

ESSENTIALS OF SHEET METAL WORK AND PATTERN DRAFTING

CHAPTER I

TRANSFERRING PATTERNS TO METAL

When the student or workman is required to make articles simple in form, from sheet metal, the pattern can be made directly on the metal from given measurements. If he is required to make an article round in form with flaring sides, or an article having an irregular shape, it is highly important to make a full-sized drawing and to develop the patterns. This necessitates operations with the drafting board and drawing instruments, which will be taken up later in this course. After the pattern is developed on detail paper, it may be transferred to the sheet metal and the work of construction begun.

Methods of Transfer.—There are several methods of transfer in use, depending on the nature of the material and the shape of the pattern. For the more expensive materials, such as copper, brass, and German silver, the patterns and designs are transferred to the metal by means of carbon paper in the following manner:

The carbon paper is laid upon the face of the material with the face or glossy surface touching the metal; the pattern is carefully placed over the carbon paper and held in position by small weights; then with a hard pencil, stylus, or pointed tool firmly trace over the lines of the drawing. This will give a print of the pattern on the

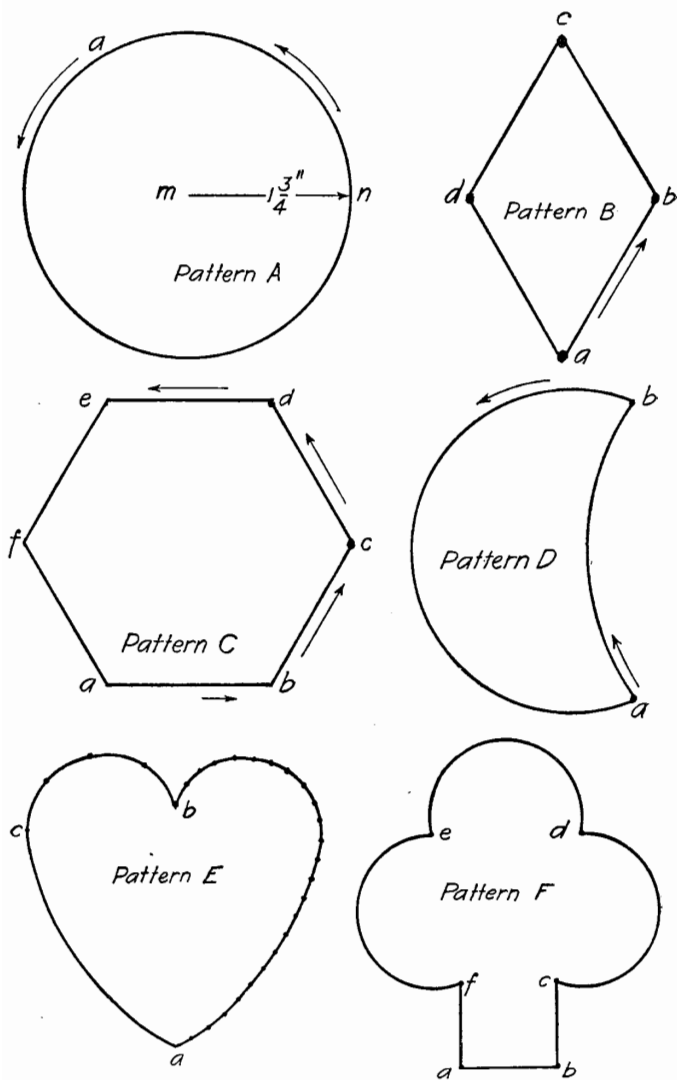


Figure 1.—Simple Patterns, or Templates. Arrows Show Proper Direction to Cut Metals with the Shears.

bright metal. After obtaining a good impression, the carbon lines may be fixed on the metal by tracing over them with a steel scratch awl.

Another method of transfer is used for the cheaper materials, such as tin plate, zinc, black iron, and galvanized iron. The process is as follows: Place the drawing paper directly on the metal, then go over the outline of the pattern with a sharp tapering prick punch, tapping it lightly with a small hammer, making slight indentations on the metal at the principal points of the drawing. This method will be used throughout this course, and is in general use in the best commercial shops.

The prick punch used in this work should be about four inches long by $\frac{5}{16}$ inch in diameter, the end being forged tapering to a sharp point, as shown in Figure 2 (*J*). A mistake often made by the student is to strike the punch too heavily with the hammer, driving the point through the metal. This is bad practice and should be avoided.

