THE UNIFICATION OF CLAY AND STEEL IN THE REPRESENTATION OF MACHINED FORMS FROM MY PAST

PROBLEM IN LIEU OF THESIS

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INTRODUCTION

My father was involved with cotton gins and grain elevators for over fifteen years, and it was he who first introduced me to machined forms used in an industrial context. I have three brothers who also influenced my fondness towards machined forms: Efren, who worked in the oil fields for five years and often carried all sorts of pipe fittings, drill bits, nuts, and bolts in the back of his truck; Santos, currently working on a mechanical engineering degree at Texas A&I, who introduced me to a variety of text books and magazines; and Martin, an employee of Aero Space Engineering in Richardson, Texas, who inspired me with his computer designs. I, myself, once worked in four different cotton gins over a period of six summers. This longterm exposure to machined forms has had a significant influence on my work.

I have worked with clay and steel for the past seven years. The inherent qualities of both media fascinate me: with clay, it is the plastic quality which allows it to be modeled into a wide range of forms; with steel, it is the strength, the immediacy, and the process (e.g., cutting and welding) that captivate me. I am also attracted to the precision of man and machine-made steel objects, and the fact that clay can be manipulated to simulate such forms.

Prior to the Fall of 1991, my approach towards each medium differed. Classical forms and functional ware constituted most of my ceramic work, while abstract sculpture made up my steel work. During the creative process, I found myself travelling from the ceramics studio to the sculpture studio and putting myself in a different state of mind for each: contemporary thoughts for sculpture, traditional mind-set for ceramics. The result was two divergent bodies of work which had little relation to one another.

During the Fall of 1991, I began to combine clay and steel. The series I was working

on required a certain size and shape of clay slab. However, a clay slab longer than twelve inches would often warp in the kiln. Steel, on the other hand, could be cut into any size or shape and still maintain its original form. The resulting pieces - wing-like shapes of sheet metal bolted onto large, classical vases - worked well in some instances, but the majority lacked a feeling of unity between the two distinctive media. The significance of that series was that it instilled in me an interest in combining the two media to create a single body of work.

From that point on, the sculptures I produced consisted of pipe-like forms rendered in clay. Clay was the dominant material used, with a minimal amount of steel bolts and rods added to create the desired effect.

Statement of The Problem

For this project, I proposed to deal with the integration of clay and steel to create sculptures of pipe forms similar to those found in cotton gins, grain elevators, and oil wells. The simulation of such forms with clay, the aesthetic results of various finishes, and the possible steel and clay combinations were factors I would investigate. The scale of the work as well as the placement were of equal importance. My objective was to develop a body of work that would exhibit a unity between the two distinctive materials, while at the same time exploring the machined forms which had fascinated me.

The questions under consideration were as follows:

1) How does the finish of one material affect the other?
2) How do scale and placement affect the impact of the work?
3) What combination of the two materials is most successful?

Methodology

In answering the above questions, I produced 19 sculptures, six of which were installations. My investigation of finishes included lowfire salt, lowfire glazes, raku, stoneware glazes, and spray paint. In order to examine how the scale affected the work, I reproduced a similar design in seven different sizes. Placement was investigated by

installing the work in different environments: the Cora Stafford Gallery, the light well in the art building, hallways, sidewalks, and lawn areas on campus.

My search for a successful steel/clay combination involved: 1) the creation of clay forms which incorporated a minimal amount of steel, 2) the use of ready-made steel forms incorporating a minimal amount of clay, and 3) the creation of forms in which neither clay nor steel dominated. The project was documented through the use of a tape recorder for taking notes, a sketchbook for drawing ideas, and photographs of objects I considered aesthetically interesting. The following descriptive compilation of the work includes a slide portfolio of the works discussed.

CHAPTER II

DISCUSSION OF THE WORK

Detailed Analysis of the Work

I decided to concentrate on clay first, treating the steel later so it would be compatible with the clay in the various finishes used. I began by working on a series of shapes inspired by a photograph of a "detonation flame arrester" in the magazine *Chemical Engineering*.

My first series consisted of seven handmade sculptures entitled Detonation Flame Arresters, I - VII. Each piece was comprised of three thrown sections and four slab flanges, all of which were measured and fit together. Care was taken in modeling to simulate the actual steel figure. The goal was to create a surface closer to the tight precision of steel rather than the porous plasticity of clay. These forms provided a good base for comparing the effects of a variety of finishes on similar sculptures, thus facilitating a decision as to which method would be most successful.

Detonation Flame Arrester I was finished in the raku process using an orange, commercial, lowfire glaze under a copper raku glaze. This method was executed on the smaller piece because of the difficulty in rakuing larger ones. Larger pieces tend to shatter due to the thermal shock of being moved from kiln to reduction chamber shortly after the glaze reaches maturity. Through this process, I was able to obtain the metallic, copper effect I wanted. Later, I added new, threaded steel rods and nuts in order to create the illusion that the sections were being held together. I did not make any changes to the new steel components; I felt they would be more compatible with the clay in their original state.

