# PRODUCT RENDERING WITH MARKERS

MARK ARENDS

NOW IN PAPERBACK

# Product Rendering with Markers

## Using Markers for Sketching and Rendering

Mark W. Arends

VNR VAN NOSTRAND REINHOLD
New York

Unless otherwise noted, all drawings are by the author.


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For Linda, Elizabeth, and Christopher

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# Contents

# Preface

Nearly everyone is strongly attracted to the hundreds of beautiful colors and the slick packaging of markers. As with colored pencils, the potential for clean, bright, immediate color is very enticing; yet few people feel comfortable using markers for anything more than casual sketching. This is an unfortunate and unnecessary limitation. Markers can be used effectively to make convincing renderings of design concepts. Their versatility and convenience make them ideal tools for most visualizing tasks, particularly for graphic, interior, industrial, and architectural designers. Markers are easy to use. They require no preparation, dry instantly with little or no mess, need little cleanup, and are appropriate for many tasks.

In this book I hope to discuss concepts not covered in many marker books. By describing the visual dynamics of rendering and explaining the visual conventions used to describe products, I hope to provide designers with a better understanding of just what makes an effective rendering. I will also show how to apply these visual conventions to individual work to create impressive renderings and presentations. I hope these insights will encourage more designers to use markers and experience the pleasures of rendering.

Using this approach you may begin by simply enhancing line drawings with a minimal amount of marker. Then, with each successive rendering incorporating these visual conventions, you will build in more subtlety of marker use to produce full-color "realistic" renderings. Once these visual conventions are learned, you will be able to modify them and invent some of your own. They will provide you with all you need for most rendering situations.

The examples in this book come from three major areas of industrial design: product, automotive, and exhibit. Each of these areas has developed its own style, which can be seen in the examples, yet the thought that goes into each rendering is the same. There is also a strong carryover into interior and architectural rendering. The understanding of light and materials is the same, the particular conventions for indicating them differ.

In addition to being a strong communication device, rendering also forces the designer to think about the products he is illustrating. In order to render an object one must understand its form, how the various parts fit together, and what the surface details are. Rendering therefore serves as a design tool that helps us develop a concept and at the same time provides us with a visual representation of the idea to react to and evaluate. And all of this is accomplished without using a great deal of time or money. Thus, rendering and rendering techniques have become important steps in the design process.

CHAPTER ONE

# Objectives of Rendering in Product Design

Mass production and the rate of technological change in our society have created the industrial design profession. The designer faces the difficult task of generating new forms that meet the needs of future users without ever having seen the product to be used. There is no model, experience, or test to evaluate the product (though the designer may have similar products or previous models to serve as guides). Therefore, the process of design must itself be the test and evaluation.

In the earlier craft tradition of design, a small number of products were produced and used. Modifications and changes may then have been made. A few more products were then produced and again changes made or new technologies incorporated. In this manner the product evolved. The impact of any problems with the product was small as there were not a great number of products or, by the time there were, the problems had been worked out through this evolution. However, as the pace of change increased, this process no longer worked.

The development of the household flatiron illustrates this. Below is outlined a brief evolution of the flatiron, listing features of each iron presented, followed by problems that promoted the production of the next iron. You can see how each successive iron attempted to solve the problems perceived in the preceding iron. However, you can also see that problems were only indicated by the failure of the preceding iron. Thus, for example, it was not until the third generation that any consideration of heat control was considered.

1. Solid Cast Iron: four or five irons were kept on the stove so there was always a hot one ready. Problems: you had to have too many irons. They were heavy and the handle was hot (figure 1–1).

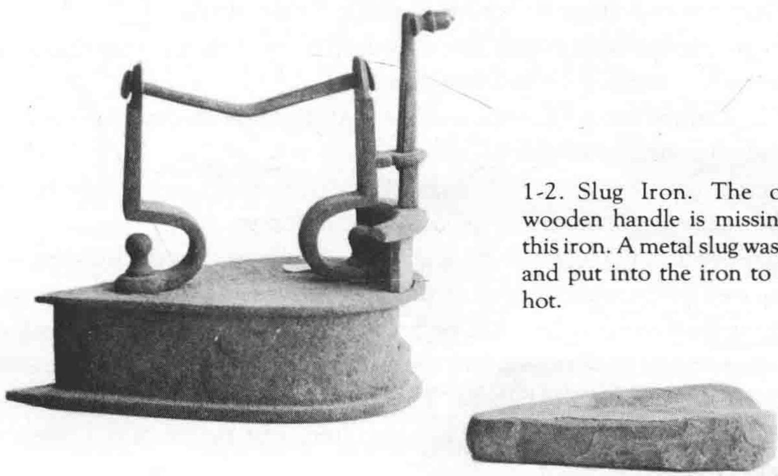
1-1. Solid Cast Flatiron. This iron was cast as a single piece and kept hot by putting it on the stove. The handle got very hot; a number of irons were needed to ensure that an iron was always hot.

