NOTES ON SANDBLASTING

BY T SMITH

Sandblasting can embellish any form of artistic endeavour. A great deal depends on just how much effect is required. The process is basically a very simple one, in which a sacrificial mask is used to cover a particular substrate. Be it glass, wood, metal or plastic. This is then subjected to an abrasive laden blast of compressed air from 70 psi up to 120 psi. Once the mask is removed the object is revealed in all its glory.

One of the most effective uses I have seen when using plastics is the Sandblasted image on an acrillic (Perspex) surface with the edge then Lit from below with a low voltage light source such as an LED strip.

When wooden products are artificially antiqued, sandblasting is used. The effect is to remove some of the pith wood and leave the growth rings proud, as occurs over a long period of continuous use in the original article.

However, surprise is the name of the game when one attempts to break new ground. I recall on one occasion when I was blasting onto a disc of polished stainless steel about 1mm in thickness, when the front surface was blasted, the whole disc distorted to form a shallow bowl. How, I wondered, was I going to cure this as the dishing was quite marked. In desperation, I turned the disc over and blasted the reverse side and lo and behold, the bloody thing straightened up very nicely. One sigh of relief and one usable disc.

Any number of materials can be used as the abrasive medium from baking soda to any of the exotics such as aluminium oxide, carborundum, garnet And so on. Ordinary sand is eminently usable but if beach sand is used, it must be washed to remove any salt residue.

MASKING MATERIAL

All sorts of stuff can be used as a mask. However, it must be able to withstand the effect of the abrasive under pressure. Do a test piece first to see how it will react under working conditions.

The self adhesive plastic material ladies use to cover kitchen shelves (It used to be called CONTACT) is suitable, but if a similar material is used, put down a double layer and try on a test piece first. Some self adhesive plastics

degrade around the edges when subjected to the rigors of the blasting process. Commercial masking material is available and there is one that I have seen that is exposed via a film positive to UV light and then washed in water to provide a usable mask. This is used in conjunction with aluminium oxide which is an extremly fast cutter on glass. This particular masking material requires special techniques and is BLOODY expensive.

Plastic self adhesive lettering can be used but I suggest that pressures of around 70psi be used. The brand of plastic letter that I use is GEOSIGN. The old LETRASET plastic letters degrade around the edges and you end up with a rather tatty letter. This of course can be used to effect if one wants that effect.

I use a commercial masking material and I find it very effective. Look in the telephone directory for sandblasting suppliers and check with them. UBLAST in Dandenong carries sandblasting supplies and also blasting cabinets. Hare Forbes also carry abrasives.

HOW TO DO IT
(Mind above navel please)

First of all, select your design and either enlarge it or reduce it to you required size. Literally any design that can be reduced to a silhouette may be used. Take a tracing of the design and using carbon paper, transfer the design to the masking material. Sometimes you may be able to cut out your design before laying it on the object you wish to blast but usually it is best at this point align and stick the mask to the object to be blasted. The areas to be blasted are then cut out and removed. I like to use a scalpel handle No2 (Available at art supply stores) and a No 11 blade. Again available at Art supply stores but if you are going to do a lot of such work, surgical supply outlets sell them in boxes of 100 units and this is the cheapest way to go about it.

WARNING WARNING WARNING.

Scalpel blades are SHARP. Be at pains NOT to cut yourself and NEVER fool around with anyone if you are using one and DON'T leave it where Kids and get hold of it.

Once you have your design on the object to be blasted and all the exposed bits cut out, make sure the rest of the object is suitably masked, so that overspray will not damage the surface. Masking tape or duct tape is vey good for this job.

If you do not have a blasting cabinet, take your job OUTSIDE. The abrasive Literally goes everywhere at high speed and you will be amazed at just how far it can travel, and at supersonic speeds at that. Protect your eyes and lungs, use proper eye protection and a dust mask of some sort. Any dust is dangerous and a great deal is produced when blasting. Silica dust is particularly dangerous. If you have spectators, keep them a safe distance away from the actual blasting and DO NOT expose your tender skin To the air blast or the abrasive blast. Air under pressure can penetrate the pores of the skin and cause an embolism in the blood stream and this can be fatal. The abrasive at high pressure can remove skin and flesh quicker than the tax man. Wear protective clothing and cover your hair as the bloody abrasive gets everywhere. You will be removing it from your eyebrows, ears and all exposed body parts for some time afterwards. A blasting cabinet makes it so much cleaner and safer. UBLAST sell a good sized cabinet for around $370 and it is quite a robust unit. A bloke couldn't make it for that price and the unit is powder coated with an interior light.

Right, you've done the job, deabrade yourself with a brisk rub down and take off the masking material. If you have followed the instructions, you can Proudly stand back and admire the result.

As when a bloke is airbrushing, sandblasting can be used the same way To produce graduated effects. This is done by not blasting the exposed areas directly but directing the blast along the edge of the masking material. The effect is a gradually diminishing blasted effect with the deeper cut starting at the masks edge and diminishing as it progresses into the exposed area.

There is a technique called stage blasting where the deepest areas to be cut are removed and blasted and then the remainder of the required areas mask is removed and blasted. The end result is a 3D effect.

Some glass has a clear glass base overlaid with a thin layer of coloured glass and this is called Flashed glass. Extremely subtle effects can be obtained

Using airbrushing techniques with this material. The end result of really good work looks just like a painting.

RECAP ON SAFETY

1. Stay alert
2. Wear appropriate safety gear (EYE, LUNG AND BODY)
3. Keep sharp instruments away from kids
4. Don't blast yourself or others with the airstream
5. No Cabinet? Take the job outside
6. Keep spectators well away at a safe distance
7. Be aware of the dangers of residual dusts
8. Don't use faulty equipment
9. Abrasive goes everywhere, protect other equipment.
10. Use common sense

GOOD LUCK

Sand

Try it once and you'll be blown away

Here at *WOOD*® magazine we'll experiment with most any technique, woodworking or otherwise, that we think will interest our readers. After discovering what a sandblaster can do (see some of our results at *right*), we couldn't wait to show you how to utilize this machine in your shop. So get out those air compressors—and get ready to blast off!

Wooden signs

Drinking glasses

How to talk like a master blaster

Have you ever noticed that every time you try a new subject area, the first thing you run up against is a lot of terminology you don't understand? We have! Sandblasting has its share of mysterious words, too, so here are some key definitions.

Abrasive—You've probably heard sandpaper referred to as an abrasive. In this case, the word refers to the tiny particles (sand or other fine, gritty materials) sprayed through the sandblasting gun. Abrasives chip away at the work surface to produce the desired effect. See the chart on page 36 for a list of abrasives.

Carving—By concentrating a stream of abrasive at one spot, you can lower or "carve" the surface of wood or glass.

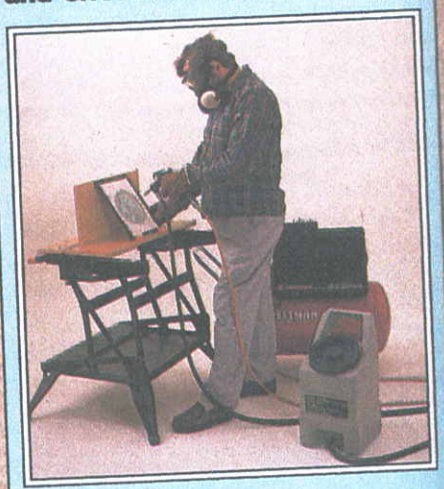
Etching—Also called surface etching, this process requires light, even sandblasting of glass or brass to give it a frosted look.

Siphon-fed sandblasters—Selling for less than $100, these widely available systems have two hoses leading to the gun: an air-supply hose from a compressor and a sand-supply hose hooked to the abrasive tank. You can purchase a reliable unit for less than $100.

Pressure-fed sandblasters—These units send abrasive under pressure from a tank to the sandblasting gun. They cost $300–$800 and cut faster, while using less air, than a siphon-fed sandblaster. You need this type of sandblaster only if you intend to carve glass or do sandblasting on a regular basis.

Resist—Any material that blocks the stream of abrasives from selected areas of a surface, leaving those sections unetched or uncarved.

A basic setup for safe and effective blasting

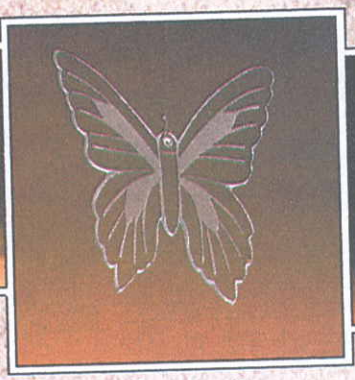


Sandblasters throw abrasive every which way, so try a setup like the one shown *above* on your driveway or lawn. Because these sand-throwing machines require a lot of air, hook them to a compressor of at least 2 hp and 20-gallon capacity.

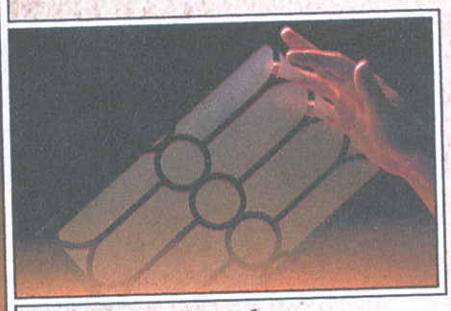
For safety and comfort, wear face protection, a long-sleeved shirt, and gloves. Since blasting with any type of sand produces airborne silica dust, wear a dust-mask respirator when spraying these abrasives.

blasting

Brass plaques



Ornaments



Cabinet doors

PROVEN TECHNIQUES FROM THE WOOD MAGAZINE SHOP — SHOP TESTED

GLASS: DISCOVER THE ENDLESS POSSIBILITIES

Like you, we're woodworkers at heart. But before we sandblast wood, we'd like to fill you in on the basics of working with glass. As we found out, you can achieve an almost unlimited variety of stunning effects and designs with this versatile material. Just remember not to use tempered glass—it could shatter during sandblasting.

Choosing and working with the right resist

To make sure you get off on the right foot, take a look at the chart at *right* to select the correct resist. As you can see, all of the resists except tempered hardboard work with glass. Then, follow these tips for adhesive-backed resists:

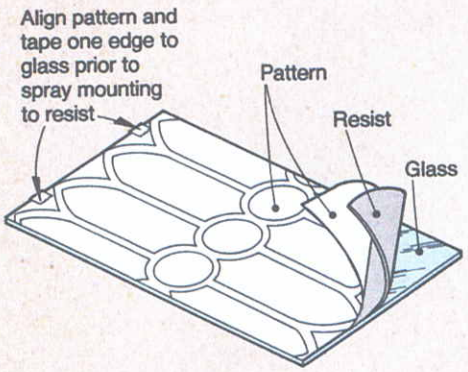
Opaque resists: These vinyl or rubber materials take the most time to prepare, but also give you the most accurate hand-cut reproductions of your pattern. For example, a geometric pattern such as the windowpane design on page 36 requires an opaque resist. To use these materials, try the method at the top of the following page.

GET THE RIGHT RESIST FOR THE JOB

RESIST	THICKNESS	USES	COST	COMMENTS
Clear vinyl	8–11 mils	Glass or brass etching	$.70–$2 per sq. ft.	Self-adhesive. Allows you to place pattern under glass and trace the design with knife. 8 mil adequate for normal etching.
Opaque vinyl	4–11 mils	Glass or brass etching	$.70–$1.25 per sq. ft.	Self-adhesive. Because pattern must be adhered to resist, this material gives a more exact reproduction of pattern. 6 mil adequate for normal etching.
Rubber	40–45 mils	Glass etching or carving, brass etching, woodcarving, boring holes in glass.	$1–$3 per sq. ft.	Self-adhesive. Easy to cut. Holds up to heavy blasting.
Photo masking	4–5 mils	Glass or brass etching	$.10 per sq. in.	Self-adhesive. Stock designs available. Custom masks available, using your artwork.
Tempered hardboard	¼"	Woodcarving	$8–$10 for a 4x8' sheet	Inexpensive. Same template can be reused. You must nail or tape template to work surface for every usage.

Continued

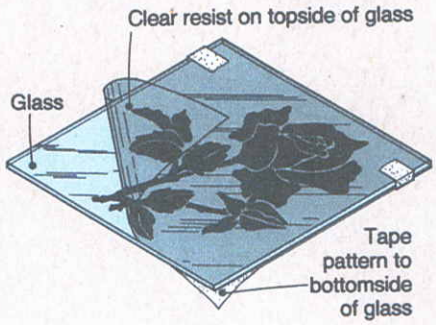
First, transfer the design to a sheet of plain paper. Next, cover the glass surface with a piece of the resist, avoiding as best you can any air bubbles underneath the vinyl or rubber materials. (The resist will be weaker in the areas of the bubbles, so pop them with a knife point and flatten again.) Then, place the design on top of the resist and align and tape it along one edge of the



glass as shown in the drawing *above*. Affix the pattern to the resist with a spray adhesive. With an X-acto knife, cut along the lines of the design, making sure the cuts overlap completely. To remove the appropriate areas of the resist, lift one corner with the knife and peel up as we're doing on the drinking-glass project shown *below*.

After lifting the edge of the resist with an X-acto knife, peel it away to expose the areas that receive sandblasting.

Clear resists: These vinyls save you some work by not requiring you to adhere the design to the top of the resist. You simply apply the see-through resist to the top surface of the glass, then slide the design under the glass according to the



drawing *above*. Then, tape the design in place beneath the glass. With an X-acto knife in hand, carefully cut the design through the resist. Finally, peel away the resist with the help of your X-acto knife.

Photo masks: To make a photo mask of your design, a supplier will transfer the design to a piece of photosensitive resist. The cost to you: the price of a photo positive of your design, plus an initial setup fee of about $20. That may sound expensive, but photo masks pay off if you intend to do several pieces of work with the same design. Why? You need only wet the backside of the mask, apply it, and that's all—you're ready to sandblast. The sandblasting supplier on page 39 provides this service as well as stock photo-masked designs.

How to etch, bore into, and cut glass

With the resist applied and cut, you've done all the hard work. Now, it's time for the fun part. To etch glass, first prop the workpiece on a small workbench. Set your compressor pressure according to the chart *below* and load your

QUICK GUIDE TO 4 SANDBLASTING APPLICATIONS

APPLICATION	COMPRESSOR PRESSURE	NOZZLE DISTANCE FROM WORKPIECE
Carving wood	40–100 PSI	2–3"
Weathering paint on wood	40–50 PSI	18"
Etching glass or brass	40–100 PSI	4–6"
Boring holes in glass	80–100 PSI	0–1"

NITTY-GRITTY ABRASIVE FACTS

ABRASIVE	APPLICATIONS	COST	COMMENTS
Fine white silica sand	Glass, wood, brass	$6–$8 per 100 lb.	Best for all-around use if you have no means of retrieving abrasive. Use respirator.
Common river or beach sand	Wood, glass	$4–$5 per 100 lb.	Abrasive must be clean and free of debris. Use respirator. Cuts slightly slower and creates rougher texture than fine white silica sand.
Aluminum oxide	Glass, brass	$1–$3 per lb.	Use only if abrasive can be recycled. Retains sharpness through repeated applications.
Silicon carbide	Glass, brass	$1.50–$5 per lb.	Available in very fine grits. Economical only if abrasive can be retrieved and recycled. Best retention of sharpness through repeated applications.

sandblaster with abrasive. We suggest using the finest white silica sand you can find (similar to the white sand often found in ashtrays). If your local homecenter or hardware store doesn't carry this abrasive, look under *sandblasting* in the Yellow Pages. See the chart at the bottom of the previous page for more abrasive information.

