(No Model.) 2 Sheets—Sheet 1.

# E. F. GENNERT & D. N. GLEASON.

## PUNCH AND DIE.

No. 382,357. Patented May 8, 1888.

Fig. 1

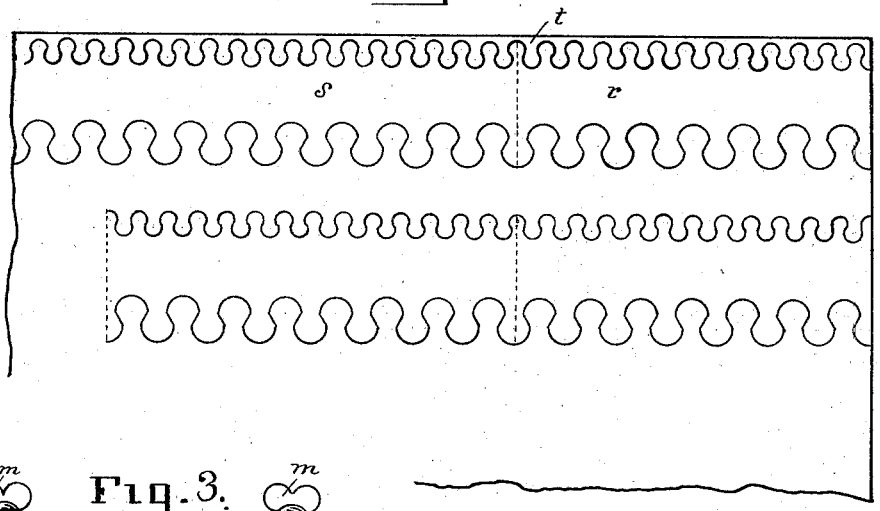


Fig. 3.

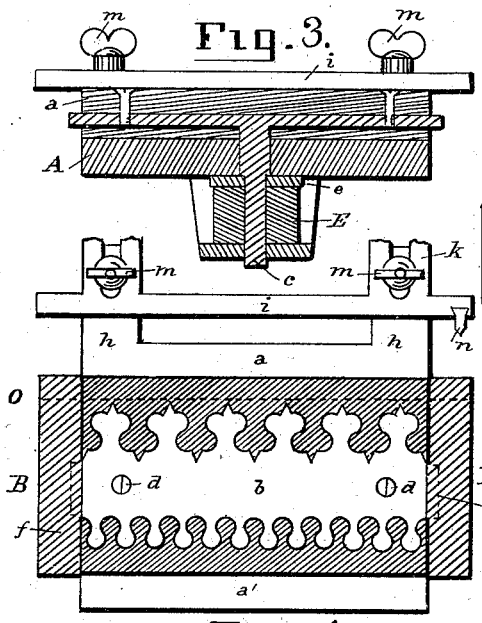


Fig. 2.

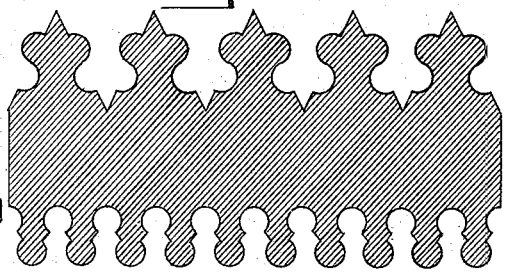

Fig. 4.

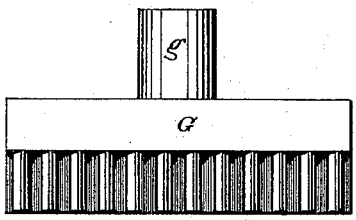


Fig. 5.

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(No Model.) 2 Sheets—Sheet 2.

# E. F. GENNERT & D. N. GLEASON.

## PUNCH AND DIE.

No. 382,357. Patented May 8, 1888.