Detonation Flame Arresters II and III were finished using the lowfire salt method. A

frit and copper solution was used because of the range of colors it provides. Results from this process vary but often include the colors orange, smoky black, red, rust, and blue, all of which are usually light in value and have a semi-matte finish. These two pieces, which were fired with the steel in place, retained all the colors mentioned above except blue.

The inclusion of the rod and bolts in the firing process resulted in good unity between the clay and the steel. The fired steel shows advanced corrosion, which is compatible with the earth tones in the clay and gives the piece an aspect of antiquity. Both pieces sustained damage during the firing but were repaired with an epoxy paste. I deliberately allowed the oozing seams of black epoxy to protrude from the cracks, because I felt they emphasized the fragility of the clay. The lowfire salt process gave the piece a finish visually compatible with both clay and steel.

Detonation Flame Arrester IV was finished with commercial lowfire glazes. For the main body, a metallic bronze was used and a dark blue was chosen to accent the edges and the flanges. Actual gas pipe forms found in commercial gas lines are usually painted in this manner. This particular finish also creates unity between the clay and the steel because of the metallic quality of the glaze.

Detonation Flame Arrester V was finished using acrylics. Because I wanted to obtain painterly effects on a form exhibiting strength and having industrial connotations, many acrylic colors were applied with a loose brush over a previous coat of silver enamel. The subsequent use of a clear enamel over the entire painted surface resulted in a higher gloss finish. Oxidized steel rods and nuts were used here for greater contrast and emphasis.

Detonation Flame Arrester VI was finished with a stoneware glaze that often acquires a metallic quality when fired in a heavy reduction. After the piece was bisque-fired, the glaze was poured on, deliberately leaving some of the surface unglazed. Two thick coats of red iron oxide were then brushed on the exposed clay, resulting in areas which appeared metallic and contrasted with the clay-like finish in texture and color. The

red iron oxide appears to have been brushed on too thickly: a thinner coat would have yielded better results by revealing more of the rust-colored finish. The bright silver of new rods and nuts were more successful with this piece.

Detonation Flame Arrester VII was finished with a white gloss enamel on the main body and a dark blue on the edge of the flanges to simulate steel. Of all the finishes I tried, I found the lowfire salt, the raku, and the lowfire glaze to be most successful: the steel and clay appeared most compatible after undergoing these processes. Traditional enamel application was also successful in that it added a steel quality to the clay. I did not care for the painterly approach with the acrylics. I feel the technique is unsuitable because the resulting finish is not common to either clay or steel. A linear approach, such as the one used with the enamels, seems more appropriate.

Although the stoneware method has possibilities, I decided to discontinue its use for the pipe forms because of its disadvantages. The precision I sought in these pieces would be more difficult to attain because stoneware glazes often vary from one firing to another, and large pieces are susceptible to warping and cracking. Pieces also undergo greater shrinkage through the stoneware firing process.

The Study Of Scale

The seven pieces which comprise the Detonation Flame Arrester series were also used to study the effects of scale. The smallest piece is 8 1/2 inches by 4 1/2 inches, and the largest one is 22 1/2 inches by 16 1/2 inches. This series - which demonstrates a consistent increase in size from the smallest to the largest - successfully helped me determine how scale affects design.

I found the smaller and larger pieces to be most significant. Pieces I, II, and III have a "precious object" quality attributable to their small scale, while Detonation Flame Arrester VII - with its dimensions of 22 1/2 inches by 16 1/2 inches - becomes more confrontational . This large piece does not require a pedestal and can easily be placed on the floor for presentation. The scale of numbers IV, V, and VI, however, is appropriate for

pedestal display. These pieces range in size from 14 inches to 18 1/2 inches tall.

In order to study visual effects on a larger scale, I produced a series of installations. For these pieces, I bought steel valves, pipes, regulators, flanges, and a variety of joints. I then produced similar forms out of clay. Some were tight and precise like steel, while others were modeled to highlight the plastic qualities of clay. With the use of an extruder (a manual tool that can be used to press clay through a die), I produced a stock of 2 inch and 1 1/2 inch pipes. Each pipe was fabricated with a slab flange on both ends so that it could be bolted on to steel flanges. Using a proportional scale, the shrinkage of the clay was carefully calculated so that, after firing, the holes in the clay flanges would line up with the holes of the steel flanges. Once I had acquired a good stock of both clay and steel parts, I obtained permission to use the Cora Stafford Gallery to test some installations. Gas Works Number I - III, Safety Precautions, Maxitrol RV 60, and Tested SMN 93 were then put together. None of these pieces were preconceived; they were all assembled spontaneously according to my aesthetic decisions and in consideration of the space available.

