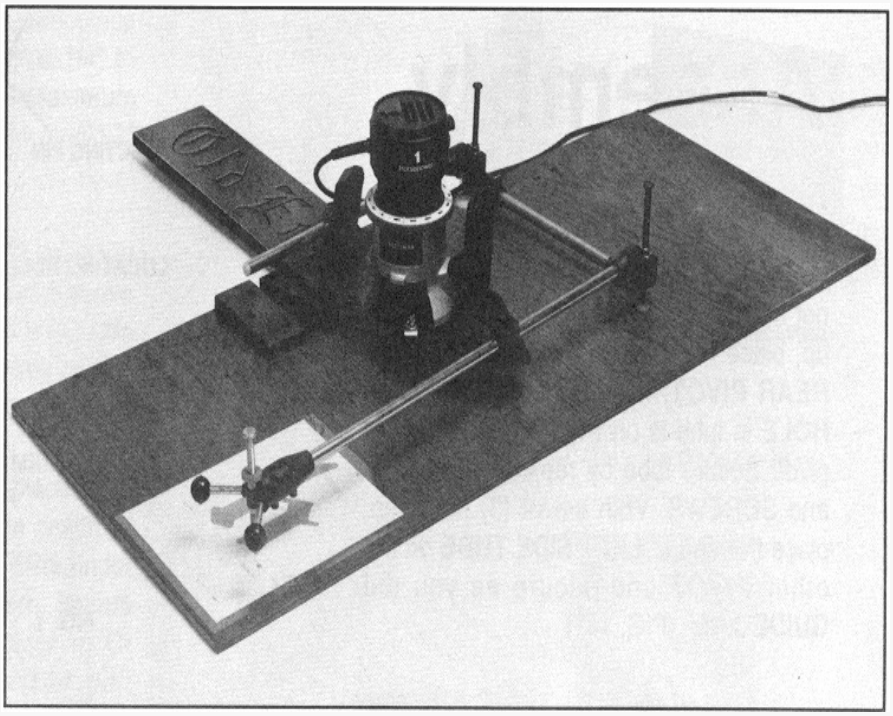
Owner's Manual

MILESCRAFT®

Always the Better Idea.

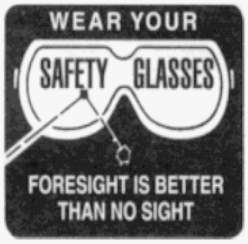
3D-Pantograph

Model No. 1298



Caution:
Before using this product, read this manual and follow all its Safety Rules and Operating Instructions.

- Safety
- Assembly
- Operation



Power Tool Safety Rules

⚠ WARNING **Read and understand all instructions**. Failure to follow all instructions listed below, may result in electric shock, fire and/or serious personal injury.

SAVE THESE INSTRUCTIONS

Work Area

Keep your work area clean and well lit. Cluttered benches and dark areas invite accidents.

Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust. Power tools create sparks which may ignite the dust or fumes.

Keep by-standers, children, and visitors away while operating a power tool. Distractions can cause you to lose control.

Electrical Safety

Double Insulated tools are equipped with a polarized plug (one blade is wider than the other.) This plug will fit in a polarized outlet only one way. If the plug does not fit fully in the outlet, reverse the plug. If it still does not fit, contact a qualified electrician to install a polarized outlet. Do not change the plug in any way. Double Insulation ⧈ eliminates the need for the three wire grounded power cord and grounded power supply system. Before plugging in the tool, be certain the outlet voltage supplied is within the voltage marked on the nameplate. Do not use "AC only" rated tools with a DC power supply.

Avoid body contact with grounded surfaces such as pipes, radiators, ranges and refrigerators. There is an increased risk of electric shock if your body is grounded. If operating the power tool in damp locations is unavoidable, a Ground Fault Circuit Interrupter must be used to supply the power to your tool. Electrician's rubber gloves and footwear will further enhance your personal safety.

Don't expose power tools to rain or wet conditions. Water entering a power tool will increase the risk of electric shock.

Do not abuse the cord. Never use the cord to carry the tools or pull the plug from an outlet. Keep cord away from heat, oil, sharp edges or moving parts. Replace damaged cords immediately. Damaged cords increase the risk of electric shock.

When operating a power tool outside, use an outdoor extension cord marked "W-A" or "W." These cords are rated for outdoor use and reduce the risk of electric shock.

Personal Safety

Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use tool while tired or under the influence of drugs, alcohol, or medication. A moment of inattention while operating power tools may result in serious personal injury.