2. Slug Iron: a hollow cast iron accepted a hot iron slug to heat it. A wooden handle insulated the hand. Problems: you needed a number of slugs and tongs to move these slugs. Slugs were difficult to handle and were easily lost. The irons were still too heavy (figure 1–2).
3. Hot Coal Iron: this hollow iron which held hot coals was lighter than its predecessors and had no loose parts. Problems: dangerous spills could occur when loading. The iron was messy, still heavy, and had no heat controls (figure 1–3).
4. Gasoline Iron: this iron was much lighter. No messy, time-consuming loading was necessary, and there was a crude heat control. Problems: this iron was very dangerous. It was still heavy and awkward to use. Better heat insulation was needed for the user, and the handle design caused great fatigue (figure 1–4).

The evolution of the iron continued with the introduction of electricity and new materials such as stainless steel and plastics. It is interesting to note that the final solution to iron design may have come from fashion technology: synthetic fabrics have almost eliminated the need for ironing!

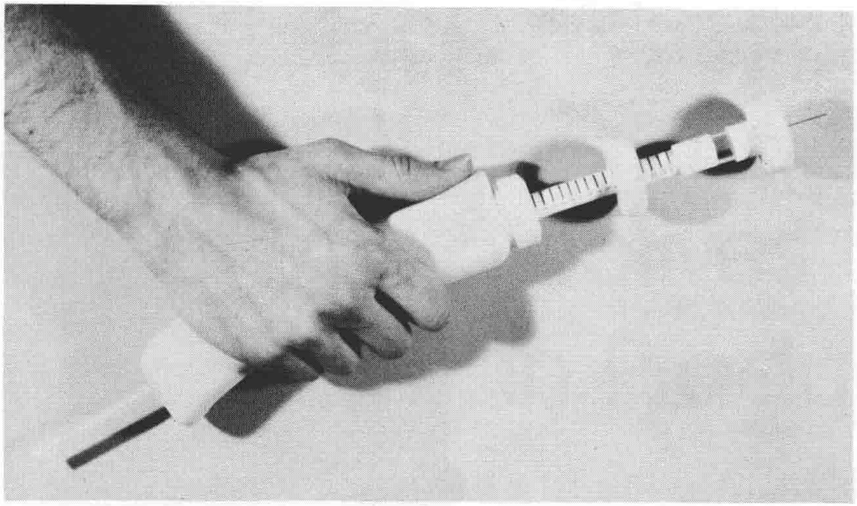
As technology changes, products will naturally change or evolve. However, many of the changes seen in the flatirons could have been incorporated into the first model had the craftsman been able to envision and evaluate the product before production.

1-3. Hot Coal Iron. Lightweight hot coals were put into this hollow iron to keep it hot.

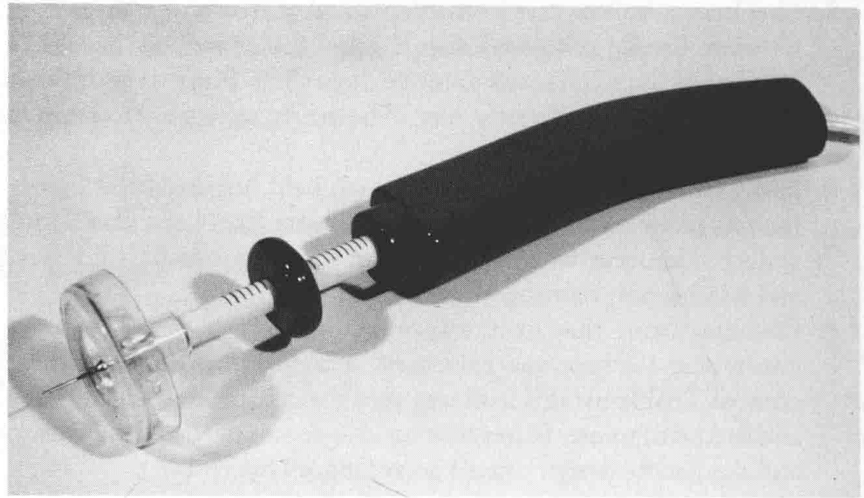


1-2. Slug Iron. The original wooden handle is missing from this iron. A metal slug was heated and put into the iron to keep it hot.