Gas Works Number I - III are made of clay forms fastened together with steel nuts and bolts. Gas Works Number I is reminiscent of steel but displays obvious clay characteristics. The pipes connected to the valve form are short sections which curve and twist in all directions, giving the piece an organic quality. The piece starts on a pedestal and reaches a few feet away to the stair rail, where it continues over and on to the other side of the gallery wall. It extends approximately 48 inches. The piece was finished with lowfire glazes to enhance the texture of the clay.

Gas Works Number II also plays with the idea of going from one side of the gallery to another. On one side of the wall, a large regulator form stands on the floor. Its top is a curved joint with a flange seemingly bolted flush against the wall. Directly opposite, on the other side of the wall, another flange is attached to another set of pipe forms. These pipe forms rise from the floor as two separate sections before joining into one long

section which curves into the flange. If a viewer were to stand where both sides of the piece were visible, the unity of the work would be evident. The thickness of the wall makes this practically impossible, but nothing is lost: the forms work well as individual pieces, too.

The forms for Gas Works Number II were modeled to simulate steel. I spray-painted them black to heighten the simulation and to provide greater contrast with the wall of the gallery.

Gas Works Number III is a floor piece that stands 58 inches high. Like Gas Works Number I, its fancifully curved pipe forms and bulbous regulator shape give it an organic quality which distinguishes it from the traditional gas line arrangement. This piece was finished with the enamels commonly used on related steel forms.

Safety Precautions measures 89 inches long, 40 inches high, and 32 inches wide. It consists of four bronze valves, 2-inch steel and clay pipe sections, and a clay regulator. I carefully balanced the steel and clay components to avoid the dominance of one material over another. The clay forms of this work were executed in a clean, tight manner resembling steel and low-fired to achieve a slight contrast with the spray enamel on the steel. A broken section of 2-inch clay pipe was added to emphasize the fragility of clay. The finished installation - unexpectedly intricate, almost chaotic, in form - was placed on a dirt surface and surrounded with a brick frame.

Maxitrol RV 60 is 28 inches by 53 inches by 59 inches. As in Safety Precautions, the clay used in this piece was manipulated to simulate steel. The installation appears to be traditional and is finished with spray enamels. This piece was also placed on a brick-framed dirt surface.

Tested SMN 93 was inspired by an oil well head. Primarily a clay installation (only the fasteners are made of steel), it measures 52 inches by 51 inches by 64 inches. The clay surface has the tight-textured precision of steel and was finished with spray enamels to reinforce that quality. The completed piece was placed on a dirt surface, and a partial

wall was constructed behind it.

The size of these installation pieces ranges from 8 1/2 inches by 4 1/2 inches, to 40 inches by 89 inches by 32 inches. In judging the effect of scale on the pieces, I found that size was not necessarily a factor in their success. Although different sizes will elicit different responses, I concluded that these pieces would be successful in a variety of sizes, perhaps because I am accustomed to seeing related machined forms in a variety of sizes. A factor that did become important was the placement of each piece and the environment in which the work was placed.

Placement

The gallery installations (Tested SMN 93, Mexitrol RV 60, and Safety Precautions) appeared out of context when they were first assembled. They seemed to need more of an environment than was provided by the clean white walls and polished wood floor of the gallery space. Although I found the arrangement and connections of the forms satisfactory, I was dissatisfied with their total appearance. When I later placed them outdoors to see what effect a natural setting would have, I was again dissatisfied: the simulated gas lines, valves, and regulators appeared merely functional. The pieces did become more interesting when placed in an unexpected location such as a hallway, the school lawn, or the light well in the art department. On the third trial, the works were placed indoors; this time, however, I recreated part of their natural environment. For Safety Precautions and Maxitrol RV 60, the settings were changed by placing them on top of a dirt surface and building a brick border around them. Similar changes were made to the presentation of Tested SMN 93, but without the brick border and with the addition of a partially-constructed brick wall. I was surprised to see how dramatically these changes improved the presentation of the pieces. The installations no longer seemed out of context; rather, with the clean gallery setting around them, they acquired an aspect of importance.

Because of their small scale, the placement of individual pieces and smaller

installations in an outdoor environment did not work well. They did, however, succeed in a gallery setting, where they were either placed on a pedestal or directly on the floor.

It appears that placement is an important factor for every piece. Larger installations seem more successful when placed either in an unexpected outdoor location, or in a gallery setting which includes part of their natural environment. Smaller pieces are more effective when displayed in the traditional gallery setting for sculpture.

Steel and Clay Combinations

For the study of steel and clay combinations, I worked in three categories: 1) clay forms incorporating a minimal amount of steel, 2) ready-made steel forms incorporating a minimal amount of clay (pieces consisting entirely of simulated-steel forms are included in this category), and 3) forms in which neither clay nor steel dominate. The Detonation Flame Arrester series was most typical of combinations in the first category. The success of this series lay in the fact that both materials were treated in a similar manner. For instance, the firing of both clay and steel for Detonation Flame Arrester II and Detonation Flame Arrester III resulted in a good unity between the two materials. The clay forms' similarity to steel furthered that unity. Other combinations, such as Salted Clay and Steel Number I and Salted Clay and Steel II, were less successful. These salt-fired pieces are more reminscent of pottery than steel, so the relevance of steel nuts and threaded bolts seems unclear.