Dress properly. Do not wear loose clothing or jewelry. Contain long hair. Keep your hair, clothing, and gloves away from moving parts. Loose clothes, jewelry, or long hair can be caught in moving parts. Keep handles dry, clean and free from oil and grease.

Avoid accidental starting. Be sure switch is "OFF" before plugging in. Carrying tools with your finger on the switch or plugging in tools that have the switch "ON" invites accidents.

Remove adjusting keys or wrenches before turning the tool "ON". A wrench or a key that is left attached to a rotating part of the tool may result in personal injury.

Do not overreach. Keep proper footing and balance at all times. Proper footing and balance enables better control of the tool in unexpected situations.

Use safety equipment. Always wear eye protection. Dust mask, non-skid safety shoes, hard hat, or hearing protection must be used for appropriate conditions.

Tool Use and Care

Use clamps or other practical way to secure and support the workpiece to a stable platform. Holding the work by hand or against your body is unstable and may lead to loss of control.

Do not force tool. Use the correct tool for your application. The correct tool will do the job better and safer at the rate for which it is designed.

Do not use tool if switch does not turn it "ON" or "OFF". Any tool that cannot be controlled with the switch is dangerous and must be repaired.

Disconnect the plug from the power source before making any adjustments, changing accessories, or storing the tool. Such preventive safety measures reduce the risk of starting the tool accidentally.

Store idle tools out of reach of children and other untrained persons. Tools are dangerous

in the hands of untrained users.

Maintain tools with care. Keep cutting tools sharp and clean. Properly maintained tools, with sharp cutting edges are less likely to bind and are easier to control. Any alteration or modification is a misuse and may result in a dangerous condition.

Check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the tools operation. If damaged, have the tool serviced before using. Many accidents are caused by poorly maintained tools. Develop a periodic maintenance schedule for your tool.

Use only accessories that are recommended by the manufacturer for your model. Accessories that may be suitable for one tool, may become hazardous when used on another tool.

Service

Tool service must be performed only by qualified repair personnel. Service or maintenance performed by unqualified personnel could result in a risk of injury. For example: internal wires may be misplaced or pinched, safety guard return springs may be improperly mounted.

When servicing a tool, use only identical replacement parts. Follow instructions in the Maintenance section of this manual. Use of unauthorized parts or failure to follow Maintenance Instructions may create a risk of electric shock or injury. Certain cleaning agents such as gasoline, carbon tetrachloride, ammonia, etc. may damage plastic parts.

Safety Rules for Routers

Hold tool by insulated gripping surfaces when performing an operation where the cutting tool may contact hidden wiring or its own cord. Contact with a "live" wire will make exposed metal parts of the tool "live" and shock the operator. If cutting into existing walls or other blind areas where electrical wiring may exist is unavoidable, disconnect all fuses or circuit breakers feeding this worksite.

Always make sure the work surface is free from nails and other foreign objects. Cutting into a nail can cause the bit and the tool to jump and damage the bit.

Never hold the workpiece in one hand and the tool in the other hand when in use. Never place hands near or below cutting surface. Clamping the material and guiding the tool with both hands is safer.

Never lay workpiece on top of hard surfaces, like concrete, stone, etc... Protruding cutting bit may cause tool to jump.

Always wear safety goggles and dust mask. Use only in well ventilated area. Using personal safety devices and working in safe environment reduces risk of injury.

After changing the bits or making any adjustments, make sure the collet nut and any other adjustment devices are securely tightened. Loose adjustment device can unexpectedly shift, causing loss of control, loose rotating components will be violently thrown.

Never start the tool when the bit is engaged in the material. The bit cutting edge may grab the material causing loss of control of the cutter. **Always hold the tool with two hands during start-up**. The reaction torque of the motor can cause the tool to twist.

The direction of feeding the bit into the material is very important and it relates to the direction of bit rotation. When viewing the tool from the top, the bit rotates clockwise. Feed direction of cutting must be counter-clockwise. NOTE: inside and outside cuts will require different feed direction, refer to section on feeding the router. Feeding the tool in the wrong direction, causes the cutting edge of the bit to climb out of the work and pull the tool in the direction of this feed.

Always use the tool with the depth guide securely attached and positioned flat against material being cut. The guide securely positioned on the material improves the stability and control of your tool.

Never use dull or damaged bits. Sharp bits must be handled with care. Damaged bits can snap during use. Dull bits require more force to push the tool, possibly causing the bit to break.

Never touch the bit during or immediately after the use. After use the bit is too hot to be touched by bare hands.

Never lay the tool down until the motor has come to a complete standstill. The spinning bit can grab the surface and pull the tool out of your control.

