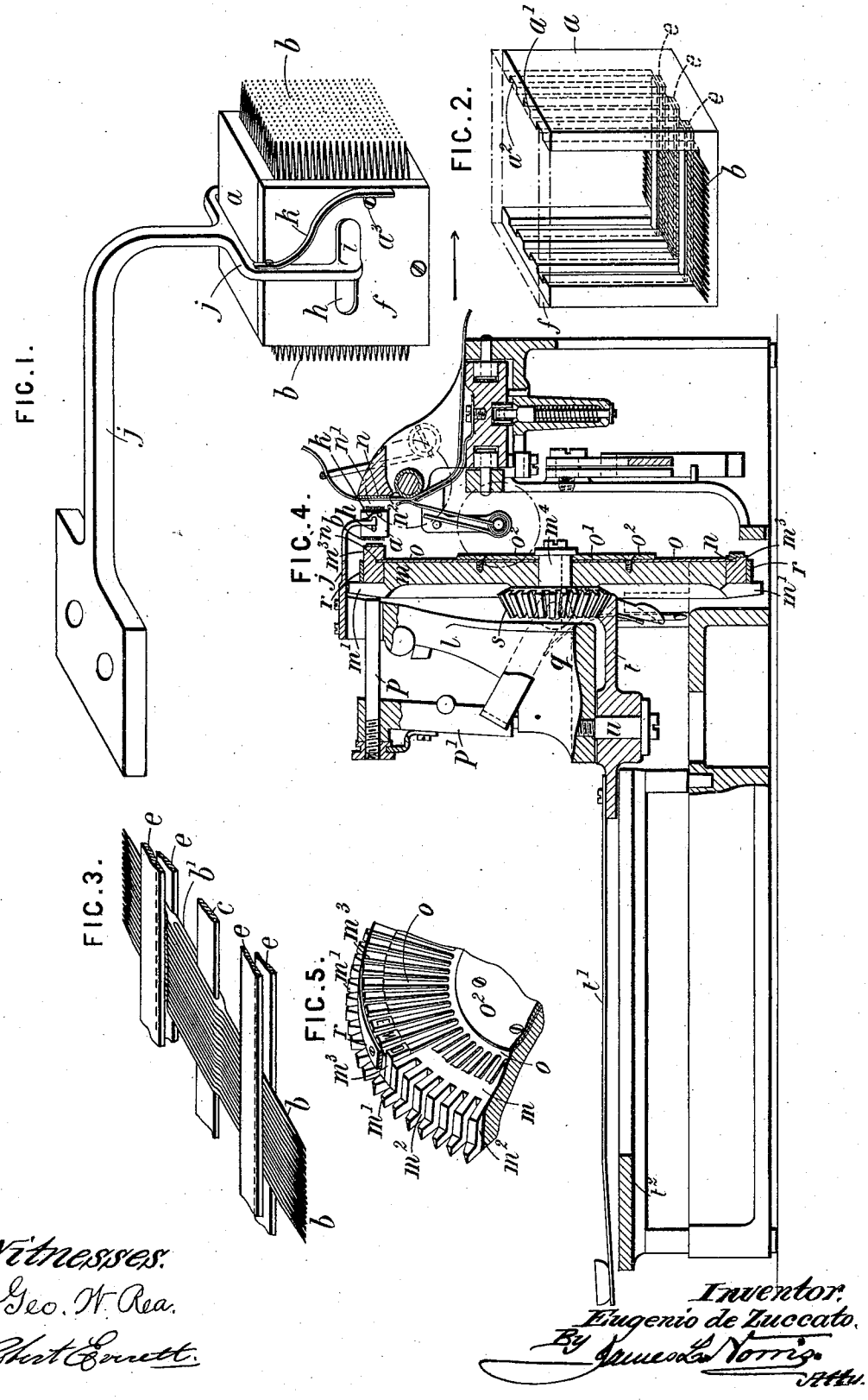
(No Model.)

E. DE ZUCCATO.

APPARATUS FOR MAKING STENCILS.