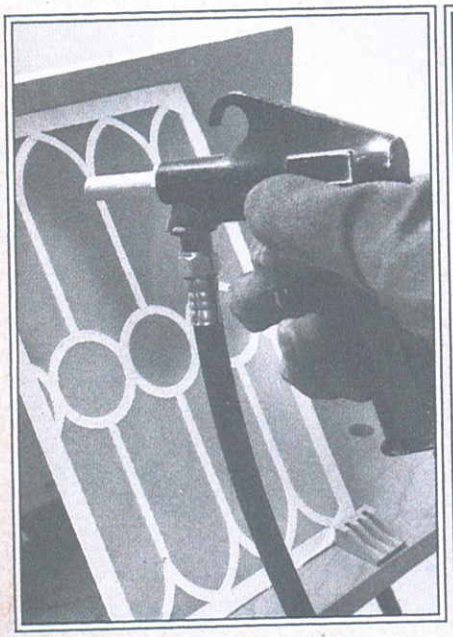
Now, move the sandblasting gun in sweeps across the glass surface as shown *below*. Be sure to overlap your sweeps, and check periodically for evenness of the frosting effect. That's it! Just peel away the resist to reveal your work of art. The same method works with brass. (We etched the soccer ball onto the plaque on page 35.)

To bore holes in glass, or cut the material into various shapes, concentrate a stream of abrasives in one area until it cuts all the way through. To make the butterfly ornament on page 35, first etch the inner-wing design, then cut away the butterfly from a pane of glass as shown *below, middle*. Because stained glass cuts slowly due to its hardness, adjust your compressor to 90–100 psi for effective results.

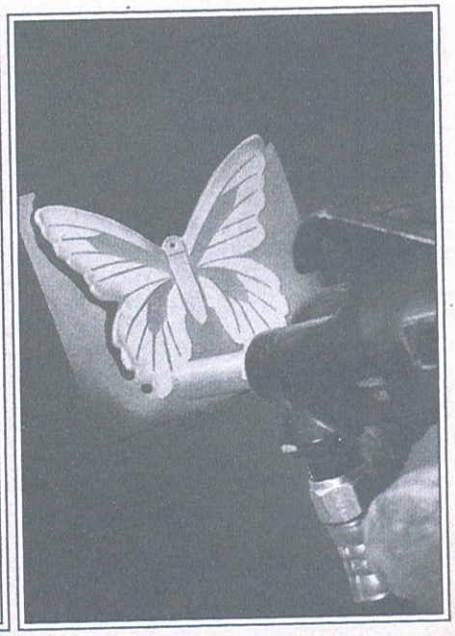
Etching flashed glass: A colorful alternative

Although flashed glass looks like stained glass at first glance, sandblasting the flashed variety quickly reveals that it's colored on only one side. By etching the colored or "flashed" side, you can create brilliant designs such as the one *above*. Many stained-glass shops sell flashed glass, but remember to keep these important points in mind:

- You'll pay a handsome price for flashed glass: about $15 per square foot. So, practice on other glass before trying the flashed variety.
- You must apply the resist to the flashed side. Normally, the flashed side is opposite the side that has tiny bubbles near the surface.



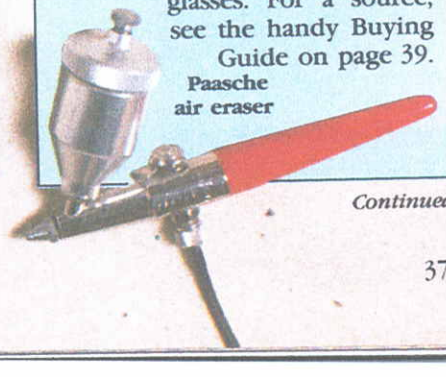
Sandblast the glass in overlapping sweeps for even coverage.



With a sandblaster, you can cut intricate shapes precisely and quickly.

Air erasers: The tool for small blasting jobs

If you only want to etch an occasional small project, here's a lightweight "sandblaster" that you can use in the comfort of your shop. The Paasche AEC-K air eraser won't cut glass or carve wood, but for $77, it lets you etch glass or brass with even the smallest of compressors. Instead of spewing out sand, the air eraser requires small amounts of aluminum oxide. Six ounces of the abrasive will etch 10 or so glasses. For a source, see the handy Buying Guide on page 39.



Paasche air eraser

Continued

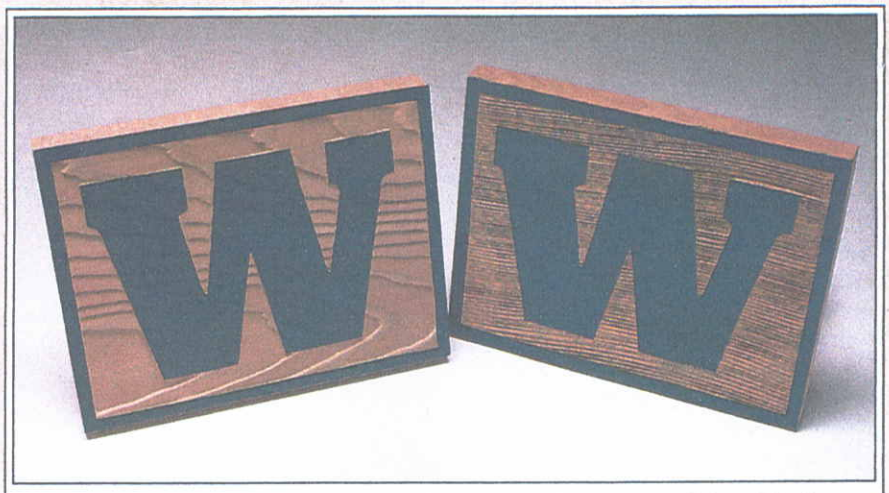
WOOD: STUNNING EFFECTS IN MINUTES

What to know before you blast wood

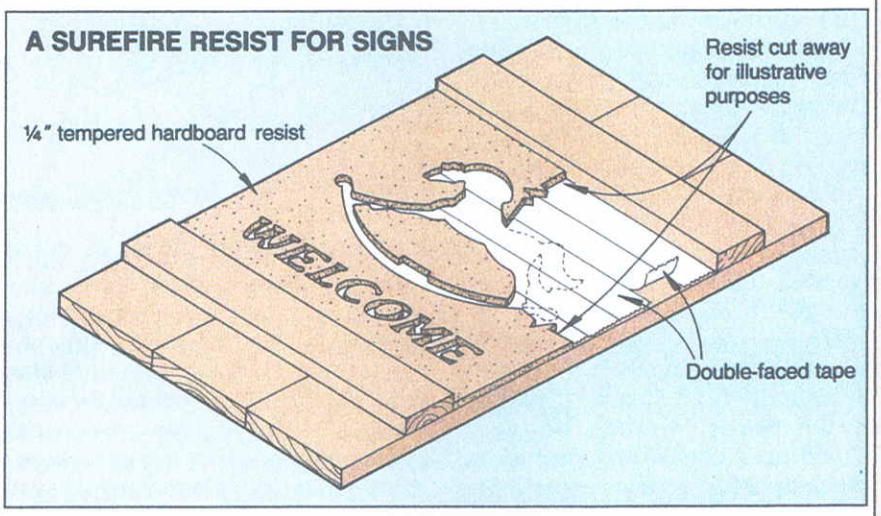
Although similar to the process for etching glass, carving in wood does require you to pay attention to the grain pattern of the workpiece. As shown in the two examples at *right,* sandblasting removes the softest grain first, giving dramatically different results on face and edge grain. We had good success sandblasting redwood and cedar—two ideal woods for outdoor signs—but had little luck carving hardwoods. Remember, the harder the wood, the more time and abrasive you'll spend carving it.

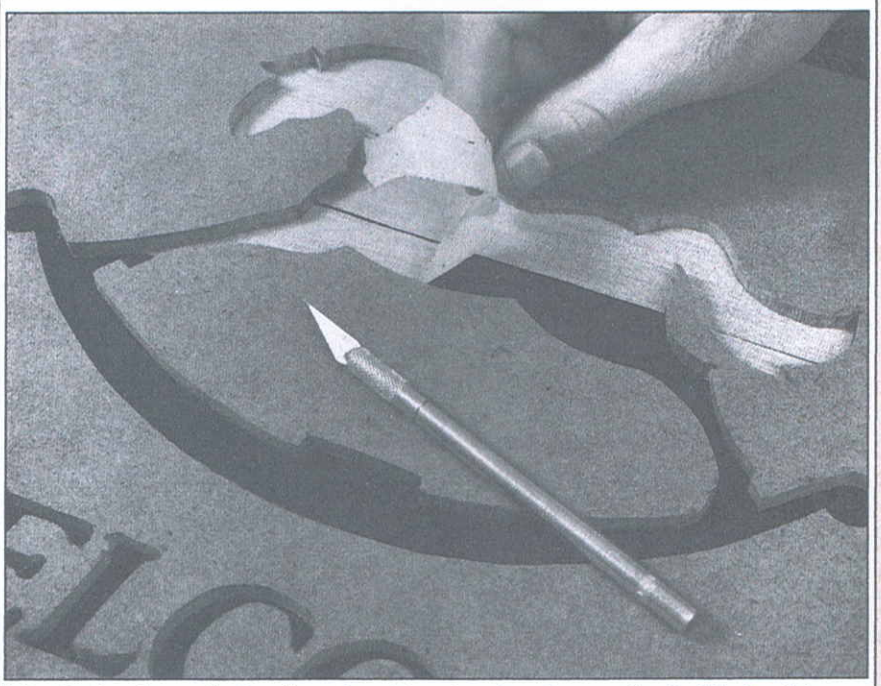
One slick way to make a sign

We don't know of any sign-making technique that's easier to control—or produces more impressive results—than sandblasting. And there's more than one way to go about it. One way: Apply and trace your pattern onto a piece of rubber resist just as you would do with glass. That works fine, but here's a less expensive method. First, transfer your pattern to a piece of tempered hardboard. With a scrollsaw, cut out the areas you want to blast. Then, apply cloth-backed, double-faced tape to the backside of the hardboard resist and adhere this assembly to the surface of your workpiece as shown at *right, middle.* You could nail the hardboard in place, but keep in mind that this will leave small brad holes in the work surface. To make the welcome sign on page 39, first paint the entire surface, then apply the resist, and cut along the pattern edges to remove the unnecessary tape as shown at *right.* Finally, sandblast the unprotected areas to a depth of about ¼". Work the blasting action into all the tight areas.

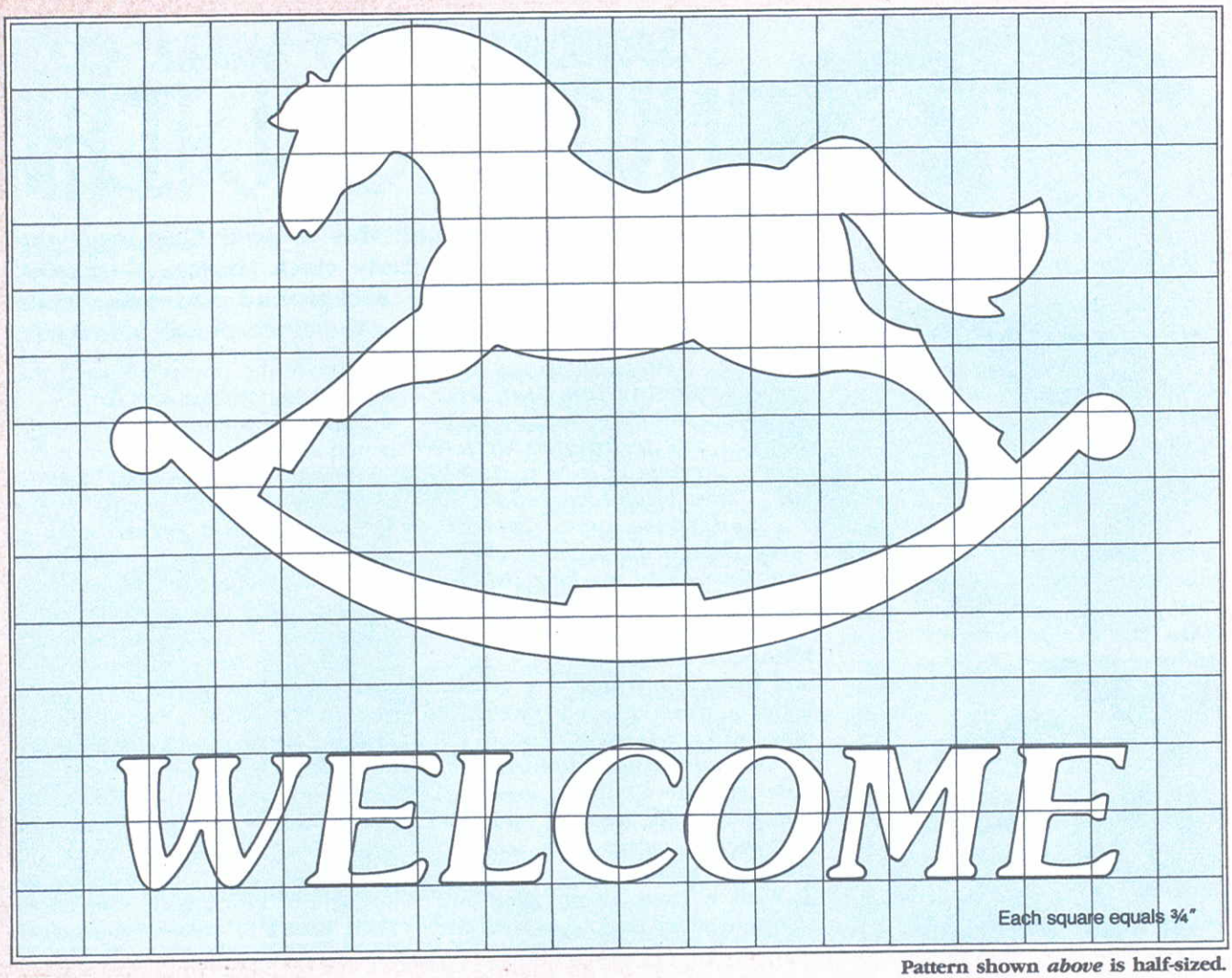


Face- *(left)* and edge-grain pieces of redwood have different sandblasted looks.





After laying down the hardboard resist, cut and peel away the double-faced tape.



Pattern shown *above* is half-sized.

How to achieve the weathered look

After carving the welcome sign, we kept our handy sandblaster nearby for the final touch: a two-minute weathered look. Here's how you can achieve the same effect. First, keep in mind that the natural causes of weathering—rain and sun—strike objects at high angles, so hold your sandblasting gun at a 45°–60° angle above the sign. Then, give the sign a light overall blasting. Finally, give a little extra blasting to the edges most likely to take a beating from Mother Nature.

Buying Guide

• ***Paasche AEC-K air eraser*** kit with six ounces of abrasive, $76.95 ppd. from The Art Store, 600 Harding Road, Des Moines, IA 50312.

Further reading and sandblasting supplies

• ***Glass Etching: Surface Techniques and Designs,*** by Norman Dobbins & Debra Felberg Oxley, $15.45 ppd. This book, instructional videos, seminars, and a complete line of sandblasting supplies (including photo masks, abrasives, resists, sandblasters, and air erasers) available from National Sandblast Systems, 20721 Marilla St. Chatsworth, CA 91311. Call 818/341-0301 for more information. Call 800-332-3824 for orders only.