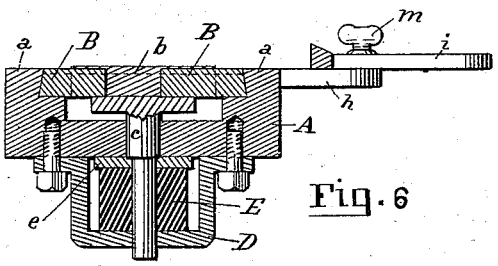


Fig. 6

Witnesses.
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Duane N. Gleason.
By his Attorney E. F. Gennert.

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# UNITED STATES PATENT OFFICE.

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## PUNCH AND DIE.

SPECIFICATION forming part of Letters Patent No. 382,357, dated May 8, 1888.

Application filed February 8, 1888. Serial No. 263,376. (No model.)

*To all whom it may concern:*

Be it known that we, EMIL F. GENNERT and DUANE N. GLEASON, citizens of the United States of America, and residents of the city of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Punches and Dies, of which the following is a specification.

Our invention relates to punches and dies of that class employed for the purpose of shearing or punching from sheet material strips the edges of which follow curved or zigzagged lines or the lines of ornamental figures. Its object is to increase the capacity and range of a punch and die or series of punches and dies employed for such purposes, and thereby render them efficient when in operation to effect a saving in the waste of material and an increase in the amount of the product; also to make them adaptable for producing strips varying in width, and yet having edges of the same figure or patern. Among the punches and dies heretofore used for the purpose stated, although numerous in variety and kind, there is not one which will serve at the same time and in one operation to punch out one completed strip and sever another completed strip from the same sheet of material, producing two complete strips each operation (except the first) throughout the working of the entire sheet with absolutely no waste of material, save at the two edges of the sheet, (which is in amount but what would be produced by punching one strip in the ordinary way.) Now this is what our invention aims to accomplish; and it consists in the means by which we accomplish it.

In the accompanying drawings, which form part of this specification, Figure 1 represents part of a sheet of material in process of division into strips having ornamentally-scalloped edges. Fig. 2 represents the face of a punch having the characteristic features of our invention. Fig. 3 shows a longitudinal central section of a die-holder and device for actuating an expelling-plunger; also the face of a gage-bar. Fig. 4 shows a horizontal view of the die-holder, gage-bar, and a die (in place) having the characteristic features of our invention. Fig. 5 shows a side view of a punch adapted to operate in conjunction with said die. Fig. 6 shows a central cross-section of the bed-plate, die-plate, and other connecting parts.

By noticing the lines forming the edges of the strips in Fig. 1 and the sides of Fig. 2 it will be observed that the figures forming the lines and the spaces between said figures are exactly alike in shape and size, so that when a strip is severed from the sheet of material the edge left to the sheet will be formed of figures of precisely the same shape and size as the figures forming the edge of the strip cut from it; and it is essential that the punch and die employed in this invention be constructed so as to have the same relative characteristics— that is to say, that the figures forming the outline of the face of the punch must be precisely the same in shape and size as the figures forming the cavity-outline of the die-face; but all figures need not be of one pattern or size, as one side of the punch and the corresponding side of the die may be formed of large and complex figures, and the other side of the punch and its corresponding side of the die may be of small and more simple figures, as is shown by Fig. 2, or a small figure may alternate with a large one.

Like letters refer to like parts in all the figures.

A represents the bed-plate or die-holder, which is adapted by suitable means for attachment to a suitable operating-press. The form is similar to such as are commonly used for power-presses. A heavy plate, A, has vertical flanges *a* and *a'* fixed to its sides, between which the die B is securely held in position a suitable distance above the plate A to allow the bar C a short vertical movement on its guiding shank *c*. On this bar C an expelling-plunger, *b*, which fills loosely the die-cavity, is secured by the screw-bolts *d d*. The guiding-shank *c*, firmly attached to this bar, extends downward through the plate A, and is there decreased in diameter, so as to form a shoulder against which a metal washer, *e*, by which it is there surrounded, has bearings. A spring, E, which we prefer to be of elastic rubber, is placed under this washer *e*, and is supported in position by the stirrup D, which drops from the plate A, to which it is firmly fixed in any suitable manner. The shank *c* of the bar C extends down through the spring E