No. 478,301. Patented July 5, 1892.



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APPARATUS FOR MAKING STENCILS.

SPECIFICATION forming part of Letters Patent No. 478,301, dated July 5, 1892.

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To all whom it may concern:

Be it known that I, EUGENIO DE ZUCCATO, manufacturer, a subject of the King of Italy, and a resident of London, England, have invented certain new and useful Improvements in Apparatus for Making Stencils, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to apparatus for the manufacture of stencils for use in the production of manifold copies of writings, drawings, and the like by the well-known method of pressing ink or color through small openings or perforations in the stencil and depositing the ink or color thus forced through such perforations upon paper or other suitable material supported beneath the stencil.

My said invention comprises an improved apparatus, hereinafter described and claimed, for making the said stencils by taking a sheet of paper or other suitable material—such, for instance, as is ordinarily used for making stencils of this kind or class—and forming perforations in the said sheet by means of pointed wires or needles packed closely together parallel to each other and held in such a manner that they can be moved longitudinally through a short distance independently of each other. The holder containing these pointed wires or needles is placed next the sheet to be perforated, so that the points of the needles are in contact with or in close proximity to the said sheet. Some of the needles are then forcibly driven into the said sheet by means of an embossed letter or figure, a type, or the like, the raised portions of which will act upon certain of the said needles, and only those needles which are in contact with such raised portions will be forced through the sheet, which will thus be perforated with a series or group of holes corresponding in form to the letter or figure on the type or similar device. When one letter or figure has thus been formed, the holder containing the needles or perforators is automatically removed from the sheet and may be applied to another part thereof, so that the needles will serve for the perforation of the sheet with another letter or figure, and so on. The protrusion of any of the needles after one letter or figure has been perforated causes no inconvenience, as when they are next brought into contact with the material to be perforated they will not perforate it unless they are forced into it by the embossed letter or the like which next acts upon their rear ends.

I find it advantageous to arrange the needles or perforators closely together and parallel to each other in a box, frame, or casing, the ends or the top and bottom of which are open. The said needles or perforators are held or retained in the said box or casing in such a manner that they can be moved endwise relatively to each other without undue friction. The said needles should all be of the same length and very thin, so that a great number of them may be packed in a small space. They are preferably pointed at both ends. The sides of the box, frame, or holder should be somewhat shorter than the needles, so that the latter will protrude a short distance from the said box, frame, or holder.

For the purpose of retaining the needles in the box, frame, or holder, while permitting their endwise movement therein independently of each other, I form the said needles with elongated eyes, for example, which are about midway between their ends, and I thread or string each row of the said needles upon fine flat wires or bands. The said flat wires or bands have a width which is less than the length of the said elongated eyes, so that the said needles move in the direction of their length upon the said flat wires or bands. In the interior of the holder grooves or recesses are formed in two of its opposite walls to receive the ends of the said fine flat wires or bands and the ends of other and similar bands hereinafter referred to. The flat wires or bands upon which the needles are threaded not only retain the needles in the box, frame, or holder, but also prevent them from getting out of their proper relative position. I separate the several rows or series of needles by similar flat wires or bands, which are placed between the parallel rows of needles and are retained in place by the insertion of their ends in certain of the said grooves or recesses. These separating-bands assist in maintaining the needles in proper relative position and compensate for the space left between the rows of needles by the enlargements of the needles at the places where their eyes are formed. The several rows of needles and the flat bands upon which they are threaded and

the other flat bands by which the said rows are separated are all retained in the box, frame, or holder by an end plate, which is secured to the said box or frame in such a manner that it closes the opening by which its contents are placed in it and closes, also, the ends of the said grooves or recesses; or the said flat wires or bands may be retained in the holder by soldering or by clamping-plates or in any other suitable manner. The eyes, being elongated, permit the required independent endwise movement of each of the said needles. I do not, however, confine myself to this arrangement for retaining the needles in place while permitting endwise movement thereof for the purpose of my invention.