Do not use the tool for drilling purposes. This tool is not intended to be used with drill bits.

Never use bits that have a cutting diameter greater than the opening in the base.

Assembly

1. Locate the **REAR TUBE ASSEMBLY** and remove the two **PIVOT CAPS** which are not holding a tube. With set of **(3) HOLES** up, place the end of the **GUIDE ARM** on **REAR PIVOT**, making sure **LOCATING HOLE** in tube is on **PROJECTING PIN** of pivot. Secure tube by replacing pivot cap and **SCREWS**. With set of (3) holes up, place the end of **LEFT SIDE TUBE** on the other **PIVOT** and secure as you did **GUIDE ARM**. (FIG. 1)

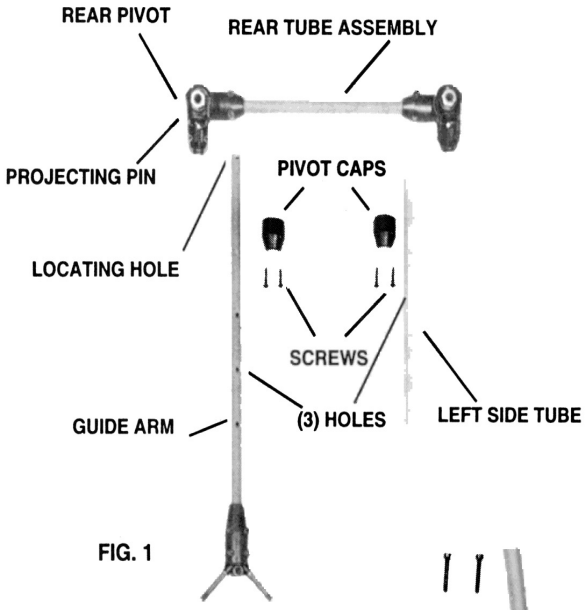
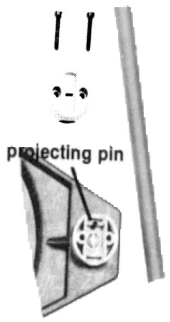


FIG. 1

2. Turn the assembly over. Rotate **ADAPTER PIVOTS** so half circle seats are in position to accept tubes. **ADAPTER PIVOTS** are fastened to **ROUTER ADAPTER PLATE**.

NOTE: Both projecting pins must be toward rear tube assembly.

Place **GUIDE ARM** in right side adapter pivot with projecting pin in center hole. Secure in place with **PIVOT CAP**, **SCREWS** and **NUTS**. Slide nuts in slots of adapter pivot, see drawing Figure 2B. Place left side tube in left side adapter pivot with projecting pin in center hole. Secure as you did guide arm. (FIG. 2)



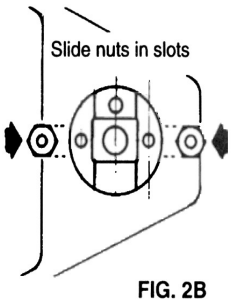


FIG. 2B

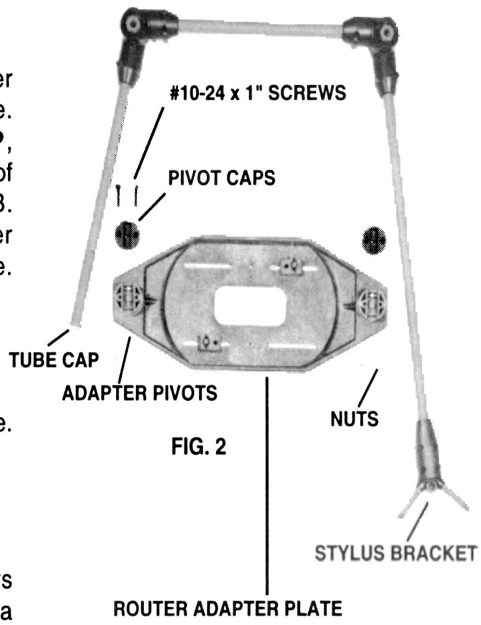


FIG. 2

3. Press **TUBE CAP** in end of left side tube. (FIG. 2)

4. Assemble **THUMB NUT** three quarters of the way on **STYLUS**. Stylus has a nylon tip. Hold hex nut (3/8-16) up under **STYLUS BRACKET** and assemble stylus through stylus bracket and thread through hex nut. Secure with thumb nut. (FIG. 3)