Written by Bill Krier
Technical consultant: James R. Downing
Photographs: Jim Kascoutas
Illustrations: James R. Downing; Kim Downing; Mike Henry

Have a blast with these *Free* patterns

To help you get in on the fun of sandblasting, we'd like to send you a set of patterns for the drinking glasses, welcome sign, roses, and butterfly shown in this article. Just send us a stamped, self-addressed, No. 10 business-sized envelope to:

What a Blast!
***WOOD* Magazine**
P.O. Box 11454
Des Moines, IA 50336-1454

Foreign readers, please include an international reply coupon.

SANDBLASTED WALL CLOCK JUST IN THE

Have some fun with this project! Blast away the numbers for the classy clock shown at left. Or, blast and paint the background and make your own wooden hands for the clock shown below left.

Note: Unless you're already familiar with sandblasting, refer to our techniques article starting on page 34. It provides helpful suggestions for masking the surface and blasting the mirror for this clock's face. For ease in masking the mirror, order our precut vinyl resist.

Miter-cut the pieces, and form the frame

1 Cut a piece of stock (we used pine) to 1½×1½×38". Follow the two-step drawing *below right* to miter-cut the 12 frame members 2⅞" long. (We first cut and dry-clamped 12 pieces from scrap to check the angle.)

2 With a band clamp, glue and clamp together the pieces with the top and bottom surfaces flush.

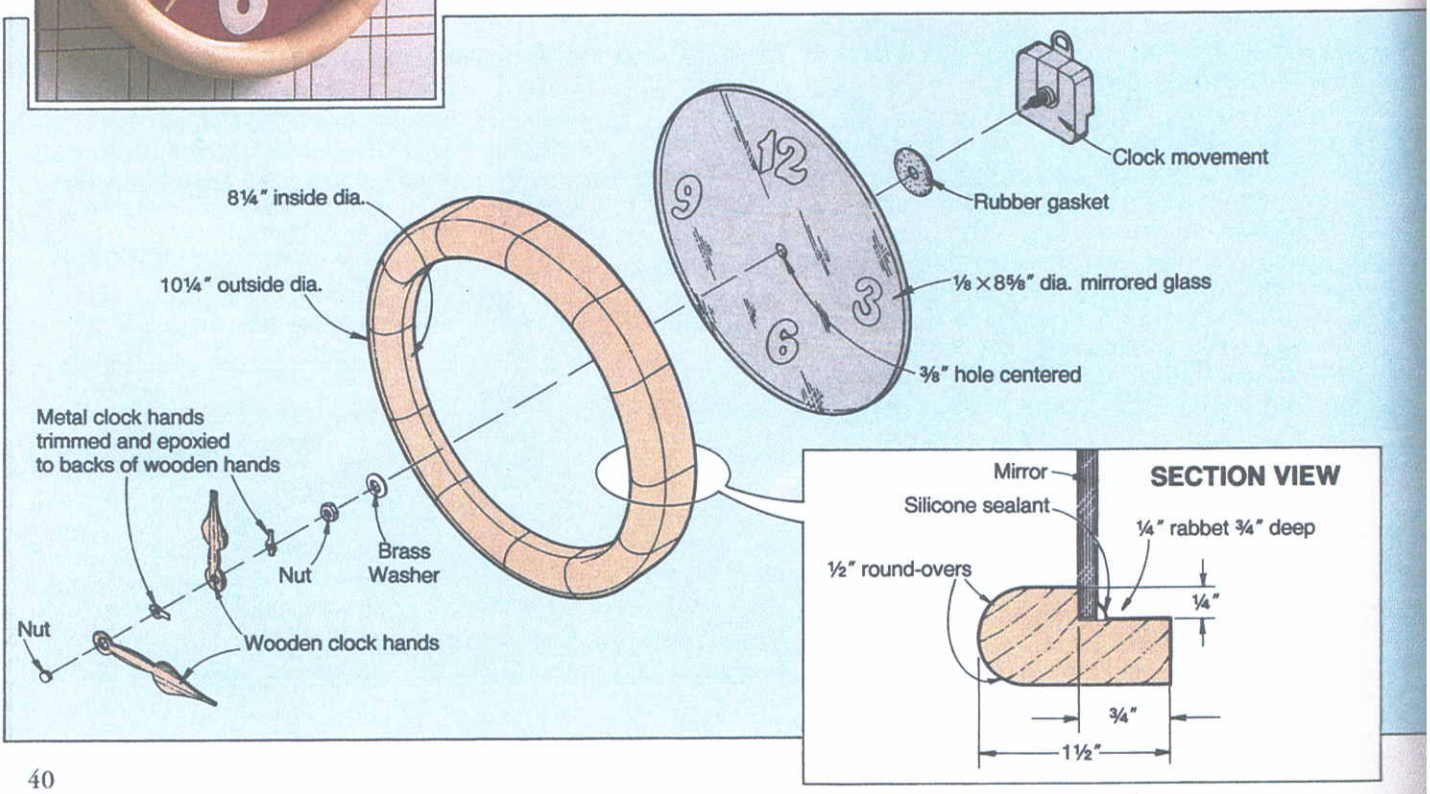
3 Remove the clamp and sand the top and bottom surfaces flat.

4 Tape the frame to your workbench as shown in the photo *right.* Mark lines across the scrap block to locate the center as shown.

5 Using trammel points, mark a 10¼"-diameter circle for the outside frame perimeter and an 8¼"-diameter circle for the inside.

6 Bandsaw the outside of the frame to shape and use a scrollsaw to cut the inside. Sand the cut edges smooth. (We used a disc sander to sand the outside and a drum sander to sand the inside.)

7 Rout a ½" round-over along both front edges of the frame. Switch to a ¼" rabbeting bit, and rout the back inside edge of the frame to house the clock face (mirror). Then, have a ⅛"-thick mirror cut to fit the rabbeted opening.

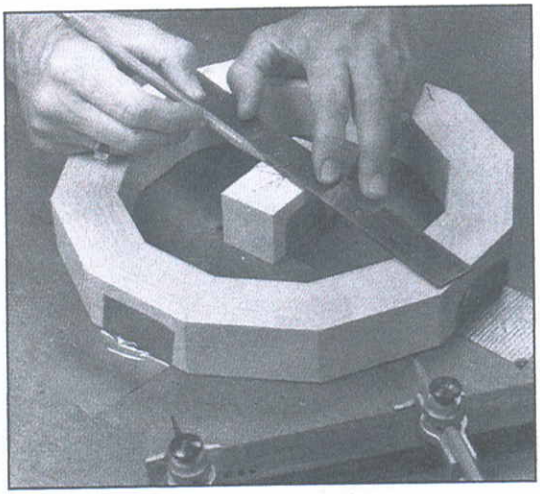


NICK OF TIME

Finish the frame and blast away

1 Hand-sand the frame smooth and finish as desired. (We left ours natural and applied several coats of spray-on lacquer.)

2 Clean the silvered side (back side) of the mirror. Find the center of the mirror and mark a centerpoint. With a hobby knife, cut around the marked hole at the center of the resist, and remove the center from the resist (see the Buying Guide *below right* for our resist source). Slowly peel the backing (brown paper) from the resist. Peel the resist slowly to prevent the numbers and background from sticking to the backing. Center the resist over the mirror's centerpoint, smooth out any bubbles, and adhere the resist to the silvered side of the mirror.



Position a straightedge on opposite joints and mark a line on the scrap block. Repeat the process with another set of joints to find the frame's center.

3 Center and tape a ⅜" flat washer over the hole in the resist. (The washer allows you to blast through the mirror without destroying the resist and making the shaft hole too large.)

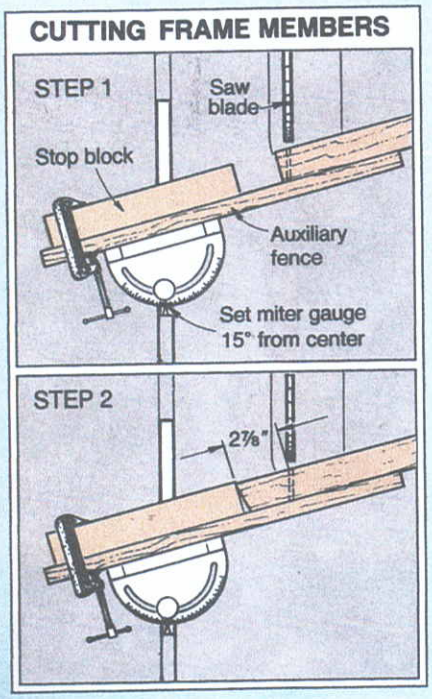
4 Sandblast a hole through the mirror at the washer (it took us approximately 4 minutes at 100 psi.). Insert the clock shaft through the hole to check for a good fit, and blast more if necessary.

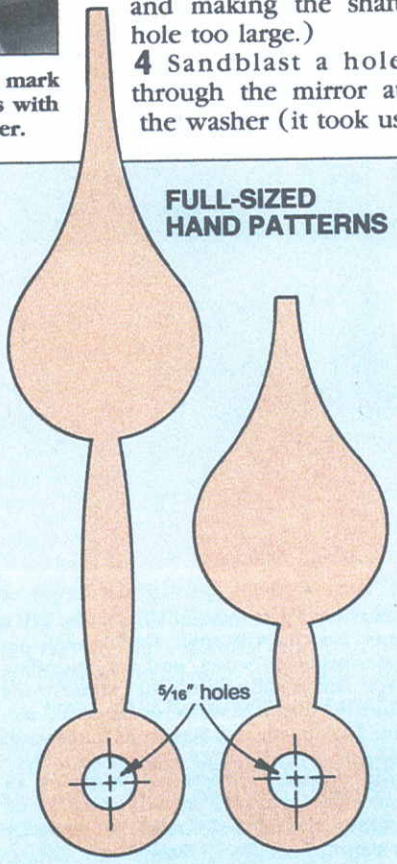
5 For the painted clock face (the clock with wooden hands), remove the background resist and leave the numbers adhered to the mirror. For the unpainted clock, remove the numbers and leave the background. Sandblast the unprotected areas.

6 For the painted version, resaw pine stock to 1/16" thick. Transfer the hand patterns *below left* to the thin stock. Drill a 5/16" hole in each hand where marked. Using a scrollsaw, cut the hands to shape. (To prevent splintering, we taped the pine stock to ¼" hardboard with double-faced tape. After cutting the hands to shape, we removed the hands from the hardboard by splashing a bit of lacquer thinner onto the taped joint to release the wooden hands from the tape and hardboard.)

7 Trim the metal hands where shown on the Exploded-View Drawing. Epoxy the wood hands to the front of the metal hands and attach them to the shaft. Fasten the movement to the mirror and attach the hands. (You'll need to trim about ½" off the ends of the black hands for the unpainted clock.)

8 Using hot-melt adhesive or silicone sealant, secure the mirror into the rabbeted frame.





Buying Guide

- **Vinyl resist.** Peel apart resist with pre-cut numbers. $6.25 each, or two for $10.45 ppd. Herrington Display Ltd., 1312 Maple, West Des Moines, IA 50265.
- **Clock movement.** High-torque movement with black hands, kit no. 71043, $15 ppd. Klockit, P.O. Box 636, Lake Geneva, WI 53147. Or, call 800-556-2548 to order.

Project Design: James R. Downing
Photographs: Hopkins Associates
Illustrations: Kim Downing; Bill Zaun

www.Nate's AircooledTech.com

AircooledTech; Tools-On-The-Cheap

Soda Blaster For Carb Cleaning & Rebuilding

Cleaning and rebuilding your carbs can be difficult these days. The really good cleaners of yester-year are no longer available now that they have been deemed "bad for the environment" and outlawed. The cleaners we could always count on are now effectively rendered almost useless. Awe yes, I remember being able to buy a gallon can of carb-dip at the local parts store and it would strip decades of grime away over night with one 12 hour soaking. Now the same brand barely loosens varnish let alone cleans it away with days of soak time. . . You still need to get carbs clean, but chemicals today just can't do it alone and you don't want to spend an afternoon scrubbing all the nooks and crannies of your carb housings. What's a guy (or gal) to do??

Blast them!! "But wait", you say, "Blasting my carbs will fill them with grit that I'll never get out and my expensive carbs will be ruined." The solution is to use baking soda as the media. Yes, common, household baking soda!! "But don't I have to own a blasting cabinet or pressure blaster in order to blast my carbs??" The answer is NO. Below is a list of the items you need in addition to an air source like an air compressor:

-1 - air gun attachment

1 - two foot length of 7/16" clear vinyl hose

1 - one foot piece of wood dowel, metal rod or thick wire

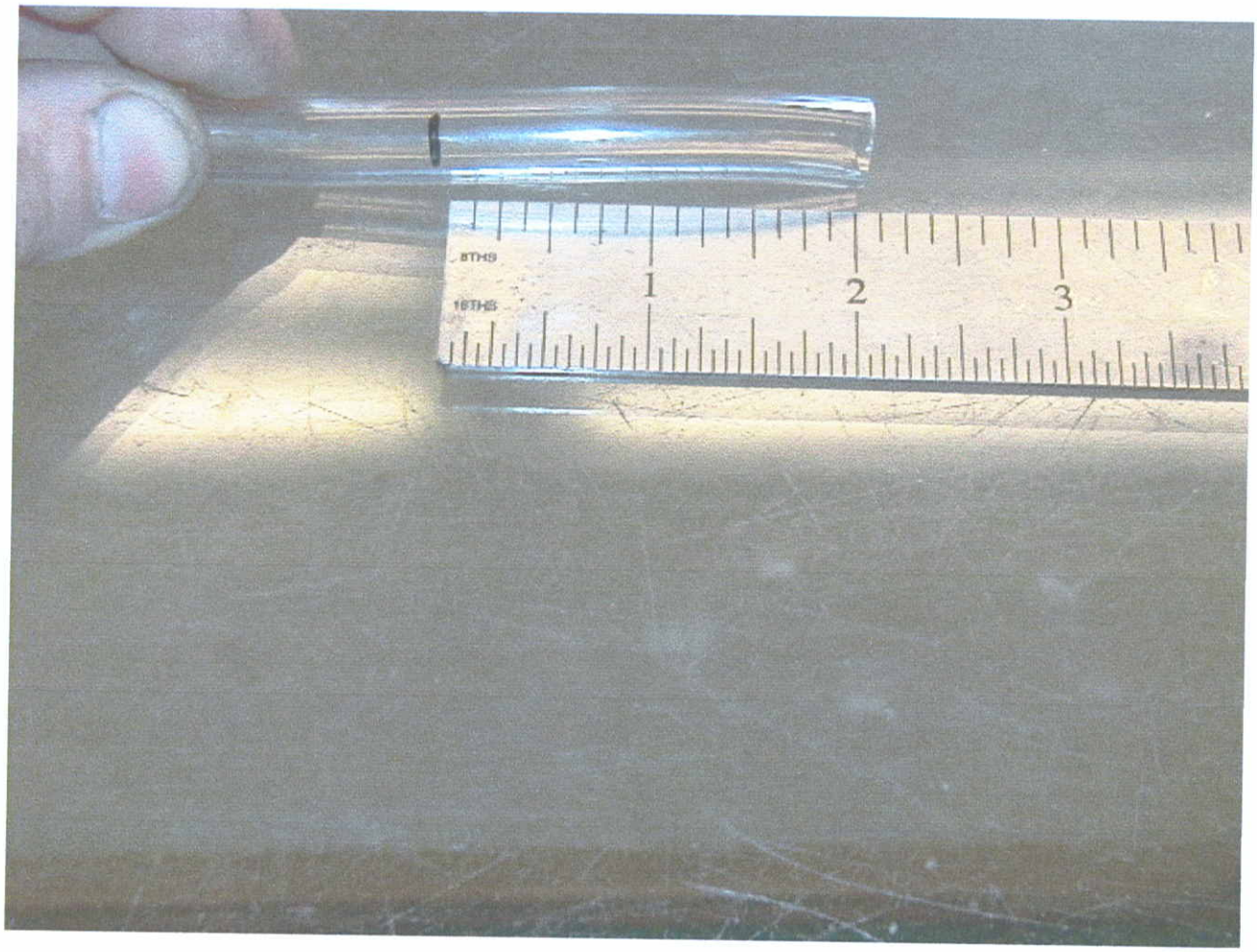
1 - box of baking soda

1 - small roll of tape (masking or duct)

1 - sharp knife (or razor blade)

NOTE: As far as air compressors are concerned for blasting, the bigger then better. The more CFM it flows the better the results will be. If you try and blast with a tiny 2 gallon compressor, you will be disappointed. For best results use a compressor with at least a 25 gallon tank that flows at least 6 - 7 CFM. I personally use a 60 gallon, 5hp, upright, Ingersol Rand and get fantastic results. Again, the bigger compressor the better.