and stirrup D, the openings in the plate A and the stirrup D, through which it passes, serving as guiding-bearings in which it can freely move longitudinally. It will be seen that the tension of the spring E is exerted against the washer *e*, and, through the shank *c* and bar C, tends to maintain the face of the expelling-plunger *b* flush with the face of the die B, it being prevented from protruding by reason of the ends of the bar C striking the under face of the die-plate, as shown by the dotted lines at *f f*, Fig. 4.

The die B is made with a cavity, each side of which is outlined or formed of a series of any desired fancy or ornamental figures having the characteristics before stated. The face of the die at the sides having the cutting-edges (which coincide exactly with the lines forming the figures) is raised, something more than the thickness of the material to be used, above the face of the die at the ends, thus providing against severing the material by the ends of the punch, and the punch G is made to conform to it, and not only be an exact counterpart, but also to have figures on each of its sides which are precisely the same in size and shape as those on the respective sides of the die-cavity. It is also provided with a shank, *g*, or other suitable means, to adapt it for attachment to a suitable operating-press.

From the flange *a* of the bed-plate A arms *h h* extend backward, and serve to carry a gage-bar, *i*, made to be adjustable by means of its slotted arms *k k*, which are adapted to slide over the arms *h h*, and are secured thereon by set-screws *m m*, so as to hold the bar *i* secure in any position to which it may be adjusted. This gage-bar is provided with a stop, *n*, adapted to enter a space between two of the figures or scallops on the side of the sheet of material being operated upon, and serve to stop the sheet at the proper place.

The operation is as follows: The gage-bar *i* is first adjusted so its face will be on the die about where the dotted line *o* is shown. The upper right-hand corner of the sheet of material to be worked is then inserted between the punch and the die, its side edge being pressed against the face of the gage. A stroke of the punch is made and a portion of one strip severed from the sheet. (Shown by Fig. 1 at *r*.) The sheet is then fed to the right just the length of the punch, and another portion of the strip is severed, and so on successively until the other end of the sheet is reached and one completed strip severed from the sheet, as shown by *s r*, Fig. 1. This and the rim *t* are removed. Then the gage-bar *i* is moved back the width of the strip to the position shown at *i*. The sheet is again inserted and the operation proceeded with in the same manner as before; but it will be observed that this time two strips are being made at the same time, one directly under the punch and the other between the punch and the gage-bar; also, that the latter may be made of any width desired accordingly as the gage-bar is adjusted, the punch performing the function of a double shear, but shearing on lines which form a series of fancy full figures instead of straight lines.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a combination of a punch and die adapted to operate conjointly with each other, in which the figures forming the outline of the face of the punch are precisely the same in shape and size as the figures forming the cavity outline of the die-face, a die, the cavity outline of which is formed with cutting-edges on two diametrically-opposite sides, and with depressions from the die-face that render the edges of the other two sides of the die-cavity inoperative as cutting-edges, substantially as described.

2. A piercing and shearing punch having cutting-edges on its two sides which conform to the lines of figures that are precisely of the same size and shape as the spaces that occur between them, and a die-plate adapted to operate conjointly with the same, and which has the portion of its face upon which the cutting-edge is formed raised above the portion of its face which has no cutting-edge, in combination with a gage-bar, as *i*, and suitable means for holding the same in position, substantially in the manner and for the purpose described.

3. The following parts: a punch, as G, a die, as B, each having the characteristics described, bed-plate, as A, and bar, as C, with its guiding-shank *c*, plunger *b*, spring E, and stirrup D, when combined and arranged in the manner and for the purpose set forth.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 12th of November, 1887.

EMIL F. GENNERT.
DUANE N. GLEASON.

Witnesses:
C. F. KELLEY,
JNO. N. MCLEAN.