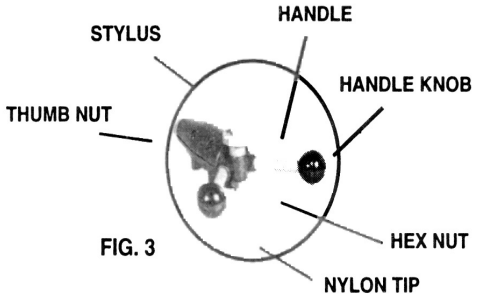


FIG. 3

5. Screw the two **HANDLE KNOBS** on **HANDLES**.

6. Screw a **3/8-16 HEX NUT** on both of the **REAR SUPPORT SCREWS**. Assemble both screws through the **REAR PIVOT BOLTS** until the ball end protrudes 1/2". Snap **SLIDE BUTTON** on ball of screw which is on guide arm side. (FIG. 4) Snap **HOLD DOWN SOCKET** on ball of screw which is on left side. (FIG. 5)

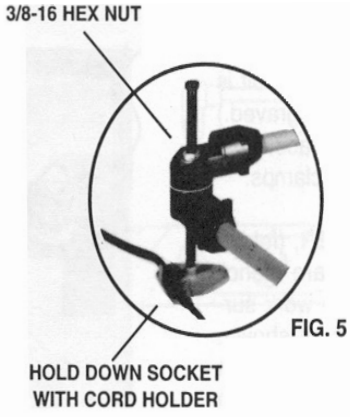


FIG. 5

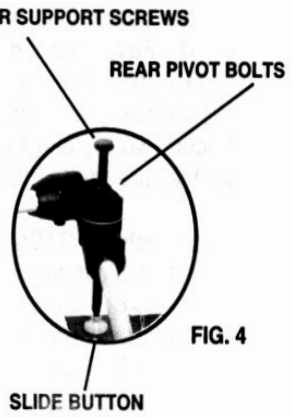
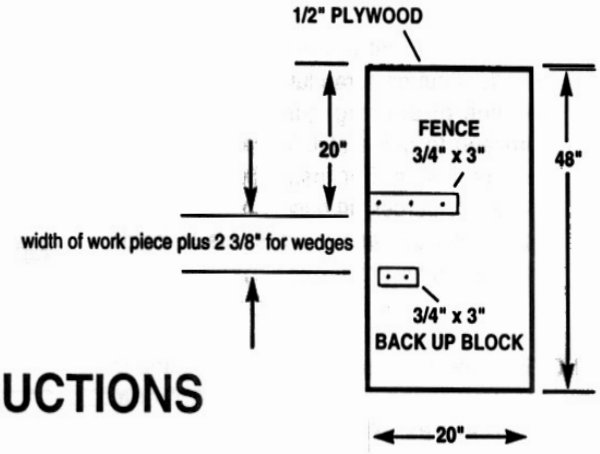


FIG. 4

7. This **ROUTER PANTOGRAPH** can be used for engraving designs, animals, signs and other flat work, also three dimensional wood sculpturing. These can be done on a workbench or table. **We recommend a plywood fixture** for using with the work holding **WEDGES** supplied. This fixture will save time, especially when making signs, and is a handy way to store the unit on the workshop wall, set up and ready to use. See drawing to right.



OPERATING INSTRUCTIONS

8. **Take one of the line drawing template sheets supplied in the stencil set and engrave in redwood as your first project.** This is the best way to learn about the unit and get a feel for its use. We recommend the V-groove bit for line drawings. Install the bit in the router collet leaving it above the router base. Adjust depth when ready to cut.

9. Place router in the center of adapter plate, with cord to the rear. Secure router in place using **CARRIAGE BOLTS, ROUTER CLAMPS, WASHERS** and **WING NUTS**. (FIG. 6) Place **ROUTER CORD** in **CORD HOLDER** allowing some slack. (FIG. 5)

10. Lay **WORK PIECE** on work surface. (Fixture described in step 7 or workbench). Place adapter plate on work piece, with router bit on center of location to be engraved. Adjust hold down socket down to work surface by turning support screw. When left side tube is parallel to work surface, lock support screw with nut.

11. Adjust support screw on guide arm corner until guide arm is parallel. Now left side tube and guide arm are parallel to work bench. Secure in place with nut.