By my said invention I am enabled to conveniently and advantageously make stencils of the kind or class above referred to by the aid of a type-writing machine. For this purpose I arrange the box, frame, or holder containing the needles in such a manner that each type when operated will act upon some of the said needles and drive the points of the same through the sheet to be perforated, which is suitably supported to permit such peforation. A spring or other suitable device is provided, whereby after each operation of perforating the sheet the box, frame, or holder containing the needles will be automatically moved away from the said sheet and the needles will be pulled out of the paper to permit the feeding forward of the latter relatively to the said box, frame, or holder.

In the accompanying drawings, Figure 1 is a perspective view of a box, frame, or holder containing pointed wires or needles arranged as herein described and of the arm or bracket by which it is retained in place upon a type-writing machine, for example. Fig. 2 is a perspective view of the said box, frame, or holder with its end plate removed and one row only of needles in place within it. Fig. 3 is a diagram showing a portion of a row of needles with the flat wires or bands in proper position relatively thereto. Fig. 4 is a cross-section through a type-writer of the "Victor" class and shows, for example, apparatus constructed according to this invention applied thereto. Fig. 5 is a perspective view of the type-wheel of the type-writer and will be hereinafter more particularly referred to.

Like letters indicate corresponding parts in all the figures.

a is the box, frame, or holder.

b b are the pointed wires or needles, each of which is formed with an elongated slot or eye b'.

c c are the supporting-wires, one of which is passed through the slots or eyes b' of each wire or needle in a row of the said wires or needles. The said supporting-wires are secured in place in the box, frame, or holder a by having their ends placed in the grooves a'.

e e are flat bands or wires for separating the rows of pointed wires or needles. They are preferably arranged between each series of needles, as shown, on each side of the enlargements, wherein the eyes of the needles are formed, and they are retained in position by having their ends placed in the grooves a^2 of the box, frame, or holder.

f is the end plate or cover-plate of the box, frame, or holder, which is placed over the end of the said box or frame, as indicated in dotted lines in Fig. 2, and is secured in place by screws. The said plate holds the contents of the box, case, or frame a together, and also prevents the wires c c e e from rising out of the grooves a' a^2.

Slots h are formed in the outer walls of the box, frame, or case a, as shown, into which slots enter projections or guides i, which extend from a bracket j, so that the said box or the like is supported and is free to move in a direction parallel to the pointed wires or needles by sliding upon the said guides i.

k is a spring secured to the bracket j and bearing upon a stud a^3 or other projection from the side of the box, frame, or case a, so that the said box a if moved at any time in the direction of the arrow, Fig. 1, may always be returned by the said spring to the position in which it is shown in that figure upon the removal of the cause of its displacement.

With reference now to Figs. 3 and 5 the bracket j is screwed or otherwise firmly fixed to a vertical standard l, projecting from the type-writer bed, so that the box, frame, or holder a is held between the face of the wheel m, which carries the type, and a soft surface n of india-rubber or cloth or other suitable material provided upon the face of a bar n', against which soft surface rests the sheet of paper to be perforated, as indicated at n^2. The said soft surface n is provided in order that the needles may pass completely through the paper without bringing their points into contact with material which is likely to seriously affect their sharpness.

The type-wheel consists of a disk m, which is free to rotate upon a pin m^4, fixed to the main frame of the machine. The said disk is provided with a series of radial projections m' at its circumference, between which are recesses m^2, in which types m^3 may move parallel to the axis of rotation of the wheel m. A notch n or its equivalent is provided in each type, and into these notches enter the ends of the radial extensions o of a disk o' of sheet metal, which is secured to the wheel m by a retaining-ring o^2. The said extensions o constitute springs to retain each type in the position in which two types m^3 are shown in the cross-section, Fig. 4. The type may move from that position toward the box, frame, or case a when propelled in that direction by the projection p from the arm p', which is oscillated upon an axis at q by a lever which is moved by the finger of the operator. Any type moving as described is returned to its normal position by one of the spring extensions o. The types are prevnted

from moving radially out of position by a band r, which is passed round the circumference of the wheel outside the types, and is secured to the said circumference between the type-grooves m^2 by screws or by soldering or any other convenient means.