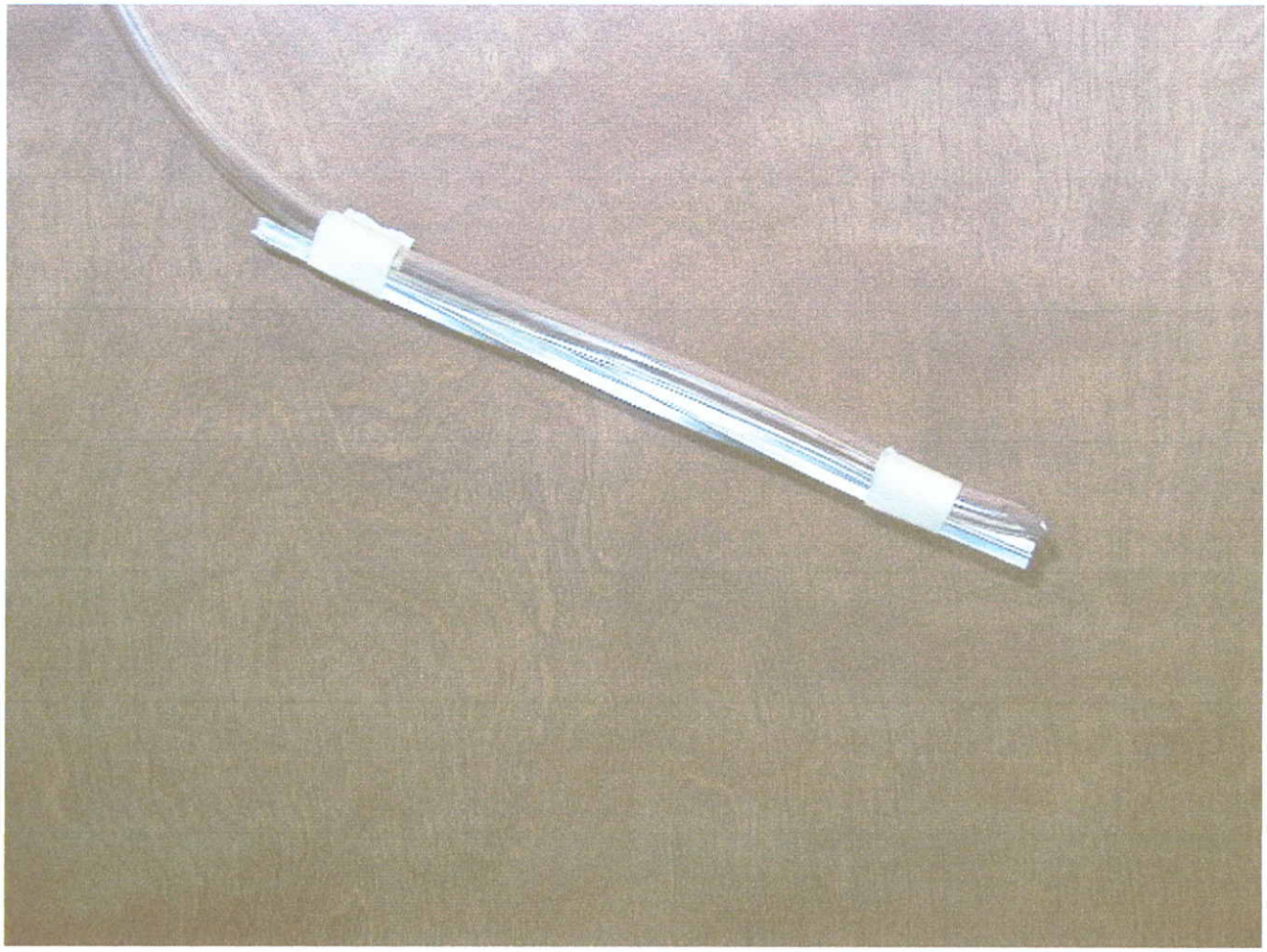
You start by cutting your length of vinyl hose approximately 2-2.5 feet long. Vinyl hose is available at home stores like Home Depot, Lowes, etc. for around $2.00 for a 10 foot roll. Then measure from one end in about 2" and mark it with a Sharpie.



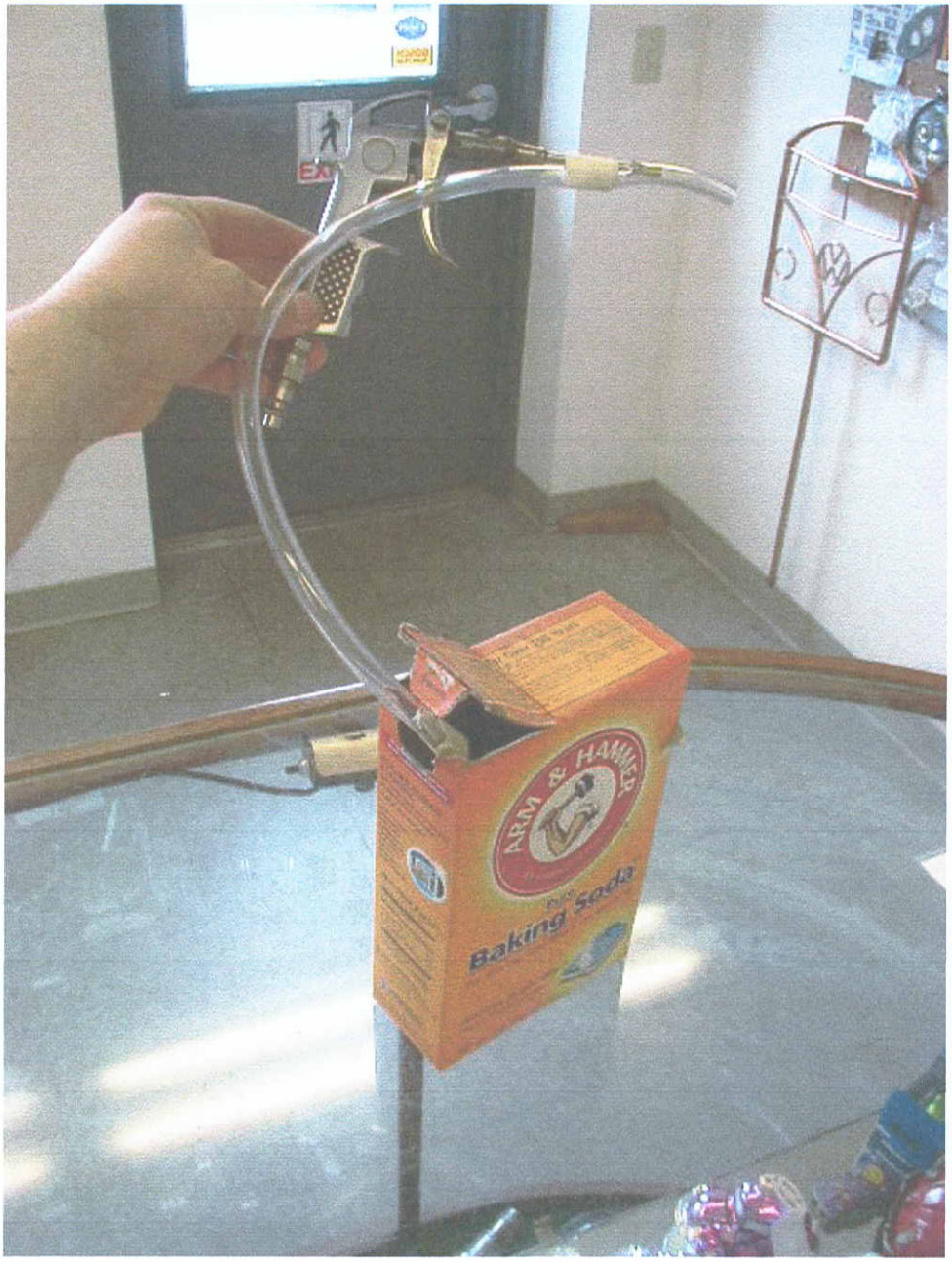
Take your knife or razor blade and make a small cut across the hose ONLY through one side. The cut needs to be just large enough so that the tip of the air wand attachment will stick into the hose. Stick the tip of the air wand into the hose and let it stick in about 1/4" - 1/2".

Positioning your wand tip like this will create a venturi effect in the hose causing the soda to be pulled up from the box by low pressure and mixed with the high pressure air from the wand. Use one length of tape to wrap around the end of the air wand and hose. This will keep the hose in the proper position on the wand tip during blasting.

I cut the other end of the vinyl hose at a 45 degree angle to allow better flow of the soda into the hose. Then I tape the piece of dowel, metal rod or wire to the other end of the hose. This will help keep it from curling up in the box of soda and help you keep good flow into the hose. You will need to periodically shake the box to keep the soda flowing nicely.



Now you have your ultra low-tech & cheap soda blaster ready for blasting!!



WARNING: Blasting should ONLY be done outside in a well ventilated area such as a patio or concrete driveway. Of course proper eye protection and a face mask should always be worn. Baking soda is not poisonous but it feels like your breathing a soft drink if you inhale it and it's irritating, so protect those lungs!!

Baking soda will get all over you and the surrounding area, but don't worry, it won't harm anything. Just wear some cloths you don't need to wear for a hot date later because they will be coated white when you're done. Adjust your air pressure to about 80 - 90 psi on your compressor. You only need to hold the blaster tip about 6" or so from your carb parts and begin the blasting.

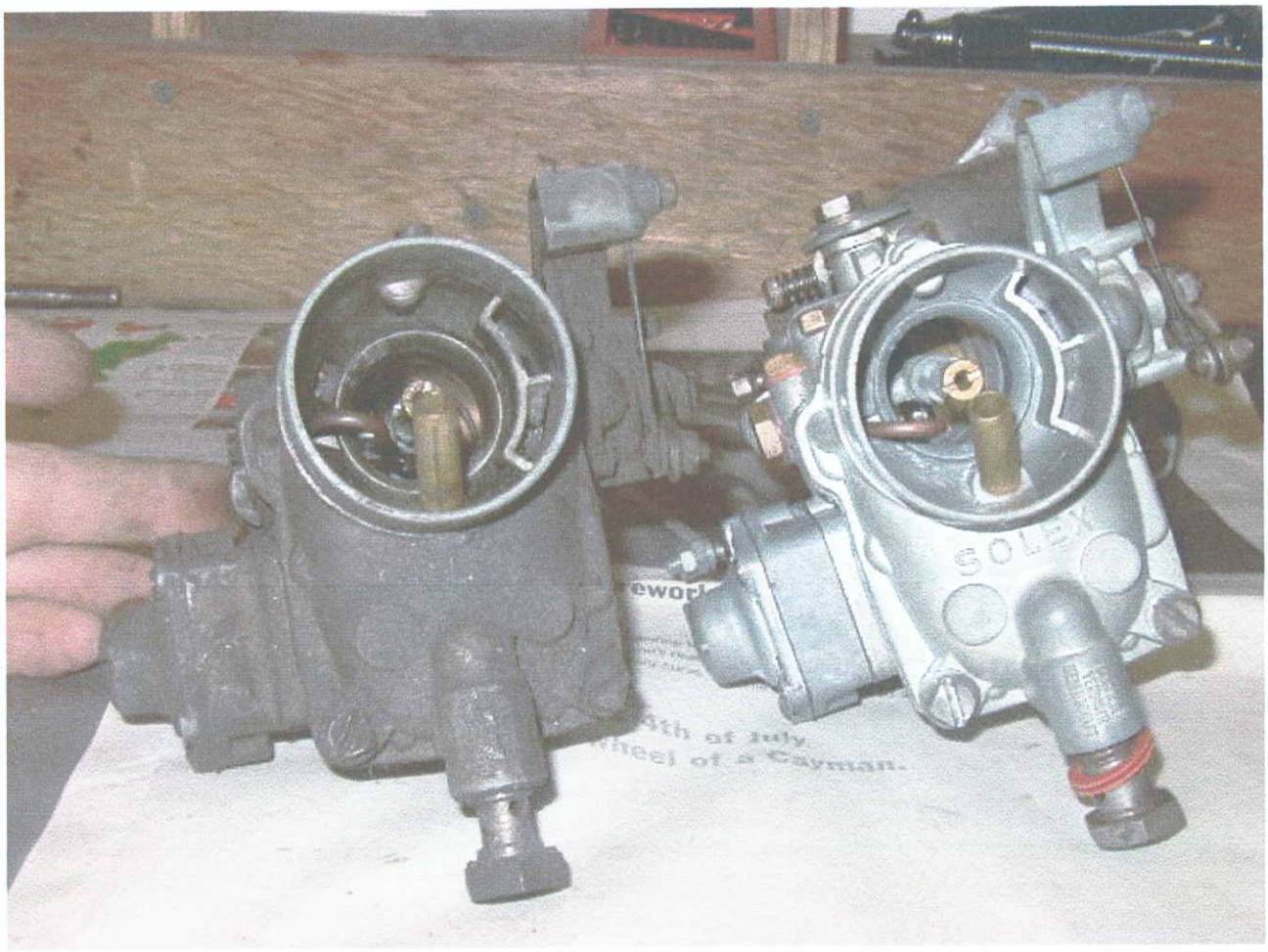
Soda is a soft media and will not harm the factory finish of your carbs. It removes all organic matter from the carb bodies as well as heavy corrosion scale in aluminum. It will not remove rust or corrosion from steel hardware; it only removes the scale build-up. You can freely blast into passages and the carb bowls since soda dissolves with water!!