Another example of the first category is Number III From The Pipe Series. This piece was given a loose execution in order to suggest a metamorphosis from clay form into pipe form. The bottom half of the piece was thrown on a potter's wheel and carved with a knife. The top half was extruded and carefully manipulated to simulate a steel pipe. I installed actual nuts and bolts on the flanges to reinforce the idea that the two distinct forms are fastened together. Unlike the Detonation Flame Arrester series, Number III From The Pipe Series allows the clay's plasticity to be evident; nonetheless, the piece works well as a combination of clay and steel.

For the study of the second category - ready-made steel forms incorporating minimal amounts of clay - I completed Masoneilan 1000. This 358-pound steel form features a clay cover with a steel-like finish; visually, there is total unity between the two materials. The piece's thick, white, gloss enamel finish and the dents on its surface suggest plasticity. To augment this feeling of plasticity, I had tried to bend the steel forms; their 3/4 inch thickness defeated my attempts, however. Although this steel and clay combination works visually, I feel removed from the piece because of the relatively small amount of work I did on it.

Although created entirely from clay, I have included Numbers IV and V From The Pipe Series in the second category of combinations because simulated steel components dominate their composition. Number IV consists of three thrown sections, the topmost curved forward. Number V is similar, but all its sections are straight, and it has been fitted with a lid. The top and bottom sections of both pieces were executed to simulate steel, and clay nuts and bolts molded from real nuts and bolts were used on the flanges. The middle sections were given a loose, almost fluid treatment to highlight the plasticity of the clay, but I reinforced the dominating steel idea by finishing with a commercial bronze glaze on the pipe forms and a clear gloss coat on the middle sections. The "nuts" and "bolts" were finished with a chrome luster. The contrast between the cold precision of the simulated steel and the malleable quality of the loose clay greatly contributes to the success of the two pieces.

At this point in the study, I realized that process is very important to me. I prefer, for example, to simulate steel forms instead of incorporating ready-made forms into my work. Although I can visually appreciate Masoneilan 1000, I do not enjoy it as I do my other pieces, and I believe this lack of response is directly proportionate to the amount of contact I had with the piece.

For my study of the third category - in which neither clay nor steel dominates the

composition - I completed Safety Precautions. This installation was constructed in a manner that assigned equal importance to the two materials. Using roughly equal proportions of clay and steel forms, each with their respective finishes, gave the piece a balance which illustrates the success of this combination.

CHAPTER III

CONCLUSION

While still in the early stages of completing this body of work, I began to notice significant changes in my creative thinking. The work I was producing involved both the sculpture studio and the ceramics studio; in fact, their functions became increasingly interrelated. I became more and more captivated by the holistic implications of the process. Concentrating on an idea that involved both clay and steel caused me to work my pieces with more energy. There was also the satisfaction of using imagery I found stimulating (i.e., machined forms) and materials I enjoy working with. I appreciated the steel for its immediacy: when I needed a part such as a section of pipe, a regulator, or a valve, I could obtain it within a short time. In using the clay, I took advantage of its plasticity and its ability to be transformed into whatever shape or texture I wanted.

I feel that I was generally successful in combining clay and steel to produce a body of work that shows unity between the two distinctive materials. Finding the proper combinations of steel and clay, the appropriate finishing methods for both materials, the desirable scale to use, and the most effective display settings contributed greatly to the success of each piece.

Concerning the steel and clay combinations used with pipe imagery, I feel that clay, together with a minimal amount of steel accessories (e.g., nuts, bolts, rods, and other small pieces), is most successful. The Detonation Flame Arrester series is a good example of the effects of this combination.

The most aesthetically agreeable finishing methods are those which highlight the inherent qualities of both steel and clay. The lowfire salt finish in Detonation Flame Arrester II and Detonation Flame Arrester III produces colors that could easily be found in both materials. It is also effectively unifies the clay and steel through the firing