Any type caused to impinge upon the rear ends of the needles b will first move the whole of the said needles forward with the box or case a upon the projections or guides i, and when the said box or case has completed its forward movement some of the needles will be forcibly driven farther forward by the type and will enter and pass through the paper n^2 into the surface n behind it. As soon as the pressure of the type is removed from the needles the box a will be caused to return to its normal position by the action of the spring k upon the projection a^3, and the return of the said box in the manner described will withdraw the needles from the paper in readiness for further operation.

s is a bevel-wheel secured to the type-wheel m and gearing with a bevel-segment t, which turns on the pivot u, secured to the main frame or bed of the machine.

t' is an arm secured to the bevel-segment t, and t^2 is a segmental plate or tablet, upon which numerals, alphabetical characters, or other indications are inscribed in such a manner that if the end of the arm t' be brought over any indication or character the type-wheel is rotated to bring a type with a like character opposite to the projection p. The projections m' are pointed or beveled upon the side which faces the projection p, so that if the operator should fail to stop the type-wheel with a type exactly in alignment with the projection p the said projection when operated will strike the beveled edge of one or other of the projections m' and will give the type-wheel a small movement sufficient to bring the type and projection p into line.

It is obvious that if a device such as that shown in the drawings is applied to a sheet of paper or similar material, so that the points of the needles are in contact therewith or in close proximity thereto, and a type or similar device be pressed or caused to impinge against the butt-ends of the said needles, such of the needles as are acted upon by the raised portions of the type or similar device will be driven into the said sheet while the other needles will be inoperative.

The wires or needles b should be as short and as numerous as practicable. They may with advantage be from one-fiftieth to one seventy-fifth of an inch in thickness, or thereabout.

I do not limit myself to the above-described mode of carrying my said invention into practice, although I consider it to be one of the most practical methods.

It will be seen from the foregoing description that the characteristic feature of my said invention is the employment of a "surface" composed of a large number of independently-movable points, any of which can by means of the raised portion of a type or similar device be forced into the sheet to be perforated.

What I claim is—

1. In a device for making stencils, the combination of a box, frame, or holder, pointed wires or needles having elongated slots or eyes, and supporting-wires extending through such slots or eyes, each needle being capable of endwise movement on the supporting-wires independently of the other needles, substantially as and for the purpose above specified.

2. In a device for making stencils, the combination of a box, frame, or holder, pointed wires or needles having elongated slots or eyes, and supporting-wires extending through such slots or eyes, each needle being capable of endwise movement on the supporting-wires independently of the other needles, with wires or bands placed between the said wires or needles to maintain them in separate rows and to maintain the said rows parallel to each other, substantially as and for the purpose above specified.

3. In a machine for making stencils, the combination, with a type-writing machine, of a box, frame, or holder in which are held parallel to each other pointed wires or needles capable of endwise movement through a short distance independently of each other, said needles being arranged between the impression-surface and the type of the said type-writing machine, substantially as described.

4. In a machine for making stencils, the combination of a box, frame, or holder arranged between the impression-surface and the type, a spring whereby the said box, frame, or holder is normally held away from the said impression-surface, and pointed wires or needles which are held parallel to each other in the said box, frame, or holder and are capable of endwise movement through a short distance independently of each other, substantially as and for the purposes above specified.

5. In a machine for making stencils, the combination, with a bracket secured to the frame of the machine and provided with guides, of a box, frame, or holder in which are held parallel to each other pointed wires or needles capable of endwise movement through a short distance independently of each other and in the outer walls of which box, frame, or holder slots are formed to receive the said guides and to enable the said frame or holder to slide upon the said guides, and a spring whereby the said box, frame, or holder is normally held at one extreme of its travel, substantially as and for the purpose specified.

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

EUGENIO DE ZUCCATO.

Witnesses:
DAVID YOUNG,
A. H. HEATH.