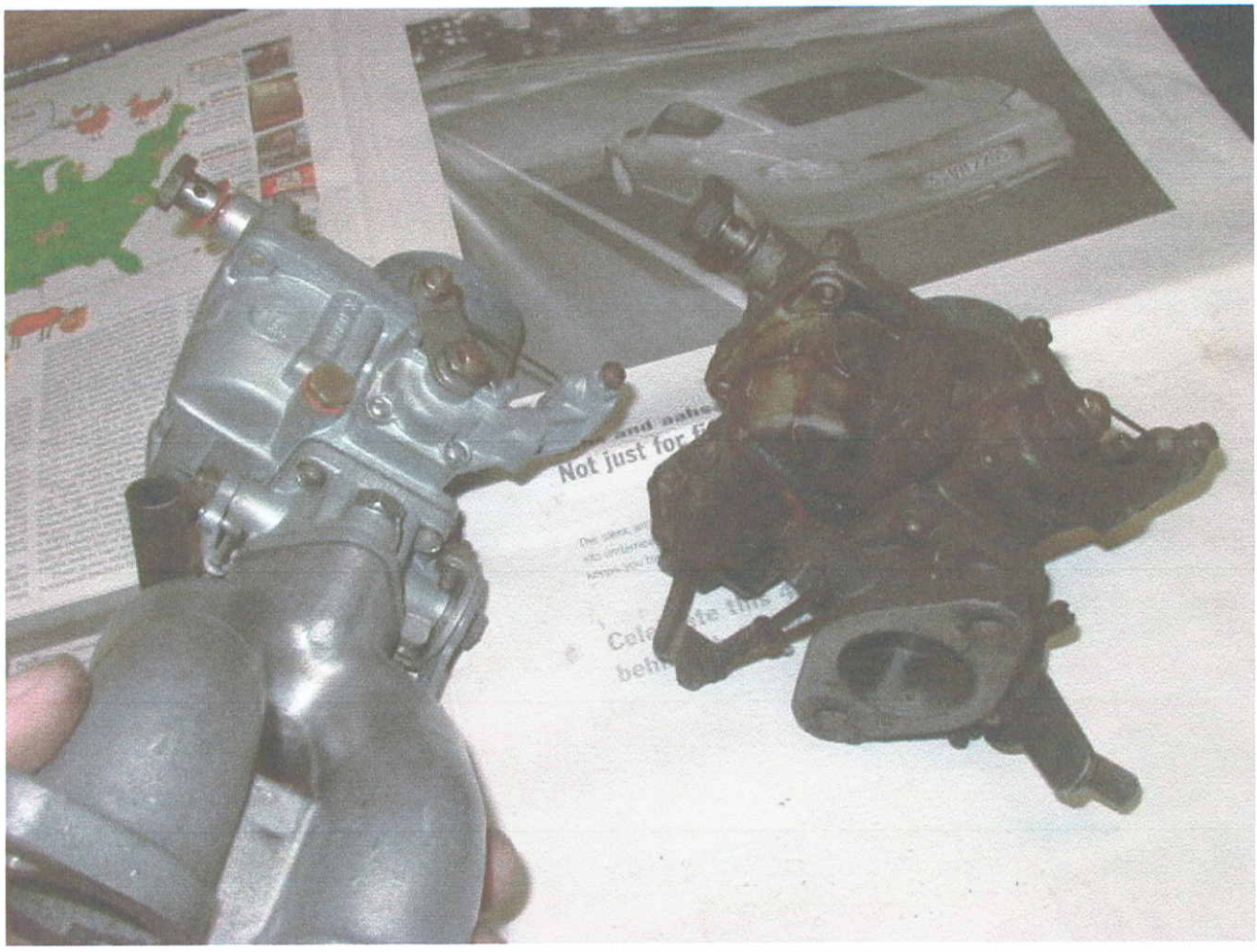
Once you are finished blasting, simply place all your parts into a pot of warm tap

water. The soda will dissolve into the water and leave NO RESIDUE behind. Then blow out the passages with air just as you normally would and your carbs are ready for re-assembly.

The mess on the concrete cleans up just as easy. Simply spray it down with the garden hose to dissolve the soda. NO caustic chemicals to seep into the ground water for future generations to deal with; this is a real "green" solution to carb cleaning and it's inexpensive too.

Below are a few before and after photos of some rare Porsche 356 carbs that I cleaned with this exact low-tech blaster. The results speak for themselves. Total cost for this blaster is about $5 including the box of soda!! So the next time you need your carbs cleaned, give this *AircooledTech; Tools-on-the-cheap* soda blaster a try and see what you think. I'll bet you never go back to chemical carb cleaners again!!





See the Garage Night guys feature video of my soda blaster in action here:
http://www.garagenight.tv/diy-soda-blasting-build-your-own-rig-cheap/

Do you have a cheap but effective tool solution for a VW problem?? Send me your tricks, tips and cool, low-buck solutions and who knows, you may have it featured here in the future.

E-Mail Me

Back To Main

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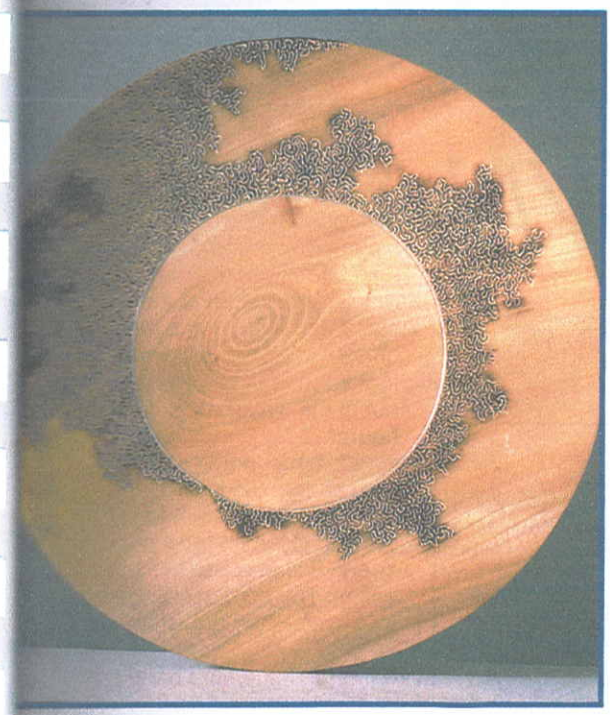
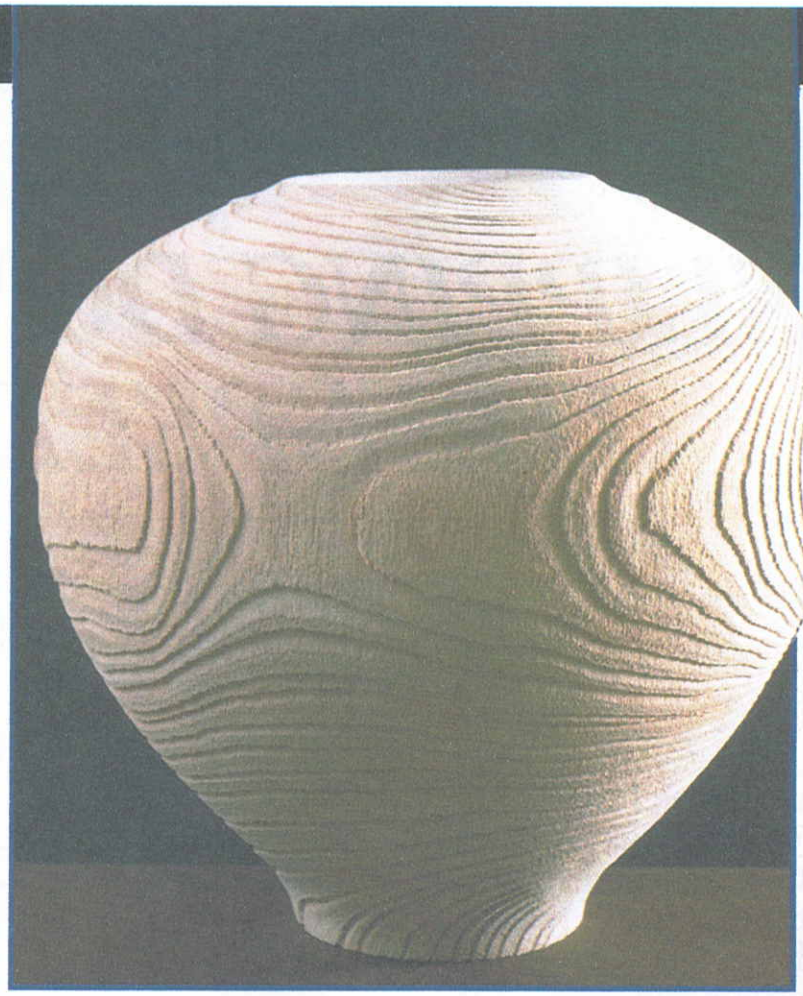
Revised: April 10, 2010 .





the vessel. Velvet fruits on a blue platter, (bottom) by Dennis Hales is more comfortably familiar. Opposite page: The design of this bedpost, (left) made by Chris Pye, is based on one from 1790. George White's 21 piece coffee set in sycamore is eye-catching and controversial (top). The carved rim of Ray Key's ash bowl (centre) complements the rippled figure of the grain. The beads round the rim of Dave Reeke's platter in spalted beech contrast with the smooth sweep of the dish (bottom). This page: Hayley Smith has turned down several offers for this platter (above left) an inlayed wire restricts the scorching and carving to the rim. John Hunnex's vase in sandblasted cedar (above right) contrasts the proportions of the shape with the texture of the open grain, whereas John Vining combines form and fine finish in his spalted beech bowl (below).

Sandblasting (abrasive etching)

Courtesy Glasshopper, Anaheim, CA.

This project was sandblasted on flashed glass. The resist was applied to the side of the glass with the pink flash. The color was then blasted away in some areas exposing the clear base.

Tools & Materials

Sandblasting or abrasive etching is a process whereby the surface of the glass is frosted by pressurized bombardment of an abrasive material. Various effects are achieved by using a resist for design control. Other techniques such as stage-blasting (pg. 13) and carving (pg. 20) are exciting possibilities to experiment with after acquiring some experience.

It is not necessary to have your own sandblasting equipment. Many stained glass shops now have facilities for sandblasting. Some do the blasting for you and others allow you to blast your own project. If you have difficulty locating available equipment, check the yellow pages under "Sandblasting."

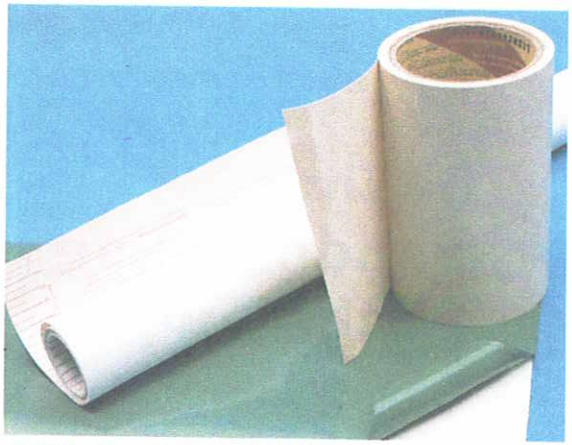
The materials necessary for doing your own sandblasting are; compressor and desired abrasive material, glass, resist, knife, carbon paper, pen, ruler, pattern, goggles and dust mask.

Be sure to remove all jewelry before sandblasting, as the abrasive material will damage the finish.

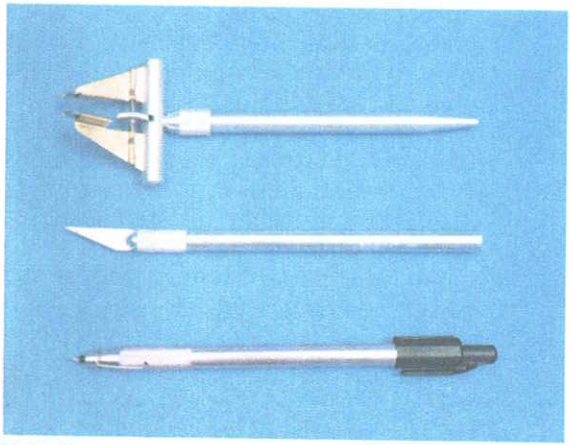
SANDBLASTING UNIT

This is a typical two horsepower compressor with sandblasting equipment. More powerful compressors are available, however one this size is more than adequate for the average hobbyist.

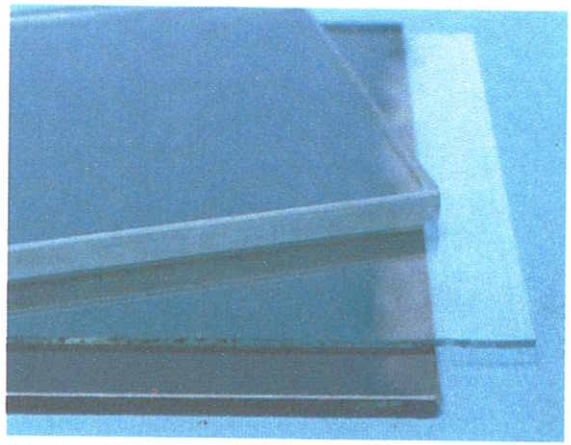
WARNING: A DUST MASK MUST BE WORN AT ALL TIMES WHEN SANDBLASTING TO PREVENT A VERY SERIOUS LUNG DISEASE CALLED SILICOSIS, CAUSED BY DUST INHALATION. ALSO, WEAR GOGGLES FOR EYE PROTECTION.



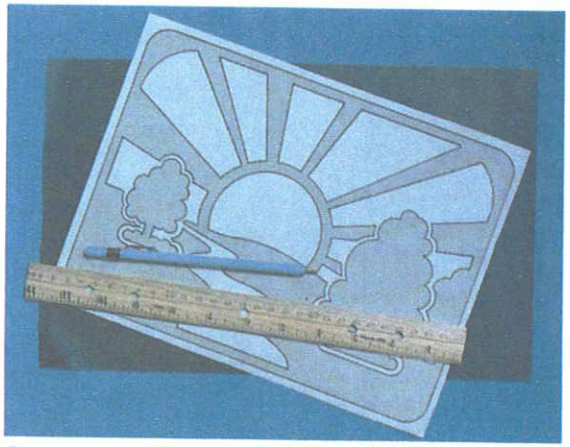
RESISTS — There are several choices of resist material. A-21 Contact® paper is suitable for very light sandblasting and acid etching. Three layers are necessary for stage blasting. A heavy masking tape ranging in widths to 24" is also available. Buttercut® is the best resist available and is recommended for stage blasting and carving. It is expensive, but well worth the investment as it holds up well under the stress of deep blasting.



KNIVES — A very sharp knife is needed for cutting resists. There are a variety available. From top to bottom — Adjustable double-bladed knife for cutting parallel lines, hobby knife with pointed blade is good for detail, swivel blade is excellent for cutting curves.



GLASS — Sandblasting can be done on most any type of glass. There are many different effects possible when using flashed glass, colored and tinted glass, antique glass and mirrors. Glass is also available in a variety of thicknesses. Carving and stage-blasting can be very dramatic on glass 3/8-1/4" thick.



CARBON PAPER, PEN, RULER AND PATTERN — Carbon is used to transfer the pattern onto the resist. A pen and ruler are also used for this purpose. Select your pattern and make any necessary alterations. (See pg. 38.)

SANDS AND ABRASIVES — For successful finished projects, the type of abrasive material you choose is an important consideration. With experience, you will learn which is best suited for your purposes.
Some of the abrasives mentioned below are available at home improvement centers. For additional sources, check in the Yellow Pages under "Sandblasting."