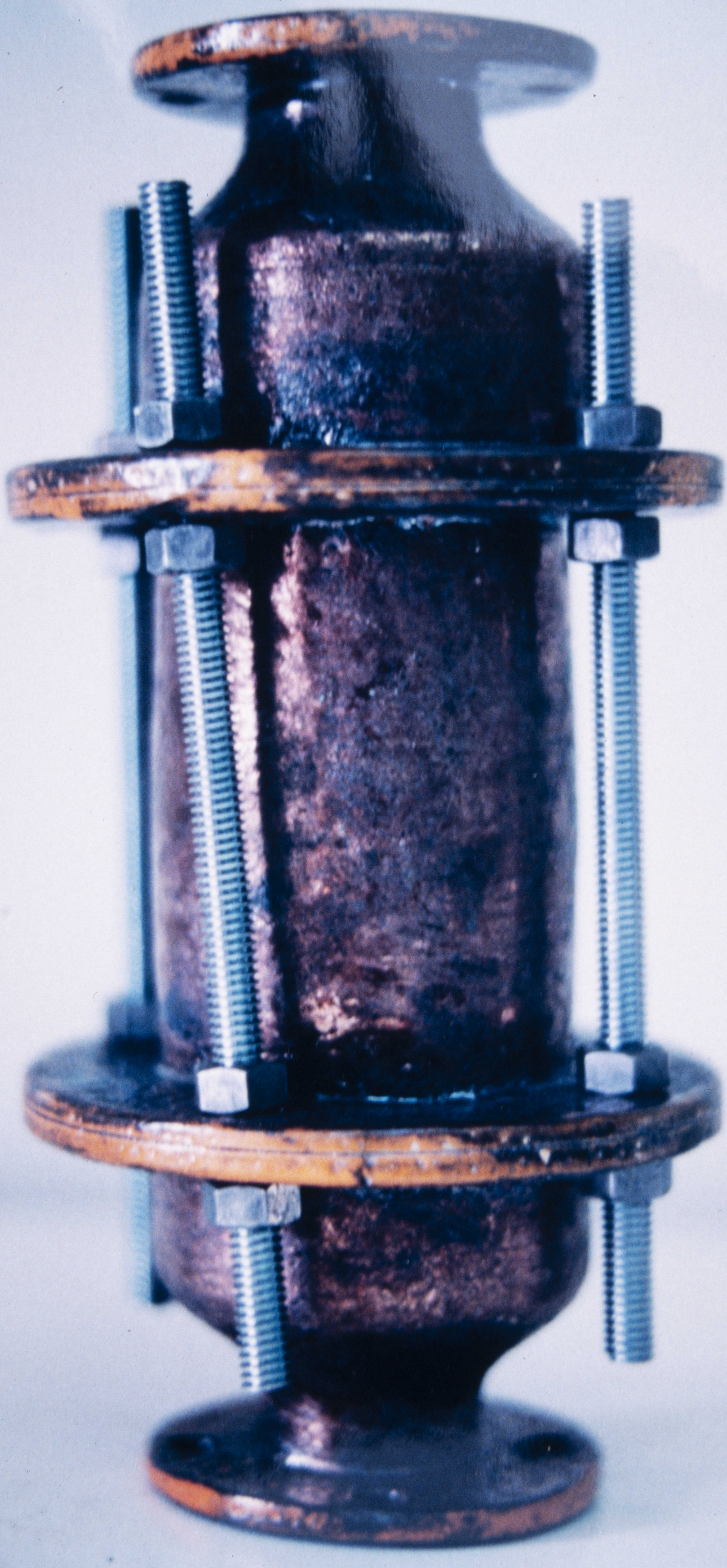
process.

Scale does not seem to pose a problem - the pieces can be successful in a variety of sizes - but I did find the small-scale pieces like Detonation Flame Arrester I and floor pieces like Gas Works Number II to be more interesting and fun to work with. The question of placement and display, however, must be given careful consideration when pieces exceed pedestal size.