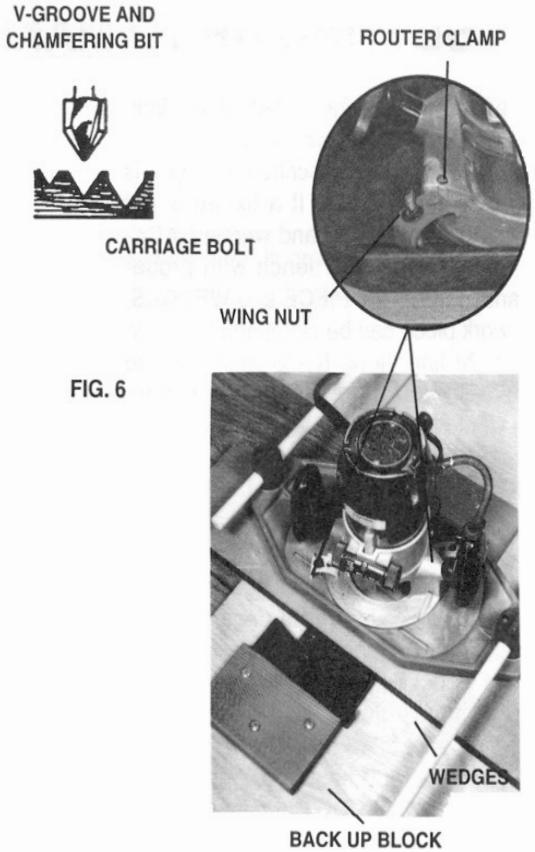


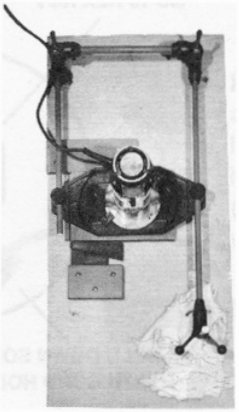
FIG. 6

12. Square pantograph frame so corners are at 90°. Fasten hold down socket to work surface through three holes. (Router bit is still on center of location to be engraved.) Secure work piece to work surface. Use wedges provided (FIG. 6) or C-clamps.

13. Place center of **STENCIL COVER**, (folded edge to left) under stylus (square stencil cover to work piece). Fasten to work surface with tacks in two corners as shown. Locate **TEMPLATE SHEET** between leaves of stencil cover, all the way in against fold and up against stem of tack. (FIG. 7) Adjust stylus down to within 1/32" of stencil cover. Stylus should not drag against stencil cover.

14. Adjust router bit to desired depth, check depth of cut on scrap lumber. Place stylus on line of drawing, turn router on and proceed to guide stylus over lines using handle knobs. For inside lines not connected to border, lift handle bar until cutter is out of wood and move stylus to inside line, let cutter down gently, placing stylus on line.

NOTE: Refer to Helpful Hints on last page to finish the engraving. Additional features section explains how to change ratio of reduction from stencil to engraving.



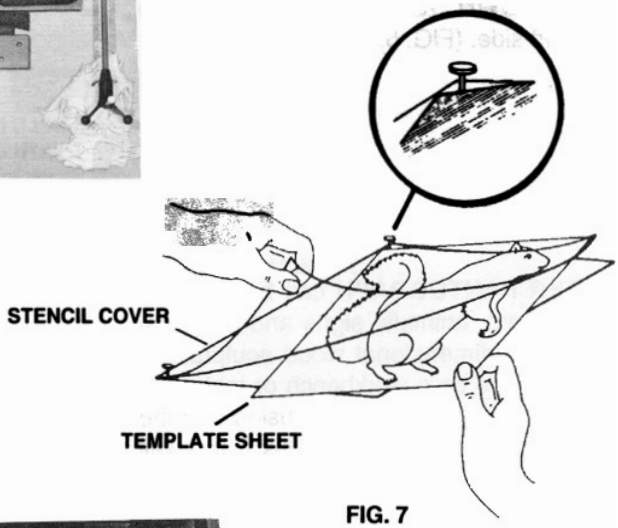
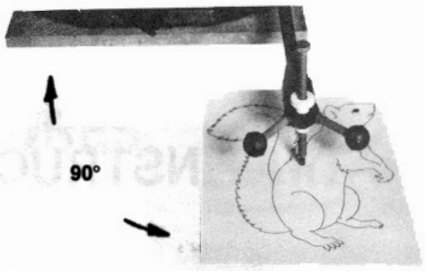


FIG. 7

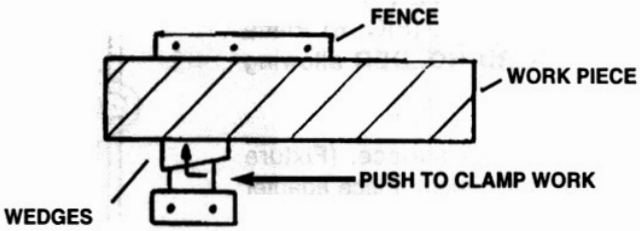


SETTING UP TO MAKE SIGNS

(Read steps 7 through 14 before starting!)