1-4. Gasoline Iron. An effective, but dangerous gasoline burner was the heat source for this iron.



1-5. Mockup of a Cow Inoculator, David Skinner. This is a quick study model made of rigid foam, plastic tubing, and tape. It is used to evaluate a design concept quickly.



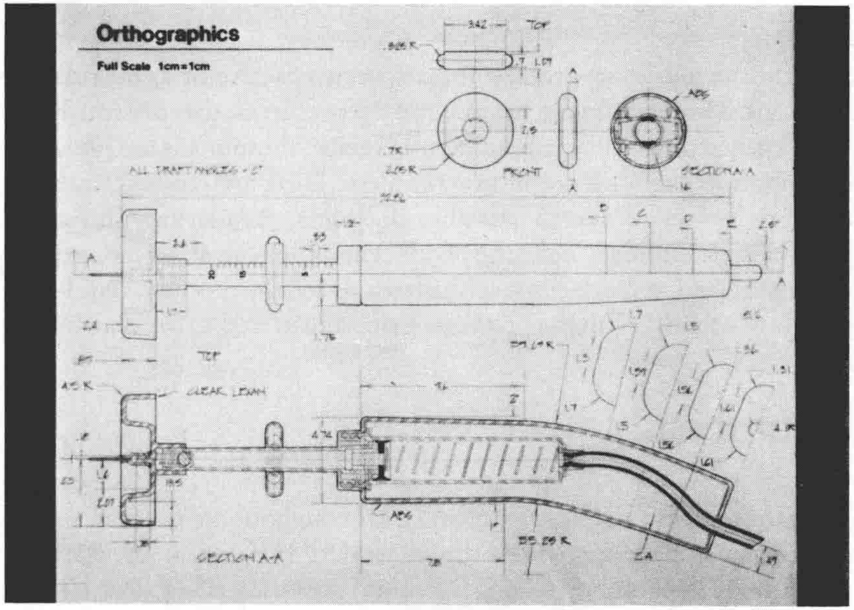
1-6. Model of a Cow Inoculator, David Skinner. This is a nonfunctioning model that the designer may use to evaluate or present a design concept.

As the designer replaced the craftsman and his task became specialized, he was separated from the marketplace and production and had to be able to design a product without ever making it, seeing it, or using it. When a product goes into production it must be appropriate to the technology and materials, have an attractive form, and be safe and durable. Speed in designing is also essential, as a product is appropriate for its time only. A particular design may be called "classic" and be in museum collections but changes in technology, cost of production, a better understanding of human factors, or changes in society make the piece more a collector's item than a response to current needs. This puts pressure on the designer and the design process. The consequences of a poorly designed product are great when multiplied by modern mass production and distribution. Economic failure, safety problems, or product failure can mean heavy losses for a company or injury to thousands of people. Therefore, one must be able to experience mentally the various possibilities for a product and communicate these possibilities to the many people involved in the product's development.

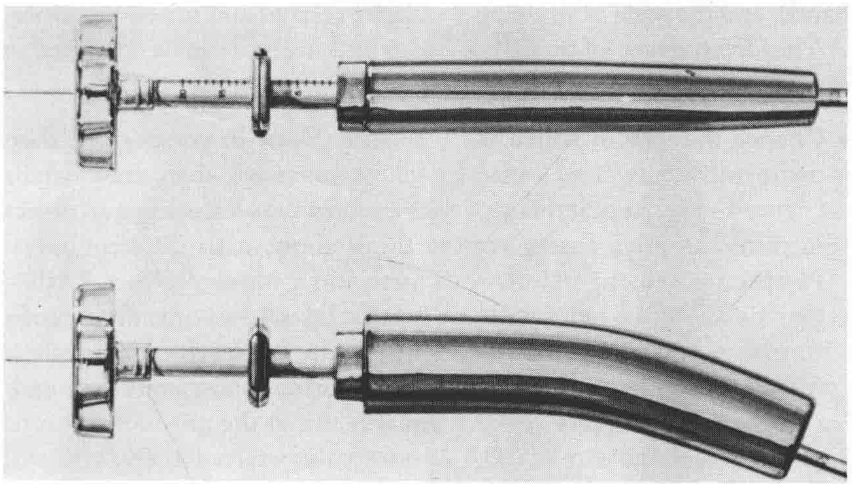
The effectiveness of drawing as a tool for thinking and the need for rapid development and communication of ideas have made rendering a basic tool for designers. (It is important to note that sketching and rendering are only some of the tools designers need. Good methodology, mathematical models, technical drawings, mockups, model studies, material tests, and prototypes are all tools a designer uses.)