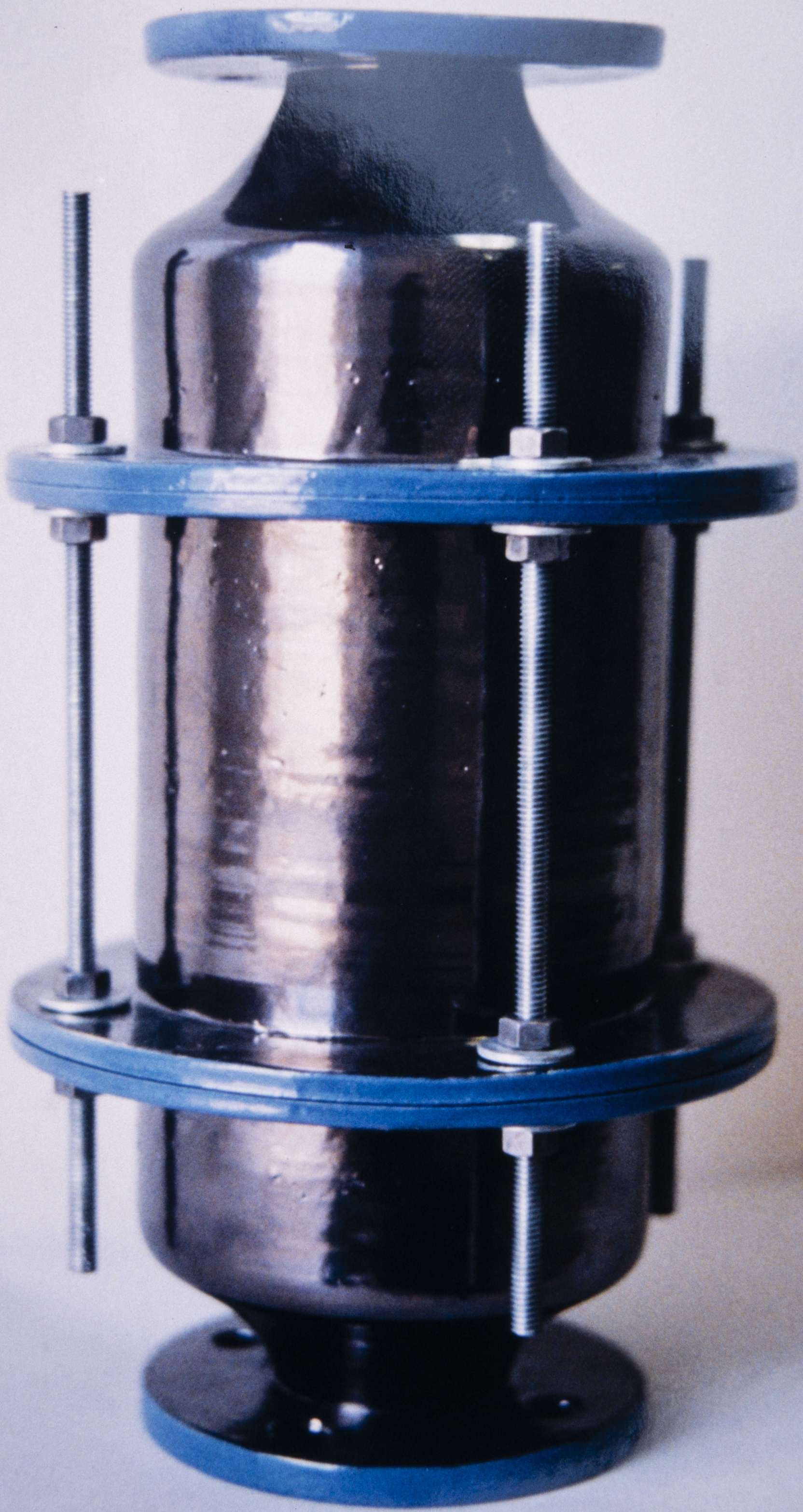
Placement and display are also highly important when dealing with installations. As explained previously, partial reconstruction of the various installations' natural environments was necessary because of their similarity to actual industrial installations. Failure to at least partially reconstruct a natural environment resulted in pieces that seemed out of place in a