CRYSTAL SILICA is the most common blasting medium. It is good for general blasting but it dulls very easily. Because it is so inexpensive, it is good for use in non-recovery systems.
GARNET is a little more efficient but also dulls after several uses. Garnet is a good compromise between Silica Crystal and the expensive abrasives.
ALUMINUM OXIDE is a very popular abrasive. It is more expensive still, but is a much sharper crystal and reduces the blasting time considerably.
SILICON CARBIDE is the choice of the professional abrasive artists. This shiny black crystal is considered the ultimate in abrasives. It is very expensive, however it is well worth the price if you intend to do much blasting. Because of its molecular structure, as the crystals fracture they become finer and sharper. Therefore, dulling is not a problem. A recovery system is necessary because of the cost of the material.

GRITS — All abrasives are available in a variety of grits. Larger grits produce less friction and less heat and are easier on your resist.

60-80 mesh is a course grit—good for cutting.

100 mesh is a medium grit—general blasting and carving.

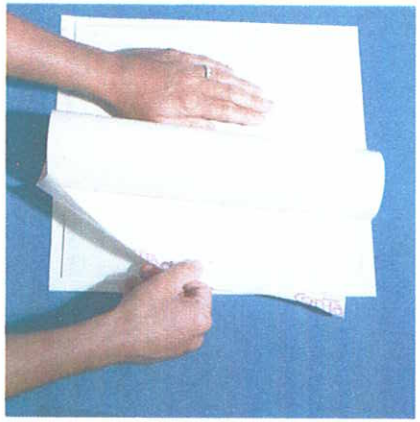
150-200 mesh is fine grit—good for shading.

Basic Sandblasting Technique

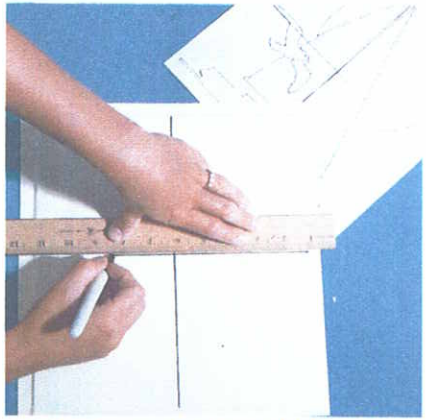
Sandblasting is really exciting to do! It is particularly rewarding because it is possible to achieve professional results with very little experience. Start with something simple and work up to more difficult projects. If you choose an extemely detailed design for your first attempt, take the extra time necessary to practice cutting with the hobby knife before you begin cutting your resist. It is well worth your investment of time to cut your resist very carefully and accurately. Remember, the success of your finished project is directly related to the quality of your prepared resist. Follow the step by step instructions on the next page and have fun!

(Left) As illustrated by the projects shown here, the effect of a design may change entirely when different areas of the same pattern are sandblasted. Examine your pattern before cutting the resist to determine which areas of your pattern you want to blast.

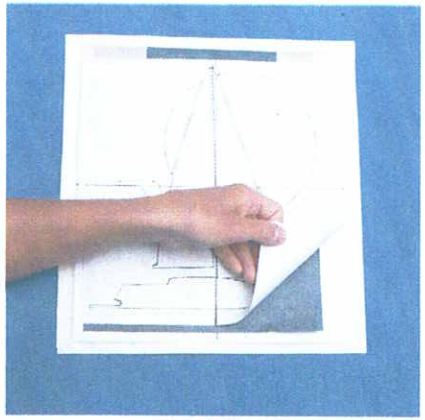
CAUTION: ALWAYS WEAR EYE PROTECTION TO PROTECT FROM AIRBORN DUST AND SAND. ALSO, IT IS VERY IMPORTANT TO WEAR A DUST MASK TO PREVENT A SERIOUS LUNG DISEASE CALLED SILICOSIS, CAUSED BY INHALATION OF THESE DUSTS.



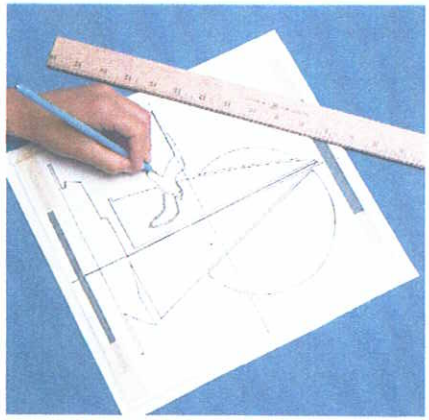
STEP 1. APPLY RESIST — Cut two pieces of resist that measure 1" larger than the glass. Apply to both sides of glass. The back is covered to protect from scratches. If using Buttercut,® the back need only be covered with Contact® paper or tape.



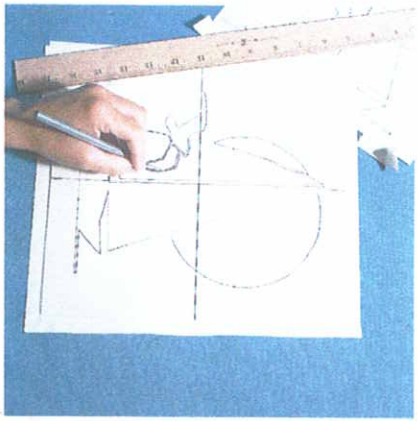
STEP 2. CENTER PATTERN — Divide covered glass into quarters using ruler and marking pen. Divide the pattern in the same way. When transferring the design onto the resist, these lines will be used to position and center the pattern.



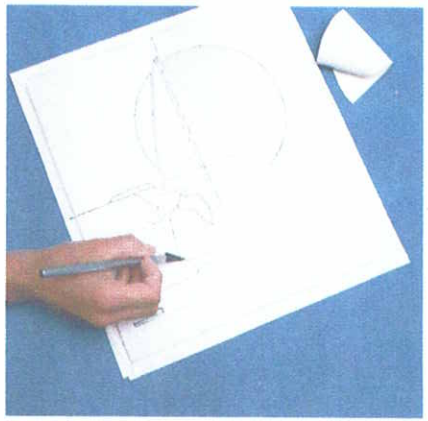
STEP 3. CARBON PAPER — Center the pattern on the glass by using the lines as positioning guides. Insert a piece of carbon paper between the pattern and the resist with the carbon side toward the glass. Tape securely in place.



STEP 4. TRANSFER PATTERN — Using a pen, transfer the pattern onto the resist by firmly outlining the entire pattern. Before removing pattern, lift up the bottom and check to be sure you have traced over all lines.

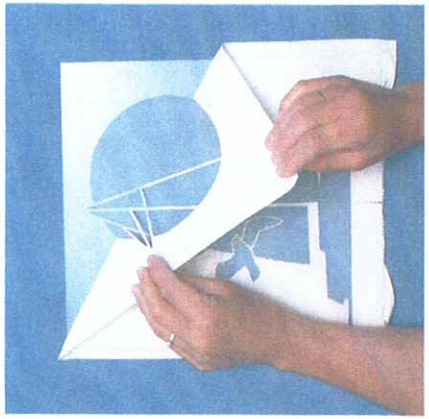


STEP 5. CUT RESIST — Remove tape, pattern and carbon paper. Cut through resist along all lines with a sharp, pointed knife. When blade dulls, replace it with a sharp one. A dull blade may loosen the resist from the surface of the glass.



STEP 6. REMOVE RESIST — Determine which areas of the pattern you want to blast. Carefully remove resist from those areas. Use the tip of the blade to help peel up the small edges. If using Contact paper® or masking tape, rub down all edges before blasting.

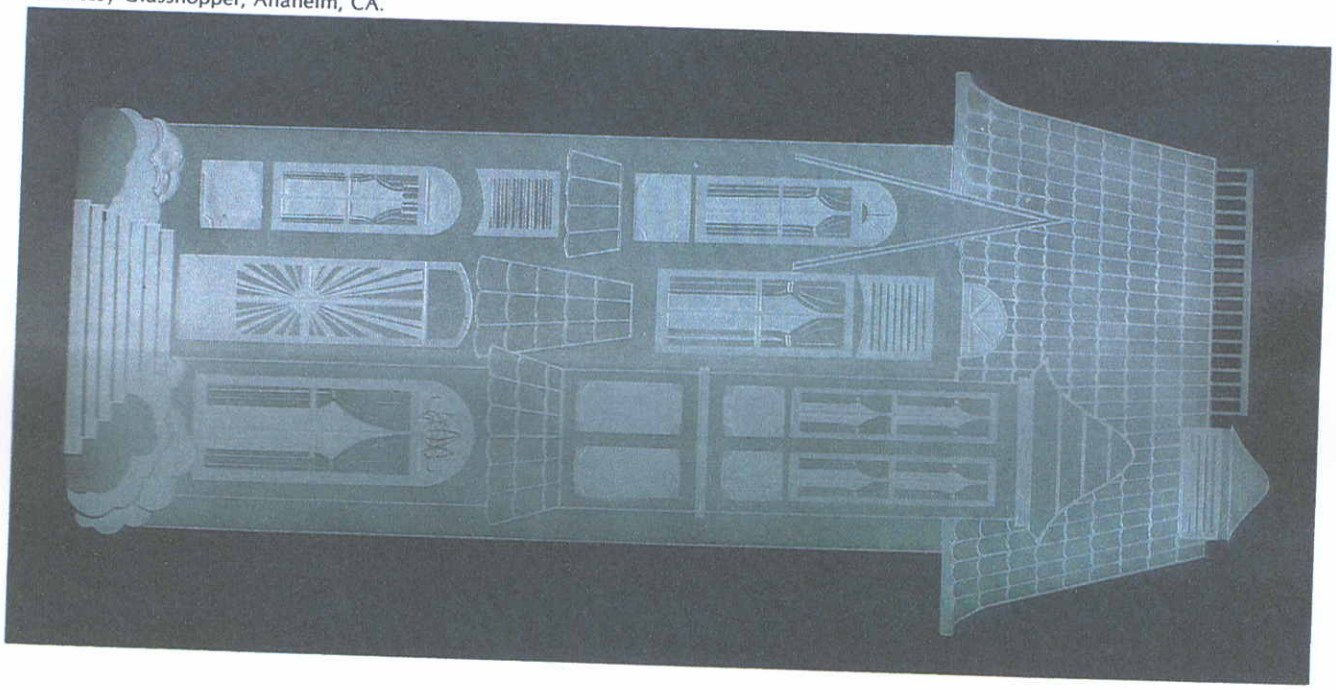
STEP 7. SANDBLAST — For a uniform blast, hold the nozzle 8-10" from the glass. After some experience, you may want to change this distance to achieve different effects. Be careful at close range, however, as the friction can melt the edges of the resist.



STEP 8. CLEAN-UP — Before removing the resist, carefully examine all of the blasted areas to assure that they have been blasted to your satisfaction. Touch up where necessary. Remove resist and run glass under water to remove the sand and dust. Finally, clean with glass cleaner.

Courtesy Jack Eslinger, El Toro, CA.

Courtesy Glasshopper, Anaheim, CA.

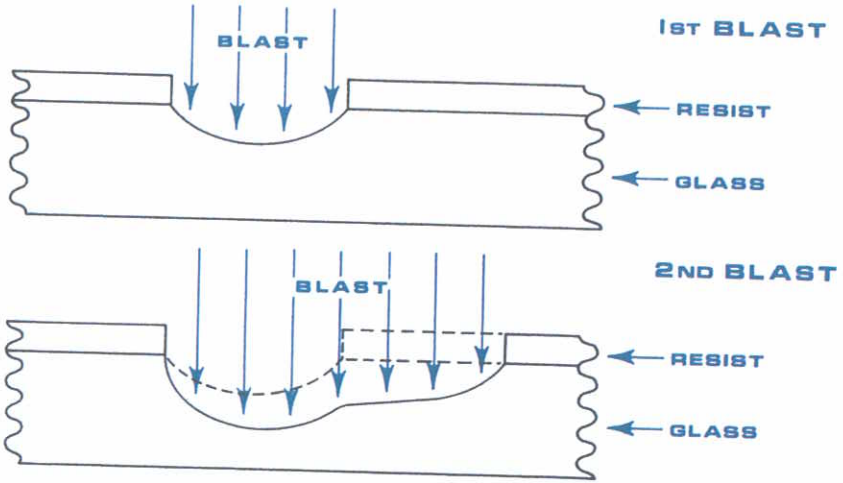


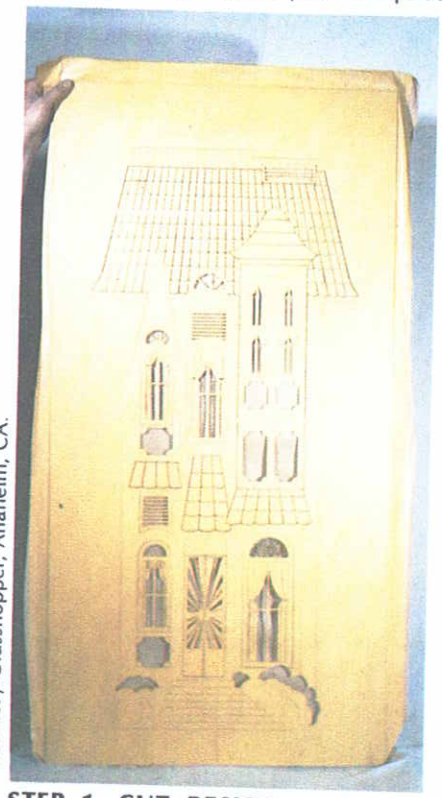
Courtesy Glasshopper, Anaheim, CA

Techniques
Stage Blasting

Stage Blasting is a technique where a design is blasted to different, distinct depths. Since you usually blast a project from the back, it is necessary to visualize the design in reverse before stage blasting. The areas which are blasted deepest, when viewed from the front, will appear to be closest to you.

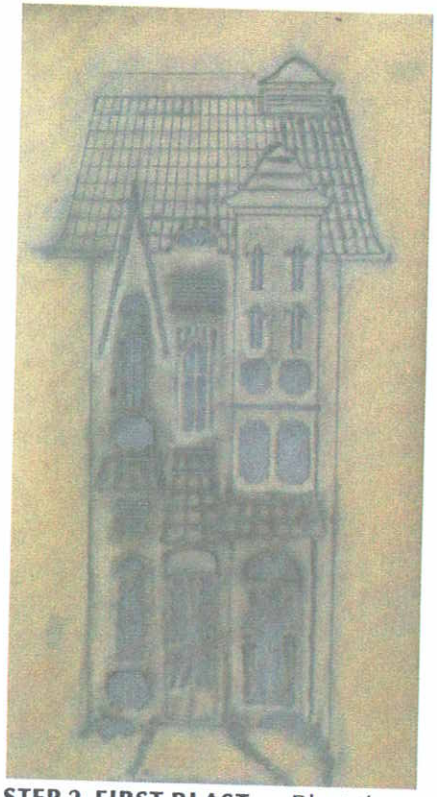
Although you will be blasting the project more than once, you can usually use the same resist by simply removing portions and continuing blasting. The first blast generally does not get much deeper with subsequent blasts, but it does round out. Remember to consider the thickness of your glass when you determine your deepest point.