Simple Patterns.—The first work of the student will be to draw to full size on paper, the set of simple patterns show one-half size in Figures 1 and 2, then to transfer them to metal, using IC bright tin, or light galvanized iron not heavier than No. 28 gauge. These patterns, or templates, are transferred to the metal in the following manner: To transfer pattern *A*, set the dividers $1\frac{3}{4}$ " equal to the radius *mn*, take a small piece of scrap metal and describe a circle. A mistake is often made by the beginner by pressing too heavily upon the wing divider, causing a deep depression in the center of the circle.

Patterns *B*, *C*, and similar forms, are transferred by pricking through the paper patterns to the metal. Place the pattern on the metal in a position to have as little waste of material as possible, placing a weight on the paper to keep it from moving; light prick marks are made on the metal at corners of the pattern as shown by

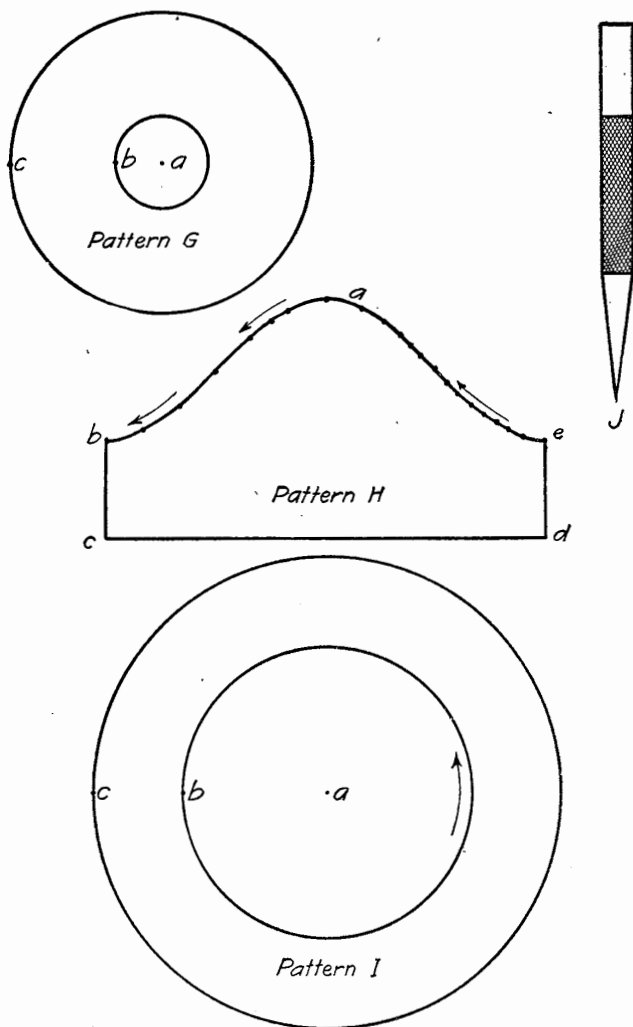


Figure 2.—Simple Patterns, Continued. *J*, a Prick Punch.

heavy dots; remove the paper, and with a straightedge and scratch awl, complete the pattern by describing lines connecting the prick marks on the metal.

Patterns *D*, *E*, and *F*, are transferred to metal by pricking lightly the curved outline of the patterns. In pricking curved lines the prick marks should not be placed too far apart, but should be placed as shown from *a* to *b* in pattern *E*. After pricking the outline of patterns, a scratch awl, or lead pencil, is used to draw the curved line through the points on the metal. If the prick marks were placed too far apart as shown from *c* to *b*, pattern *E*, and *a* to *b*, pattern *H*, it would be impossible to draw the proper curve through the points, and the result would be a worthless pattern.

When transferring patterns *G* and *I*, it is not necessary to prick around the circles. Prick the points *a*, *b*, and *c*, upon the metal, then set the dividers with the radius *ab*, and *ac*, and describe the circles on the metal.

Use of Patterns.—If two or more pieces from a pattern are desired, do not prick through the paper pattern to obtain each piece. When one pattern is cut from metal, it should be used as a pattern whether two or a dozen pieces are required. Place the metal pattern upon the material, using a scratch awl, and scribe a line around the pattern. If the pattern is large, a weight should be placed upon it to keep it from moving, but if the pattern is small the weight is not necessary, as the pattern can be held in position with the fingers of the left hand while using the scratch awl with the right.