gallery setting. When displayed outdoors, they could simply be placed in an unexpected location and work well.

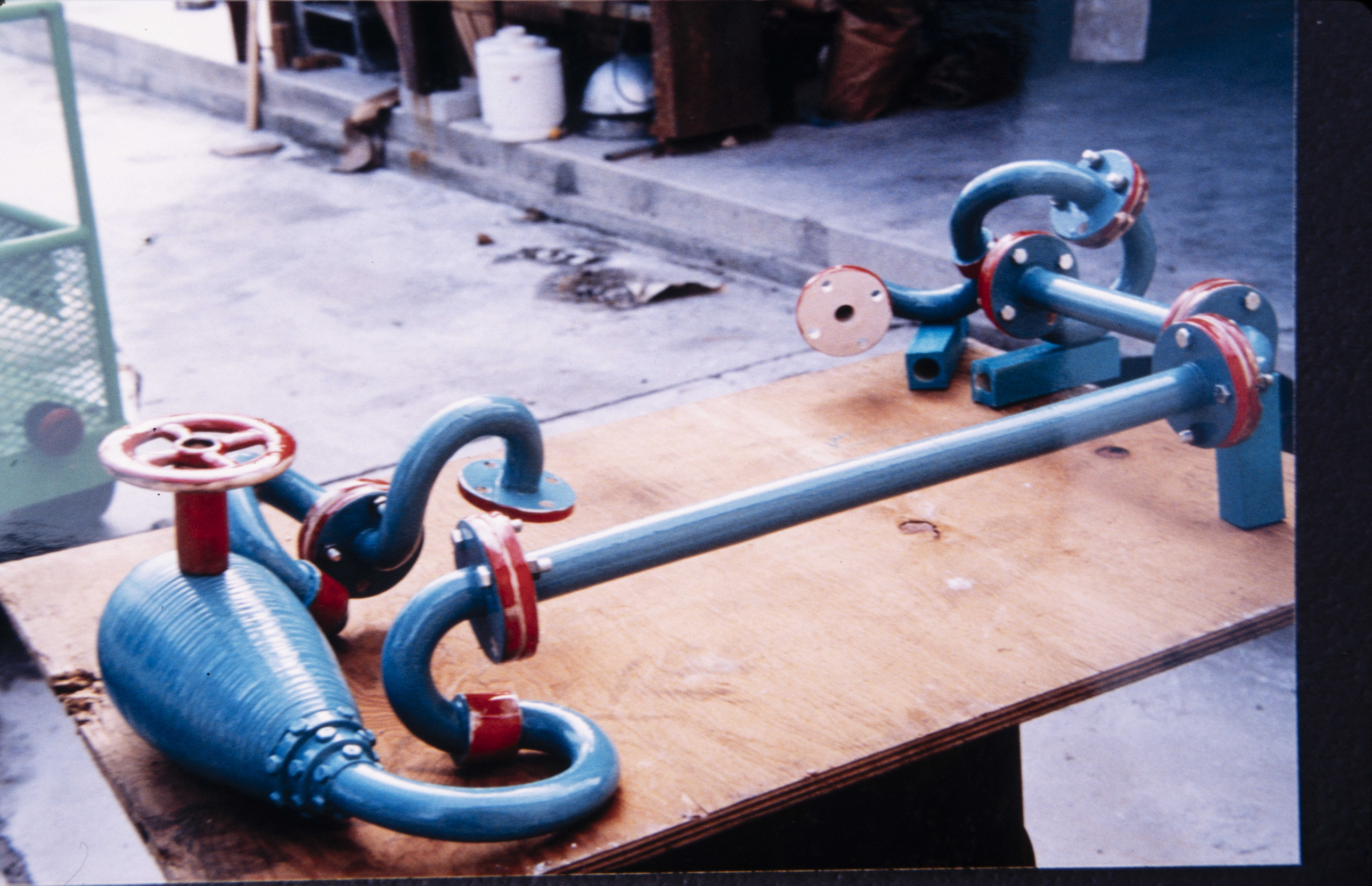
The pieces I deal with in the near future will follow the general format of the Gas Works series, especially Numbers I and II. I found these pieces most interesting and enjoyable because of the way they play with their component materials and the space around them.