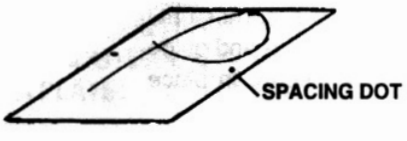
15. The plywood fixture described in step 7 is helpful to make signs. If a fixture is not used, mount a **FENCE** and wedge **BACK-UP BLOCK** on work bench with proper distance for **WORK PIECE** and **WEDGES**. The work piece can be clamped and slid in a straight line along fence while making signs. (Be sure fence is always thinner than work piece.)

signs in 5 styles



MAKING SIGNS USING CAPITAL LETTERS
"Modern Writing" Style

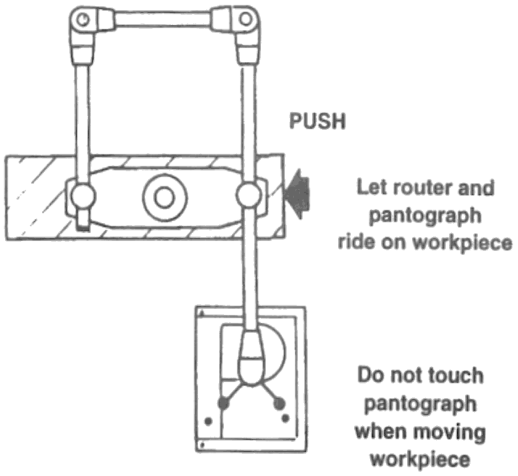
16. Locate stencil of first letter against inside fold of stencil cover and up against tack. (Locating each stencil the same results in straight work.) Be sure cutter bit is on center of work board when stylus is on center of stencil sheet. Rout first letter. Switch router off. Pick up handle bar and place stylus on **SPACING DOT** at right of stencil sheet, allowing bit cutter to rest on wood. (This properly spaces letters.)



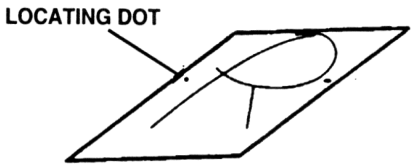
17. Remove stencil of letter just routed and place stencil of next letter in place. Loosen work piece and move work piece to left. Router and Pantograph will ride on work piece until stylus is on **LOCATING DOT**. Reclamp work piece.

18. Pick up handle bar and place stylus guide on line of stencil. Switch router on and proceed. (Repeat until sign is completed.)

    When going from capital to small letter, space to desired distance.



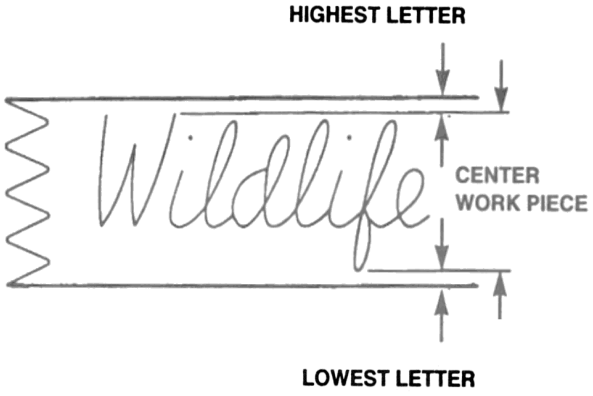
MAKING SIGNS USING SMALL LETTERS
"Modern Writing" Style



19. Pick out letters you are going to use and find those which come nearest top and bottom of stencil. Use these to locate word in **CENTER OF WORK PIECE**.

    Place router bit cutter on center of work piece. Locate center of highest and lowest letter under stencil cover with stylus on center distance. Relocate stencil cover if necessary.

    Rout highest and lowest letters on scrap lumber to make sure your work will be in center of work board.



20. Remove highest and lowest letter and locate first stencil against inside fold of stencil cover and up against tack. Rout first letter. Switch router off. **(Leave bit cutter in groove.)**

21. Remove stencil just routed and locate next stencil in place. **(Leave bit cutter in groove.)**

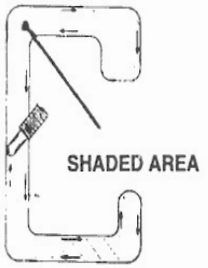
Push work piece (with bit cutter in groove) carrying router.

