depth is made on the sheet, by the cumulative effect of the plurality of light impressions between which pressure upon the sheet, at a given point, is removed, substantially as set forth.

This specification signed and witnessed this 24th day of September, 1914.

ALBERT D. DICK.

Witnesses:

S. O. EDMONDS,
I. McINTOSH.