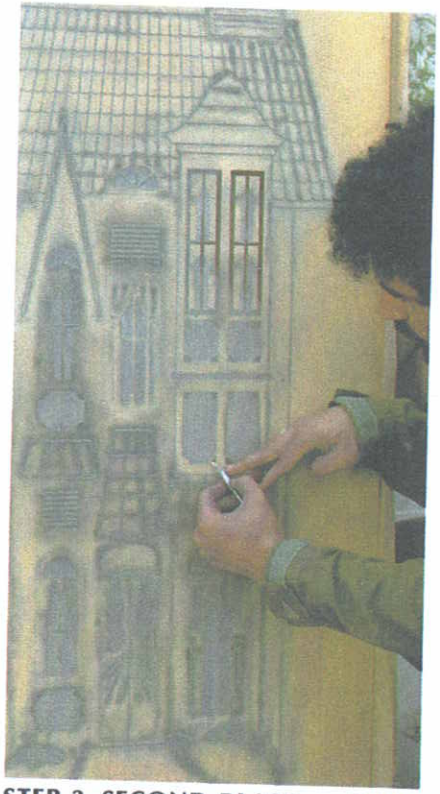


Courtesy Glasshopper, Anaheim, CA.

STEP 1. CUT RESIST — Prepare resist as explained in the basic instructions for sandblasting. Buttercut or triple thick Contact® paper is recommended. Remove areas to be blasted the deepest.



STEP 2. FIRST BLAST — Blast these first areas to the desired depth. As you continue blasting, these areas will not get a lot deeper, however they will tend to round out and blend with the next depth.



STEP 3. SECOND BLAST — Determine which areas are to be blasted next. Cut and carefully remove the resist material. Sandblast these areas same as step 2.

STEP 4. SUBSEQUENT BLASTS — Continue removing resist and blasting in this manner until the entire design has been completed.

Techniques

There are several other techniques that make sandblasting creative and fun!

PAINTING
Select areas of a design can be painted after they have been established to add interest and color. (Fig. 6) The word Private was painted. (Fig. 2) The entire design was sandblasted and then the flower and one border were painted blue. (Fig. 1) This design takes on a very serene mood when painted black.

SCREEN MASKS
A very unique effect can be achieved by adding interesting textures to a design. (Fig. 3) A piece of common window screen was stretched over the design and blasted lightly. Different gauges of screen or wire mesh can be used to add interest to a background or design.

DOUBLE BLASTING
Try sandblasting part of a design on one side of the glass and the rest of the design on the reverse side of the glass. You may allow some parts to overlap. (Fig. 4) The fish and the wave were blasted on opposite sides of the glass to create a sense of dimension. The fish appears to be jumping out of the water. (Fig. 5) The frosted mat for these pictures was created by sandblasting. Both sides were blasted to make the mat obscure so that the edges of the photos would not show through.

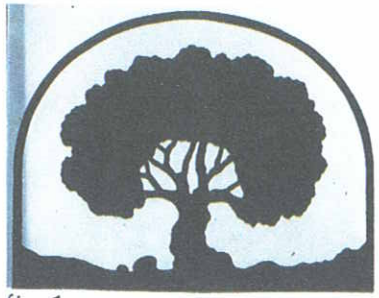


fig. 1

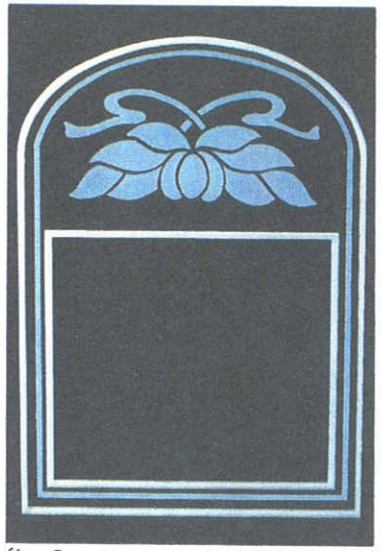


fig. 2

Courtesy Jack Eslinger, El Toro, CA.
fig. 3

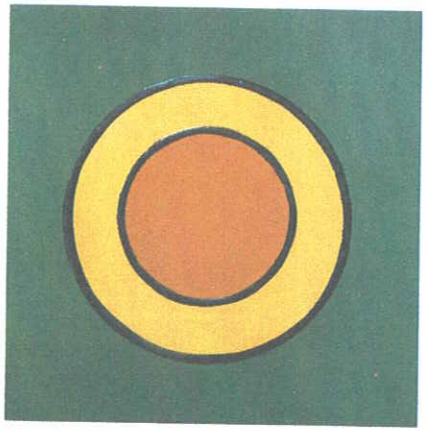
fig. 4

Courtesy Gregory Johnson, D.D.S., Irvine, CA.
fig. 6

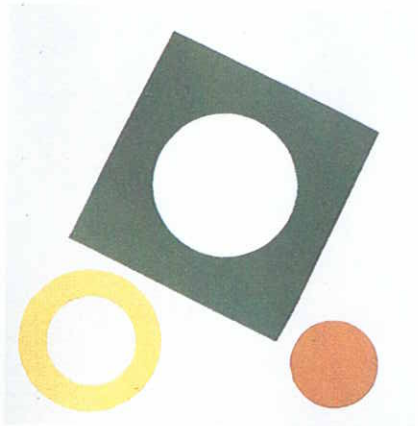
fig. 5

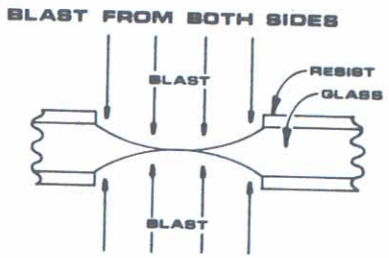
Techniques
Blast Cutting

Blast cutting can add a new dimension to art of stained glass. Difficult and "impossible" cuts can be made by sandblasting.

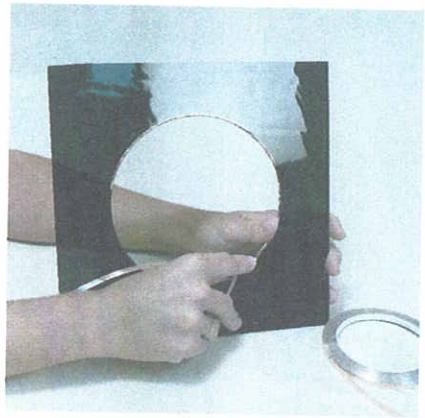


As you can see from this page, designs can be cut out of the interior of a piece of glass without any cuts or lead lines extending to the perimeter of the piece of glass. These simple circles illustrate the unique possibilities of blast cutting.





When cutting out a piece of glass by sandblasting, it is best to blast from both sides. This provides you with the cleanest and most accurate edges. It is essential that the cut areas of the resist be accurately matched on both sides of the glass. The simplest method of getting the resists properly aligned is to use three or four layers of clear Contact® paper so that you can actually see through to the other side as you are cutting.



The simplest way to assemble the pieces is to use the copper foil method. This consists of wrapping a narrow strip of copper foil tape around the edges of each piece of glass and then soldering them together.

The cloud in the window above was cut out by sandblasting. It would have been virtually impossible for even an advanced stained glass craftsman to accomplish this with a conventional glass cutter. By learning and utilizing this technique, a whole new aspect can be added to stained glass work.

How to enlarge a design

Let's assume you have selected a pattern and would like to put it into a window opening that is 24" wide. To determine the height of the enlarged pattern you will have to proportion it up from its original size.

Step 1 - Tack a large sheet of lay-out paper to your worktable. Draw a 24" line at the bottom. Using a right angle draw a vertical line extending up from the beginning of the 24" line.

Place a traced copy of the pattern in this lower left-hand corner. Line up the left-hand side and bottom lines of the pattern in the right angle. Draw a diagonal line from the lower left-hand corner to the upper right-hand corner and extend it beyond.

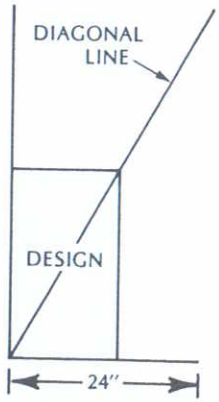
Step 2 - At the end of the 24" line draw another vertical line extending up, until it intersects the diagonal line. From this intersecting point draw a horizontal line back to the left-hand vertical line. This will give you the exact height of the enlarged pattern.

If after you have done this you discover the pattern will be too tall or perhaps too short, you may still be able to use the same basic design with alterations. The easiest method of altering the shape of a pattern is to increase or decrease the width or height of the border area. Another alternative is to frame the etched window so that it will fit into an existing window opening.

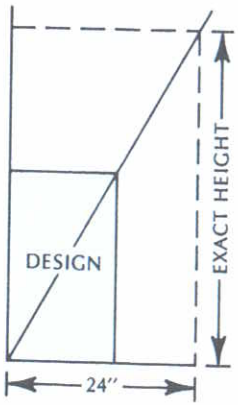
Step 3 - Divide the enlarged pattern area with equal sized grid lines, both vertically and horizontally. The grid lines should be approximately 2" to 3" apart depending upon the complexity of the design.

Step 4 - Divide the pattern with the same number of grid lines, both vertically and horizontally.

Step 5 - Number each line of the grid on the existing pattern and the enlarged pattern. Begin to transfer the design, square by square, in pencil. Draw over the design with a black felt tipped pen after the entire design has been transferred.



STEP 1



STEP 2

How to alter the shape of a design

There are many ways of altering or bordering designs to make them fit the shape of your existing window opening. A design that fills the window area or at least has a similar shape as that of the opening is usually more pleasing than one that does not.

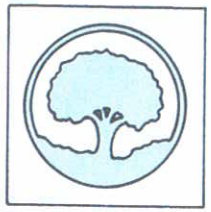


fig. 1

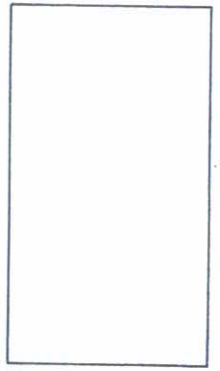


fig. 2

For example, let's say that Fig. 1 is the design that you have selected and Fig. 2 is the window opening that it must fit. By adding borders around the window opening as in Figs. 3 and 4 the original design becomes the focal point of a larger design. Fig. 5 does not completely fill the window area yet is an attractive and simple solution. The same design was used twice in Fig. 6 for a reflection effect. Short designs such as a round or square adapt to this usage best. Fig. 7 shows the double usage of the same design and the addition of borders. Also, note that the bottom design was executed opposite from the one on the top. A very simple, stretched version of the design was used in Fig. 8. It fills the shape of the window yet did not require the addition of any new design elements.

fig. 3

fig. 4

fig. 5

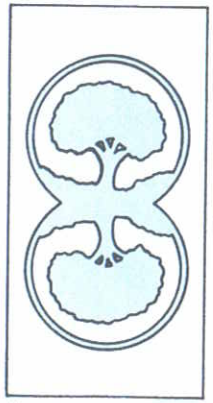


fig. 6

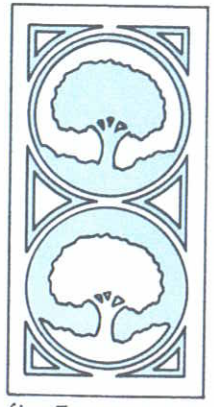


fig. 7

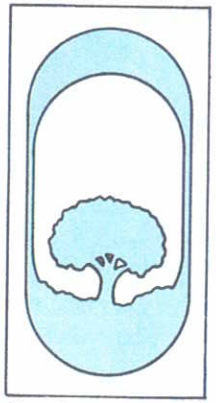


fig. 8

Window Installation

The simplest method of installing an etched window is to install it over an existing window (Fig. 1). Measure and cut stops to fit around the existing window sash. Secure the stops in place with brads. Place the etched window against the new stops and square off with wooden shims if necessary. Place a second set of stops around the perimeter of the panel and secure them in place with brads. There is no need to putty or seal the panel as the existing window is already weather-proofed. Note: Before installing be sure to thoroughly clean the surfaces of glass that will be sealed inside. It is also best to locate the etched surface inside so that your normal window cleaning will be easier.

To permanently install an etched window in a wood sash (Fig. 2), remove all of the old putty and glass. Apply new putty to the sash and sill opening. Install the etched window in the opening. Drive glazing points into the sash along the four sides to hold the window in place. Putty where the window meets the wood. Place wood stops completely around both the inside and the outside of the window. Measure the stops to fit snugly and secure in place with brads. After you have finished, clean the excess putty from the window. A word of caution: Many window frames are made to accept only 1/8" window glass. For this reason you may find it best to install the etched panel over the existing window.

To install in a metal sash, the procedure is much the same except there should be existing stops. These are either screwed in or the snap-on type. If the metal sash does not have stops, look for metal spring clips. After you have puttied in the window, reset the stops and clean away the excess putty.

Smaller etched windows can be framed with wood (Fig. 3). These can then be hung with chain inside and in front of a larger existing window.