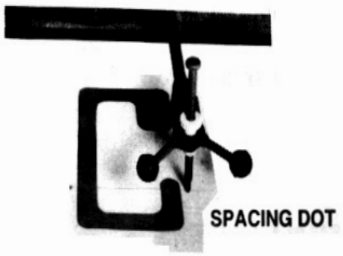
22. Loosen work piece and move work piece to left until stylus is on **STARTING POINT**. Reclamp work piece. Switch router on and proceed. (Repeat until sign is completed.)

OTHER FOUR STYLES

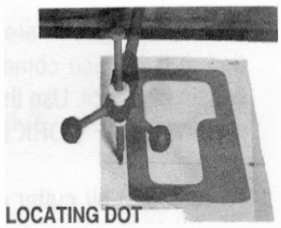
23. To rout a sign using "Old English", "Script", "Computer", or "Far East" follow same method as capital letters of "Modern Writing", (Step 16-17-18) for set up and spacing between letters. Use a flat bottom router bit (1/8" diameter works good). No need to rout deep.

24. Turn router on and guide stylus around letter keeping stylus on inside edge of letter. After bordering the letter,remove **SHADED AREA** of letter with a series of short strokes being careful not to touch the edges of the engraved border. (Guide the unit using handle knobs while watching the cutter, when routing center shaded area away.) Turn router off. Pick up handle bar and place stylus on **SPACING DOT** at right of stencil sheet, allowing cutter to rest on wood. (This properly spaces letters.)



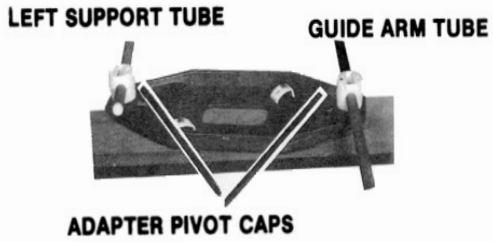


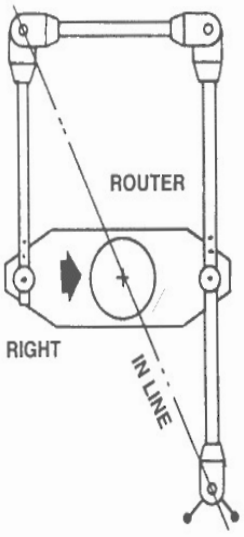
Remove stencil of letter just routed and place next stencil in place. Loosen work piece and move to left carrying router until stylus is on **LOCATING DOT.** Reclamp work piece.



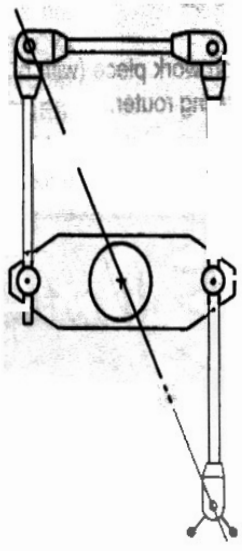
ADDITIONAL FEATURES

The pantograph has three settings which gives different ratios of reduction from stencil to engraving. Ratio is adjusted by removing **ADAPTER PIVOT CAPS** on both sides of adapter plate and adjusting **GUIDE ARM TUBE** and **LEFT SUPPORT TUBE** to the proper locating hole. Locate router on adapter plate so router cutter is **IN LINE** with stylus and **PIVOT CORNER**.

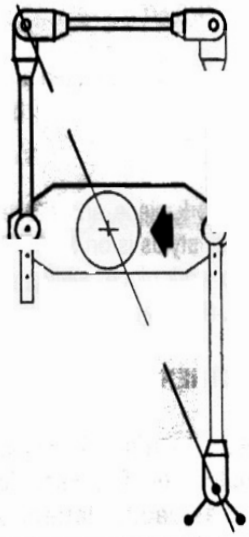




FOR 40% REDUCTION, ASSEMBLE ADAPTER PIVOT CAPS IN FRONT HOLES IN TUBES WITH ROUTER TO RIGHT OF ADAPTER PLATE.



FOR 50% REDUCTION, ASSEMBLE ADAPTER PIVOT CAPS IN CENTER HOLES IN TUBES WITH ROUTER ON CENTER OF ADAPTER PLATE.



FOR 60% REDUCTION, ASSEMBLE ADAPTER PIVOT CAPS IN REAR HOLES IN TUBES WITH ROUTER TO LEFT SIDE OF ADAPTER PLATE.

