

The Development of a Symmetrical Welded-Sculpture Style, Leading to the Design and Construction of a Kaleidoscopic Projector.

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The Development of a Symmetrical Welded-Sculpture Style, Leading to the Design and Construction of a Kaleidoscopic Projector

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Abstract

The author, a sculptor, discusses his works stimulated by a particular interest in four-fold rotational symmetry that has developed over a period of almost two decades. His wall sculptures, generally circular, are constructed by welding together thousands of short pieces of bronze rod, an extremely time-consuming process.

After constructing a number of pieces, he felt a need to have a way to produce initial designs in less time. Eventually, he collaborated with two physicist colleagues in designing and constructing the Symmetricon

kaleidoscopic projector. The main purpose of the device is to produce with ease numerous images having four-fold symmetry, any of which can be photographed for possible use, for example, in the design of his wall sculptures and other welded artworks.

THE DEVELOPMENT OF A SYMMETRICAL WELDED-SCULPTURE STYLE, LEADING TO THE DESIGN AND CONSTRUCTION OF A KALEIDOSCOPIC PROJECTOR

Paul F. Miller, Jr.*

Abstract—The author developed a technique for intentionally producing four-fold rotational symmetry and has developed a method of where the device. His work is primarily abstract, and is inspired by welding equipment demands of recent years (up to 1962) and an overall one-concept process.

After constructing a number of designs, he felt a need to have a simple projector which would allow him to produce a wide variety of designs in a single piece. Eventually, he combined a few of his previous designs in designing and constructing the Symmetrical Kaleidoscopic Projector. The main purpose of the device is to produce, with ease, numerous designs having four-fold symmetry, any of which can be photographed for possible use, for example, in the design of his wall sculptures and other welded artworks.

I.

My initial interest as a young artist was in abstract expressionist painting, which I pursued in undergraduate and graduate school. Moreover, I spent my summer vacation periods in Provincetown, Mass., U.S.A., studying under Hans Hoffman, who, I believe, was one of the most profound leaders of Abstract Expressionism. However, during my last year in graduate school, my central interests turned to symmetrical welded objects. This began in 1960 when, in a course on welding, the first object that I made with an oxy-acetylene torch was, to my surprise, symmetrical, very different from my paintings. Almost immediately I began to produce with ease small geometric configurations. These were followed in succeeding years by more sophisticated wall sculptures and liturgical and ceremonial objects for churches and synagogues. Most recently, I pursued a project jointly with two physicists in the building of a particular *kaleidoscopic projector*, which we call a *Symmetron*. It can be used to produce countless symmetrical configurations as sources of ideas for my wall sculptures.

II.

The first welded symmetrical objects I made were small enough to be worn as jewelry pendants. They were crudely executed and of simple design (Fig. 1,

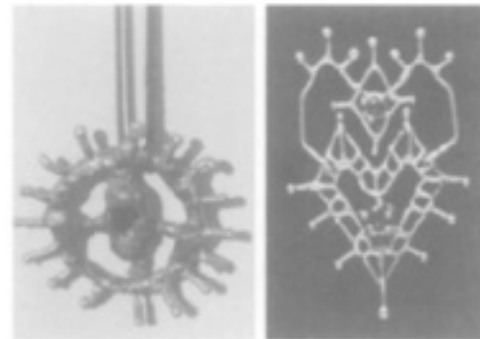


Fig. 1. (Left) welded copper bronze pendant, 4.5 cm diam. (Right) design pendant. The two pendant parts and plate rivets, height 5.8 cm, 1961.

left). At that time I noticed symmetry in many of my designs (Fig. 2, left). As my manual skill and welding technique improved, the bronze pieces became more intricate (Fig. 1, right). However, from the beginning, the designs displayed a rather limited range in variety. No matter how involved the designs were, each design was based on one of only three different types of symmetry, and each type was selected without my knowledge of the various possible types. It was later to learn that 230 3-dimensional and 17 2-dimensional types of symmetry are possible! (1, 2.) Each of the designs possessed either (1) a vertical and/or a horizontal reflection plane (Fig. 2, right), (2) 90° rotational

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