INSTALLATION OVER AN EXISTING WINDOW

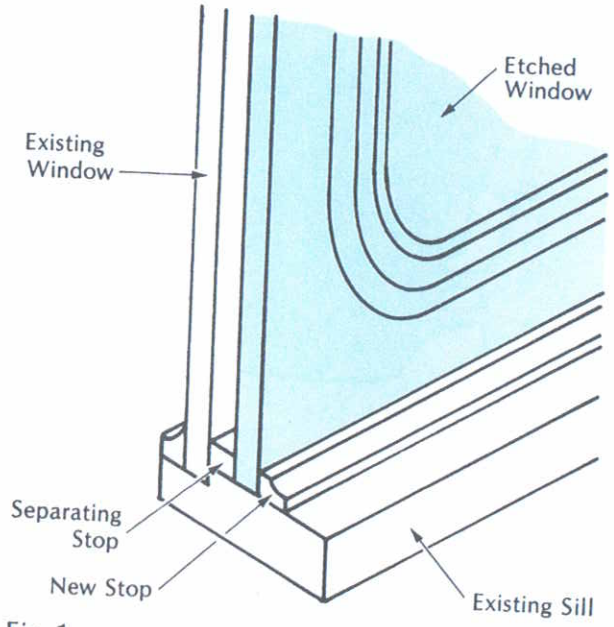


Fig. 1

PERMANENT INSTALLATION

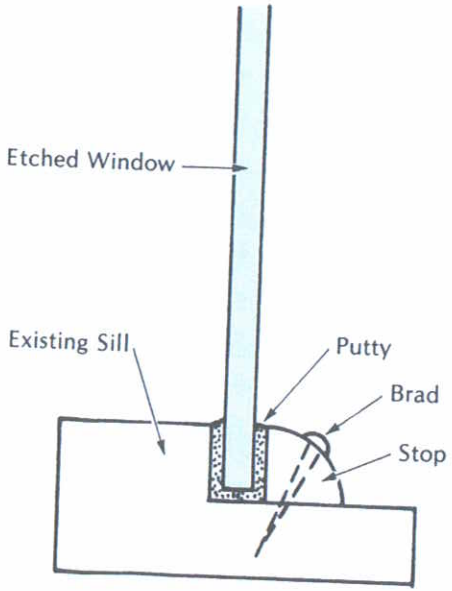


Fig. 2

HANGING THE ETCHED PANEL

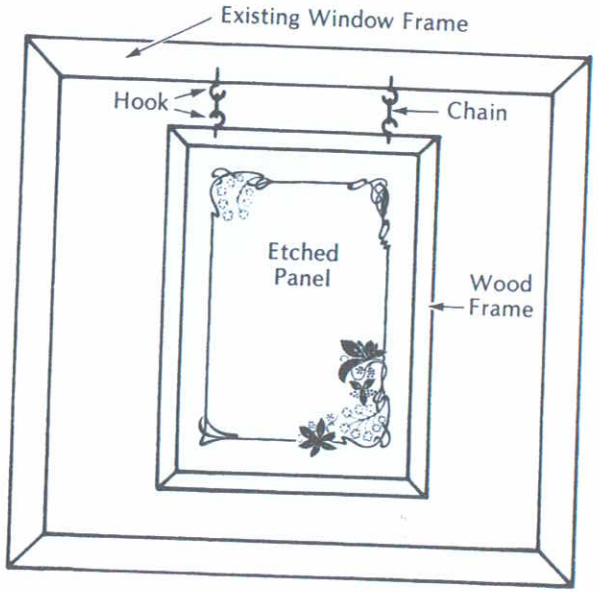
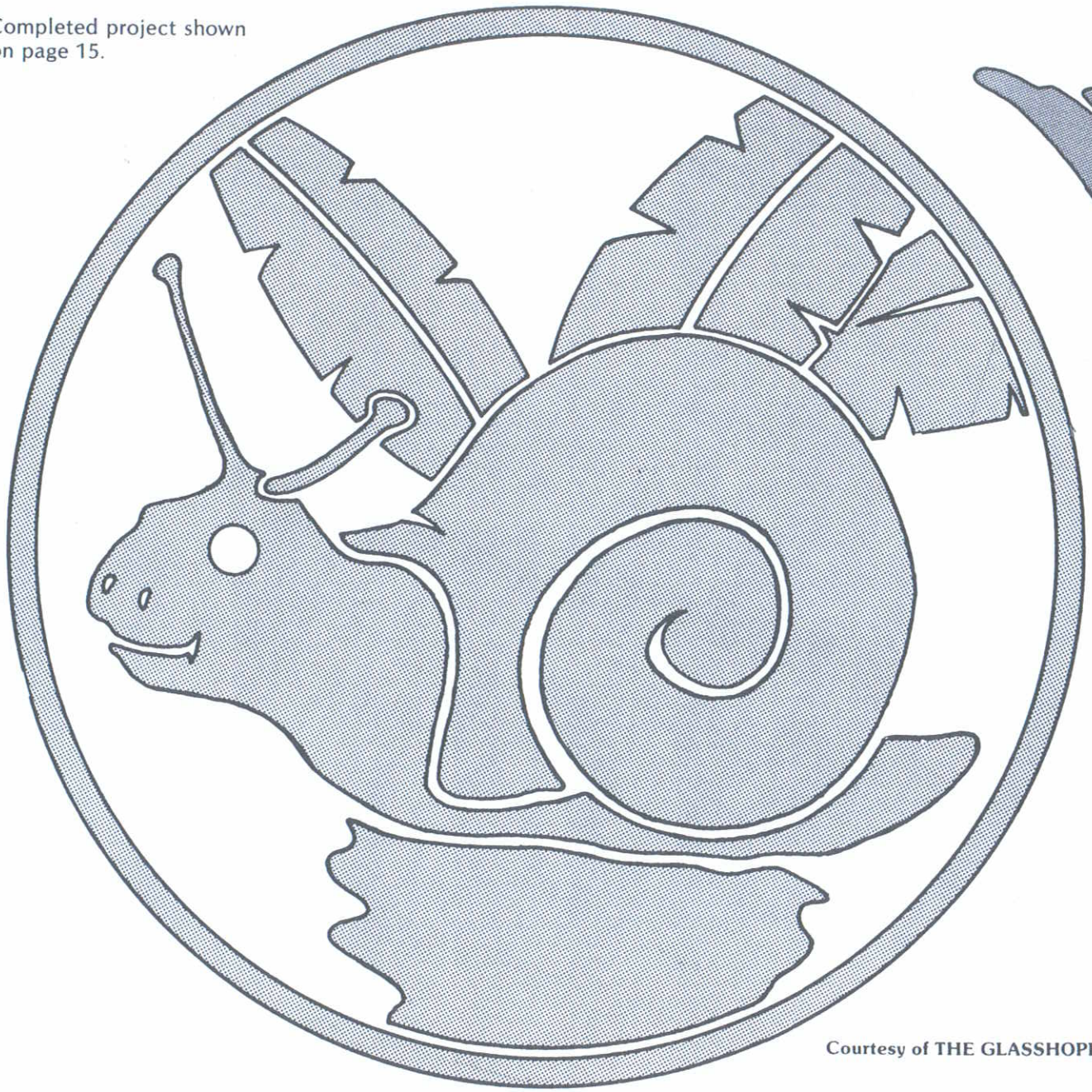
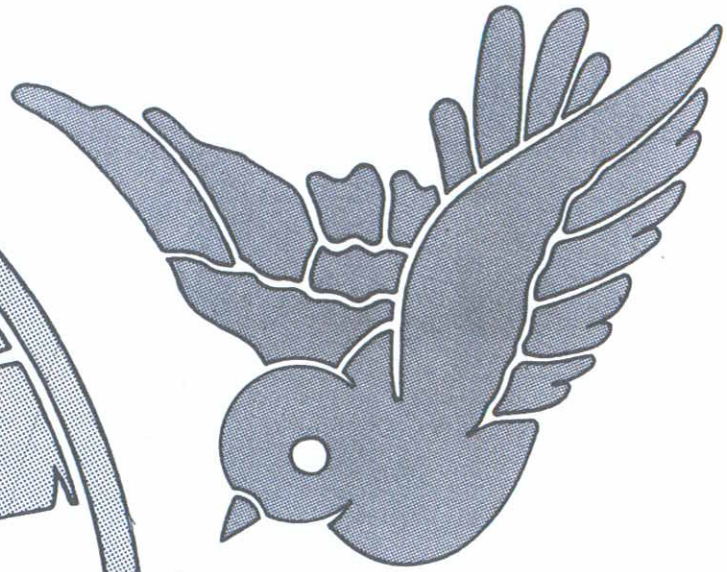


Fig. 3

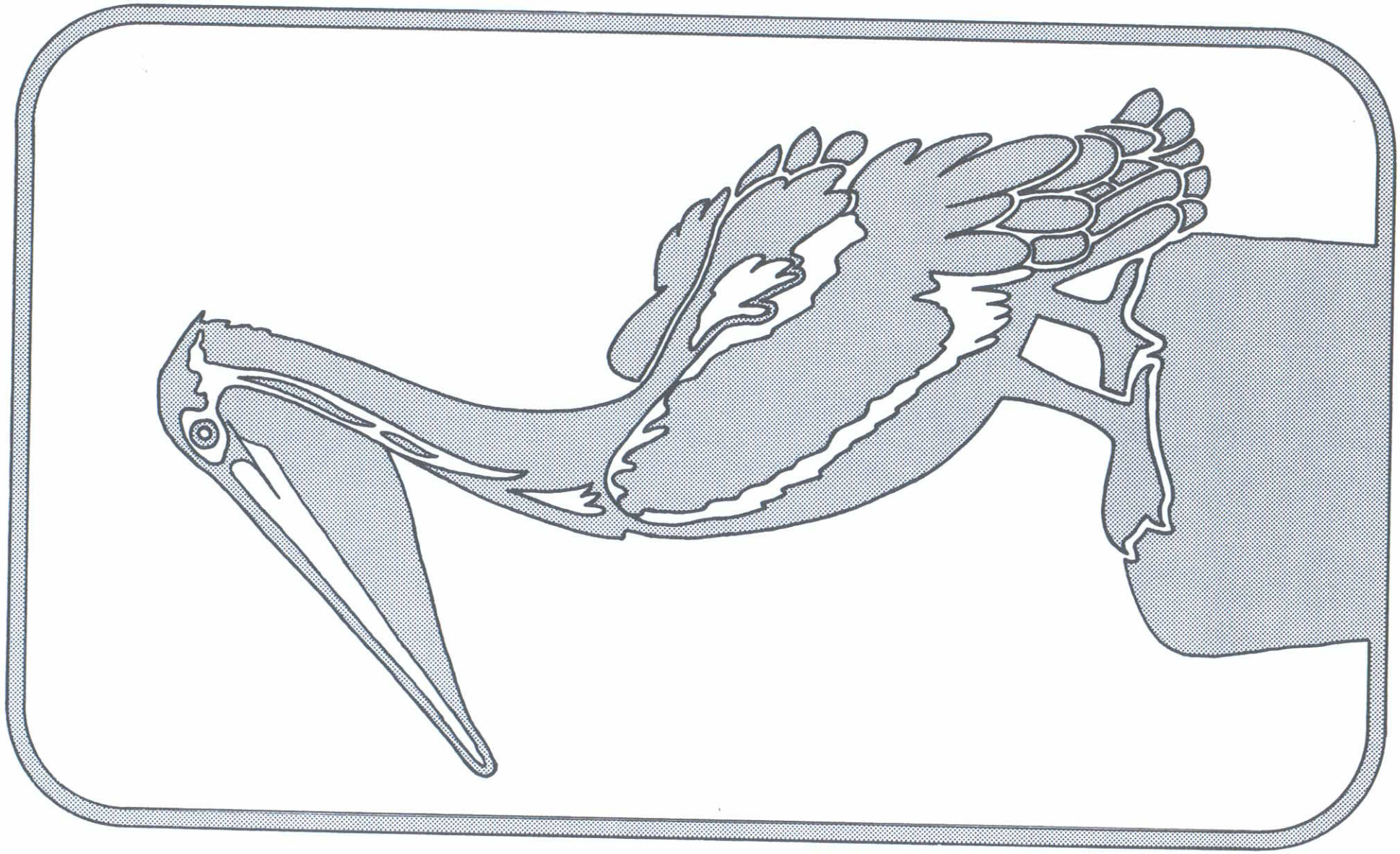
Completed project shown on page 15.

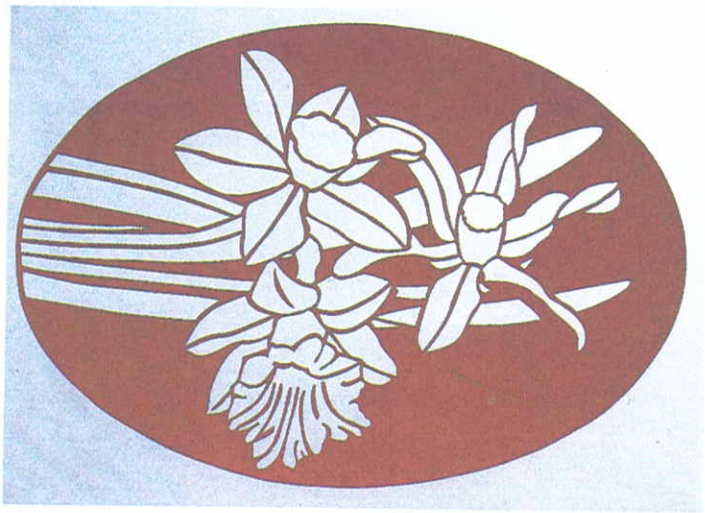




Completed project shown on page 26.

Courtesy of THE GLASSHOPPER, Stanton, CA





Courtesy Glasshopper, Anaheim, CA.

Courtesy Glasshopper, Anaheim, CA.

Glossary

ABRASIVE MATERIAL . . . . . Garnet, aluminum oxide, crystal silica or other sand-like substance used to abrade the surface of glass.

ACID ETCHING . . . . . Method of frosting the surface of glass with acid.

ALUMINUM OXIDE . . . . . Moderate grade abrasive material used for sandblasting.

ANIMAL GLUE . . . . . An old-fashioned glue made from animal hooves, bones and skins used for chipping glass.

BEVEL . . . . . To grind and polish the edges of glass at an established angle.

BLAST CUTTING . . . . . To cut through glass by means of sandblasting.

CARVING . . . . . To sandblast a three dimensional design in glass.

CERIUM OXIDE . . . . . An optical quality polishing compound used in the beveling process to buff out scratches.

COPPER FOIL TECHNIQUE . . A method of assembling stained glass pieces.

COPPER WHEEL ENGRAVING . . . . . A highly specialized method of cutting designs into glass.

CRYSTAL SILICA . . . . . Inexpensive grade abrasive material used for sandblasting.

DESICCANT . . . . . A substance that has a high affinity for water and is used to absorb moisture.

DOUBLE BLAST . . . . . Blasting designs on glass from both sides.

ENGRAVING . . . . . To carve, cut or etch onto glass.

FLASHED GLASS . . . . . Antique glass, usually handblown with two or more separate colors fused together.

GLUE CHIPPING . . . . . A process whereby the glass surface is decoratively chipped with the use of animal glue.

HYDROFLUORIC ACID . . . . . A colorless, corrosive, highly poisonous aqueous solution of hydrogen fluoride, used to etch glass.

NON-RECOVERY SYSTEM . . . A sandblasting set-up, usually a small room or a booth designed to recycle used abrasive material.

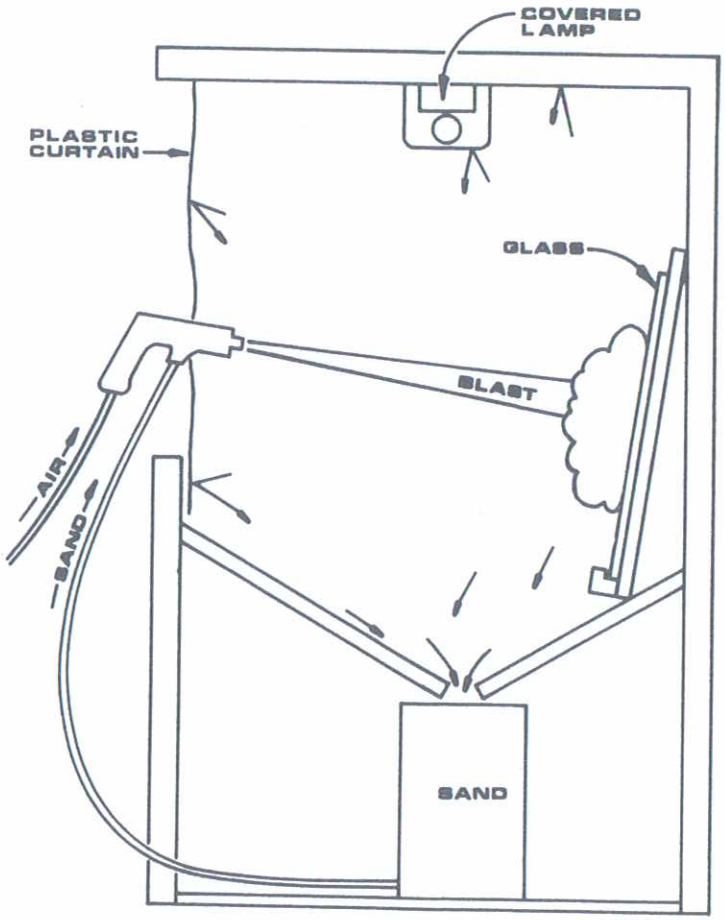
RECOVERY SYSTEM . . . . . A sandblasting set-up, usually a small room or a booth designed to recycle used abrasive material. (See diagram)

RESIST . . . . . A mask or protective covering used to prevent abrasion from sandblasting or acid etching.

SANDBLASTING . . . . . A blast of air carrying sand at high velocity to etch glass surface.

SILICON CARBIDE . . . . . A bluish-black crystalline compound, one of the hardest known compounds, used for sandblasting.

STAGE BLASTING . . . . . Sandblasting a design to two or more different and distinct depths.



SIMPLE SANDBLASTING BOOTH WITH RECOVERY SYSTEM

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