THREE DIMENSIONAL ENGRAVING

25. After selecting a pattern you will need a work piece thick enough to accept the engraving plus 1/4" to 1/2". (Redwood is very easy to rout.) Maximum pattern size you can use is 1 1/4" thick and 13" high by 24" long.

26. The 1/8" veining router bit is needed to get good detail in 3D routing. Install cutter leaving it above router base. (Veining bit has a spherical end.) (We recommend removing the router base plate so you can see the cutter as the image is sculptured.)

27. With tube frame at 90° (see step 12) place work piece under adapter plate with cutter on center of location to be engraved. Locate **PATTERN** under stylus with stylus on the center of pattern. Secure work piece to work surface with wedges or C-clamps. Secure pattern to work surface with screws or other clamps.

28. Back off stylus and both rear support screws until adapter plate is flat on work piece. Adjust both rear support screws down toward workbench until rear edge of adapter plate is off work piece by 1/8". Readjust **only** the support screw on the guide arm side up until slide button leaves work bench by 1/4". Secure both rear support screws with hex nuts.

29. Place stylus on **LOW POINT** of pattern. Adjust stylus down against pattern until front edge of adapter plate is 1/8" off work piece **(adapter plate is completely off work piece.)** Secure stylus with thumb nut.

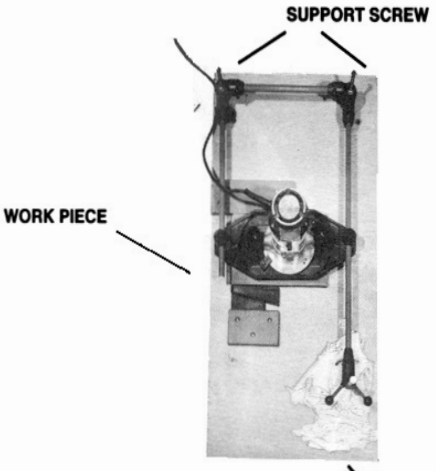
Place stylus on high point of pattern. Adjust router cutter down to workpiece (just touches).

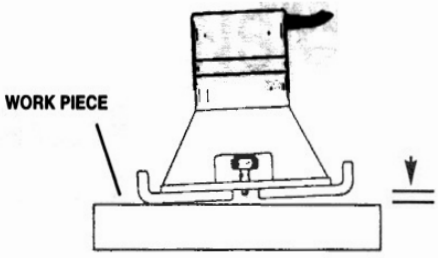
EASY DOES IT

30. **After reading helpful hints** you are ready to route a 3D sculpture. A 6" x 6" pattern will take a couple of hours to complete. The stylus will have to touch every place on the pattern. Move the stylus with an even feed and along grain lines of the pattern.

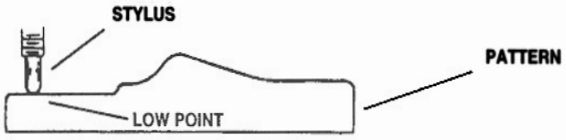
PLASTER PATTERN

FINISHED ENGRAVING

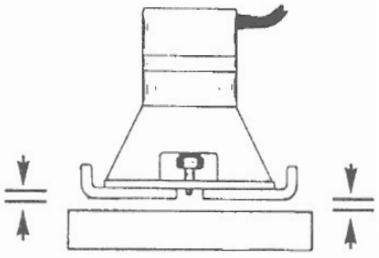




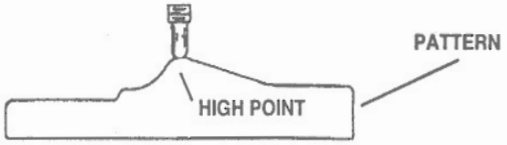
Rear of adapter plate is lifted by rear support screw (step 28)



ADAPTER PLATE IS COMPLETELY OFF WORK PIECE WHEN STYLUS IS ON LOW POINT OF PATTERN.



Front of adapter plate is lifted by stylus (step 29)



HELPFUL HINTS

- Rest your forearm on bench for better control.

- Easy way to finish a sign or line engraving. Paint entire board with quick drying black enamel. (Aerosol can is handy.) Plane off surface of sign, using small plane or rasplane (not sandpaper). This leaves paint in each letter.

- Children's color books have a wide selection of line drawings of all types for imagination.

3D ENGRAVINGS

—Start routing at the highest point and work your way down to the lower places. Avoid leaving tall thin sections because they will chip away easily.

—Avoid letting the stylus fall off ledges but let the stylus down gently under control over irregular surfaces.

—Suggested way to finish a 3D engraving is to **lightly** burn the surface with a torch to bring out detail and then stain or varnish.