Docket No. ELL-125

CHEMICAL-ETCHED DIE HAVING IMPROVED REGISTRATION MEANS

CROSS REFERENCE TO RELATED APPLICATIONS

This application is related to Provisional Patent Application No. 61/572,672 filed July 15, 2011.

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

This invention relates to a chemical-etched die of the kind to be used in combination with a (e.g., roller) press to produce die cut shapes from a sheet material. The die has a cutting edge which can be precisely registered by the user in alignment with a pattern that is printed on the sheet material from which the shapes are to be cut.

[0002] 2. Background Art

Dies have long been used by educators, marketing professionals, and those in the arts and crafts industry to produce a wide variety of shapes and designs that are cut from sheet material in response to a force that is generated by a die press and applied to the dies to push cutting edges (i.e., blades) of the dies through the sheet material. Reference can be made to U. S. Design Patent Nos. D607,910 and D585,081 for examples of hand-operated and motorized roller press machines which are adapted to accept one or more dies to cut through sheet material.

[0003] In some cases, a particular pattern to be die cut is printed on the sheet material. The user typically tries to align the cutting blade of the die with the printed pattern on the sheet material. If the alignment is accurate and the die and sheet material are run together through the press, a precise shape corresponding to the printed pattern will be cut from the material. However, if the user cannot see the cutting blade or know its exact location on the die, the die may not be properly registered with the printed pattern. Consequently, the die cut shape may not be as precise as intended.

[0004] Reference can be made to U. S. Patent No. 7,055,427 for an example of a chemical-etched die that may be subject to the registration problem described above when the die is laid over a sheet material and run through a press.

SUMMARY OF THE INVENTION

[0005] A chemical-etched die is disclosed to cut out shapes from a sheet of material when the die and sheet material are moved together through a (e.g., roller) press. The die includes a flat outside border that surrounds an inside opening through the die which defines the shape to be cut from the sheet material. A thin cutting edge (i.e., blade) projects from the outside border to extend around the inside opening through the die. The cutting edge is pushed through the sheet material in response to a compressive force generated by the die press and applied to the die. As an important feature, the cutting edge surrounds the inside opening of the die such that none of the outside border lies between the cutting edge and the inside opening. That is to say, the cutting edge lies exactly at the periphery of the inside opening through the die so as to precisely define the shape to be cut from the sheet material. To stabilize the die against twisting and

changing its shape when subjected to the force generated by the die press, the outside border is provided with a width of at least 2.5 mm.

[0006] By locating the cutting edge exactly at the periphery of the inside opening, the user will know the location of the cutting edge when the die is turned upside down and laid against the sheet material. By virtue of the foregoing, the user will be able to accurately register the cutting edge of the die with a pattern that is printed on the sheet material to be cut. Thus, the shape is cut from the sheet at its intended location corresponding to the location of the pattern printed thereon.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a top view showing one example of a chemical-etched die having the improved registration means of the present invention;

[0008] FIG. 2 is a bottom perspective view of the die shown in FIG. 1 having a cutting edge located at the periphery of an inside opening through the die to achieve the advantages of this invention;

[0009] FIG. 3 is a cross-section of the die taken along lines 3-3 of FIG. 2;

[0010] FIG. 4 is an enlarged detail of the cutting edge of the die taken from FIG. 3;

[0011] FIG. 5 shows another example of a chemical-etched die having the improved registration means;

[0012] FIG. 6 is a top perspective view of the die shown in FIG. 5 having a cutting edge located at the periphery of an inside opening through the die to achieve the advantages of this invention;

[0013] FIG. 7 is a cross-section of the die taken along lines 7-7 of FIG. 6;

[0014] FIG. 8 shows the die of FIG. 1 being moved towards a sheet material so that the cutting edge of the die will be accurately registered with a shape to be cut from the sheet material; and

[0015] FIG. 9 shows a set of chemical-etched dies like that shown in FIG. 1 being nested one within the other.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0016] Referring initially to FIGs. 1 and 5 of the drawings, two examples are shown of chemical-etched dies 1 and 3 to be used in combination with a die press (e.g., a roller press) in order that shapes can be cut out of a suitable sheet material made from paper, plastic, thin metal, or the like (best shown in FIG. 8). The dies 1 and 3 are preferably manufactured from flat steel that is treated by a conventional chemical etching process. The shapes of the dies 1 and 3 (which correspond to the shapes to be cut from the sheet material) can vary among different designs, symbols, letters, numbers, etc. to suit the needs of the user. In the examples of FIGs. 1 and 5, the chemical-etched die 1 has the shape of a square or window, and the chemical-etched die 3 has

the shape of a flower. However, the precise shape of the dies 1 and 3 is not to be considered as a limitation of this invention.

[0017] Each of the dies 1 and 3 of FIGs. 1 and 5 has a flat outside border 5 that surrounds an inside opening 7 through the die. The die cut shape to be cut from the sheet material matches the shape (e.g., a square or a flower) of the inside opening 7 through the die 1 or 3. As is best shown in FIGs. 2-4, 6 and 7, a thin cutting edge 9 projects outwardly from the top of the outside border 5 of each die 1 and 3 around the inside opening 7 thereof. The cutting edge 9 provides a blade that is capable of cutting through the sheet material in response to a compressive force generated by the press into which the die is installed.

[0018] In accordance with an important feature of the present invention, the cutting edge 9 of each die 1 and 3 is located at the interface of the outside border 5 with the inside opening 7. As is best shown in FIGs. 4 and 7, the cutting edge 9 surrounds the inside opening 7 such that none of the outside border 5 extends inwardly past the cutting edge 9 and none of the outside border 5 lies between the cutting edge 9 and the inside opening 7. In other words, the cutting edge 9 lies exactly at the periphery of the inside opening 7 of the dies 1 and 3 so as to precisely define the shape represented by the inside opening to be cut from the sheet material.

[0019] Because the outside border 5 of the dies 1 and 3 lies entirely to one side (i.e., the outside) of the cutting edge 9, the outside border 5 must have a sufficient width (designated W in FIGs. 1 and 5) to prevent the die from twisting and changing its shape when subjected to a compressive force generated by the die press in which the die is used. That is to say, the size (i.e., width) of

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