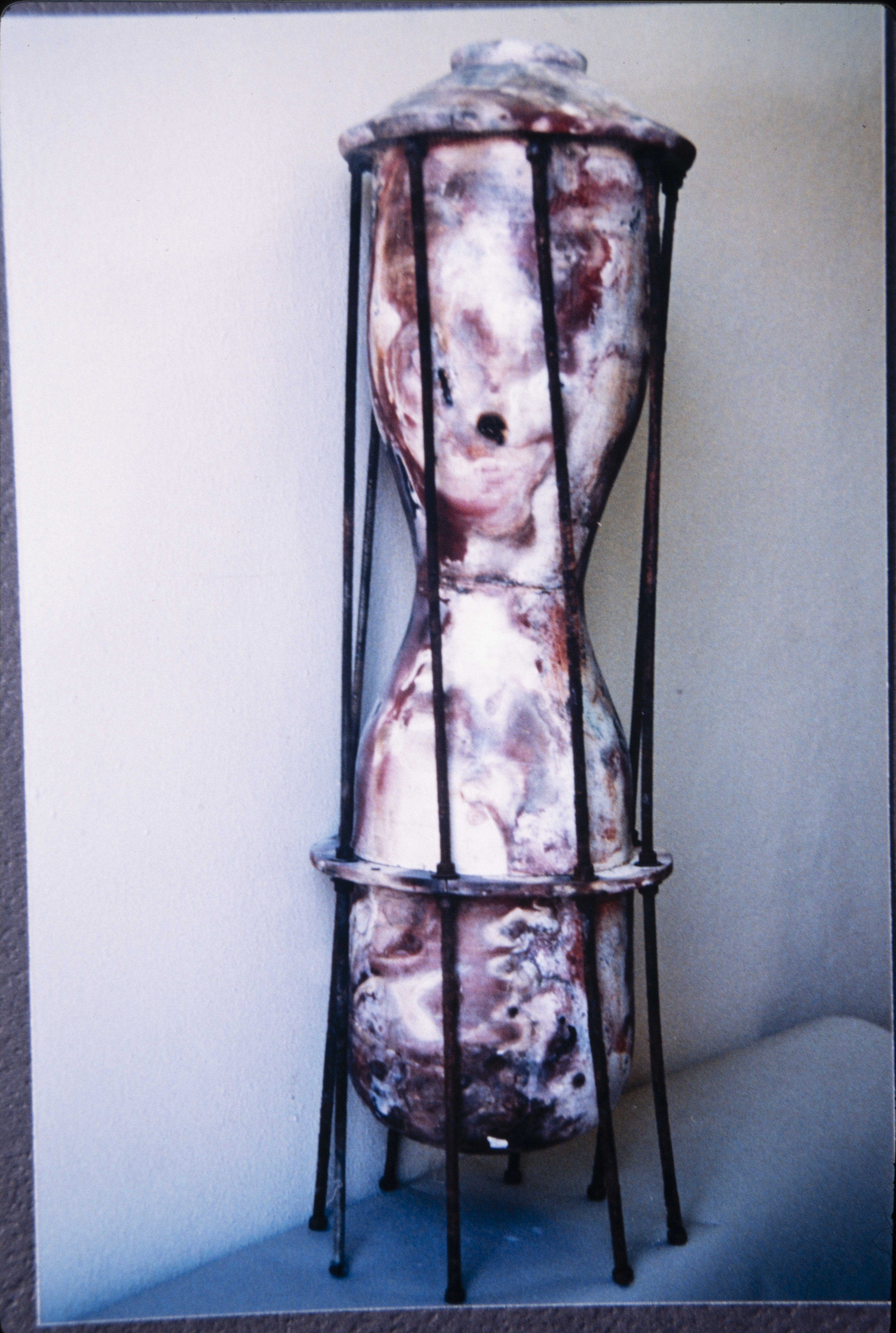
ILLUSTRATIONS

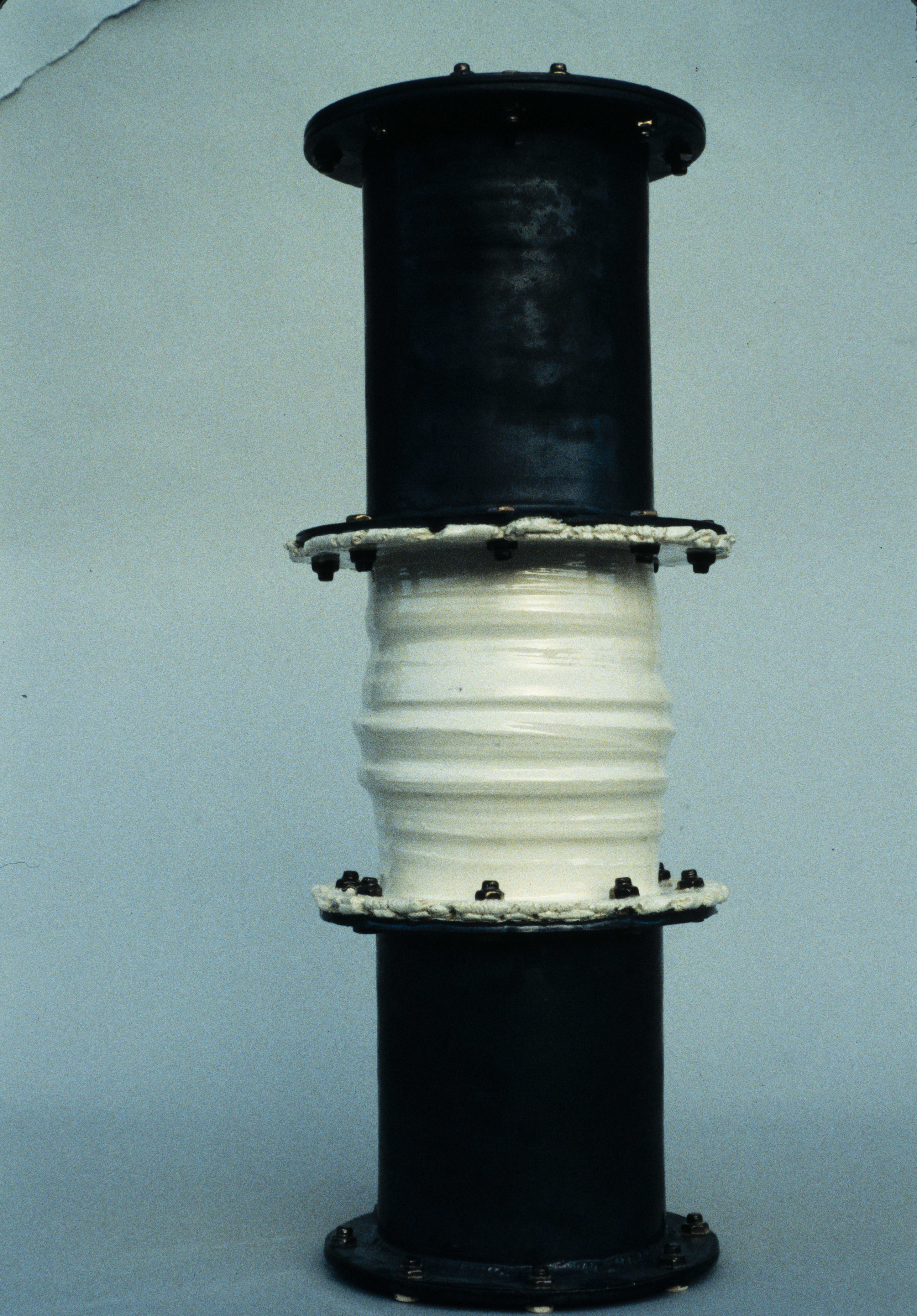



TESTED
SMN 93










PARKING