The four steps in the design of a cow inoculator shown here (figures 1–5 to 1–8) illustrate how different forms of visualization are used by designers.

1. The mockup (figure 1–5) is a quick study model made of rigid foam, plastic tubing, and tape. It is used to evaluate a design concept quickly, particularly its form and size.
2. The surface model (figure 1–6) works both as an evaluation tool and a presentation aid.
3. Design orthographics (figure 1–7) communicate to a manufacturer or engineer the technical aspects of the design.
4. The rendering (figure 1–8) gives the viewer an idea of the appearance of the product as well as the materials. The side and top views show how the product will be held and used. Notice the rendering conventions used to indicate the transparent stop by the needle and the reflections in the handle. The dark area near the lower portion of the handle is a reflected horizon line; just below it is a line of reflected yellow light.

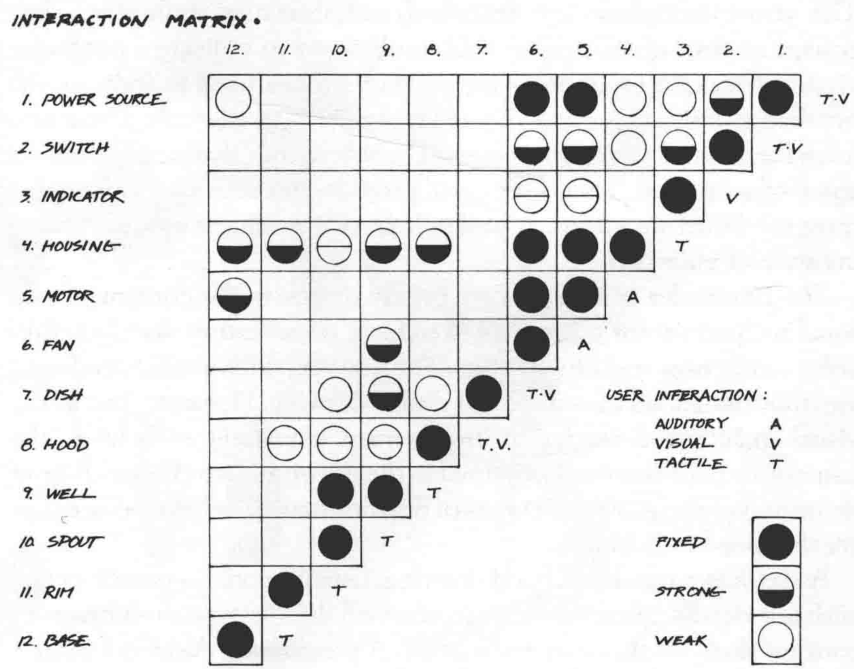



1-7. Design Orthographics of a Cow Inoculator, David Skinner. These drawings are used by the designer to communicate to a manufacturer or engineer the technical aspects of his design.



1-8. Rendering of a Cow Inoculator, David Skinner. Because this is an easy form to understand, an orthographic view may be used to render it. The rendering gives us an idea of the appearance of the product as well as the materials; the side and top views show us how the product will be held and used. Notice how the transparent stop near the needle and the reflections in the handle were rendered. The dark area near the lower portion of the handle is a reflected horizon line; just below it is a line of reflected yellow light.

Another design tool is the Interaction Matrix (figure 1–9). This is an organizational device used to cross-check elements to find critical problems important in the design of a product. To set up a matrix the designer lists all the parts of a product across the top and down one side of a grid. The type of interaction desired is then assigned to the chart; in figure 1–9 it is a physical attachment between parts of a popcorn popper. Each part is then compared to each other part. The value or strength of the interaction is assigned (usually represented with a graphic symbol), and put into the grid unit that corresponds to the two parts. For example, in figure 1–9, the switch (#2) has a strong physical connection to the fan (#6). This tells the designer that these two parts should be in the same housing, but there is flexibility in where they may




1-9. Interaction Matrix. A matrix is one method for finding critical problems important in the design of a product.