Disclaimer

This Old Workshop, in cooperation with Delta Power Equipment Corporation ("Delta"), is delighted to provide this digital reissuing of the historic *Deltagrams* produced from the 1930s through the 1970s. Each issue is presented by permission of Delta, and distributed and archived by This Old Workshop. The *Deltagram* publications are copyrighted materials. Delta is the sole owner of these publications. Reproduction of any articles, images or instructions contained in them requires the express written permission of Delta or its legal representative.

These Deltagram publications are presented solely as historic archival materials and are not intended to be used as instructional information. Techniques and practices described or depicted in these publications may no longer be consistent with accepted practice, and, in some cases, may be considered hazardous with a potential to result in serious personal injury or property damage. For the safety of you and those around you, we encourage you to comply with all warnings and instructions provided in connection with your products, including but not limited to any warning labels and operator manuals.

By using or possessing these *Deltagram* publications, you agree to hold Delta and This Old Workshop harmless against any liability based upon their content. Any advertisements or offers contained within these issues are discontinued and will not be honored.

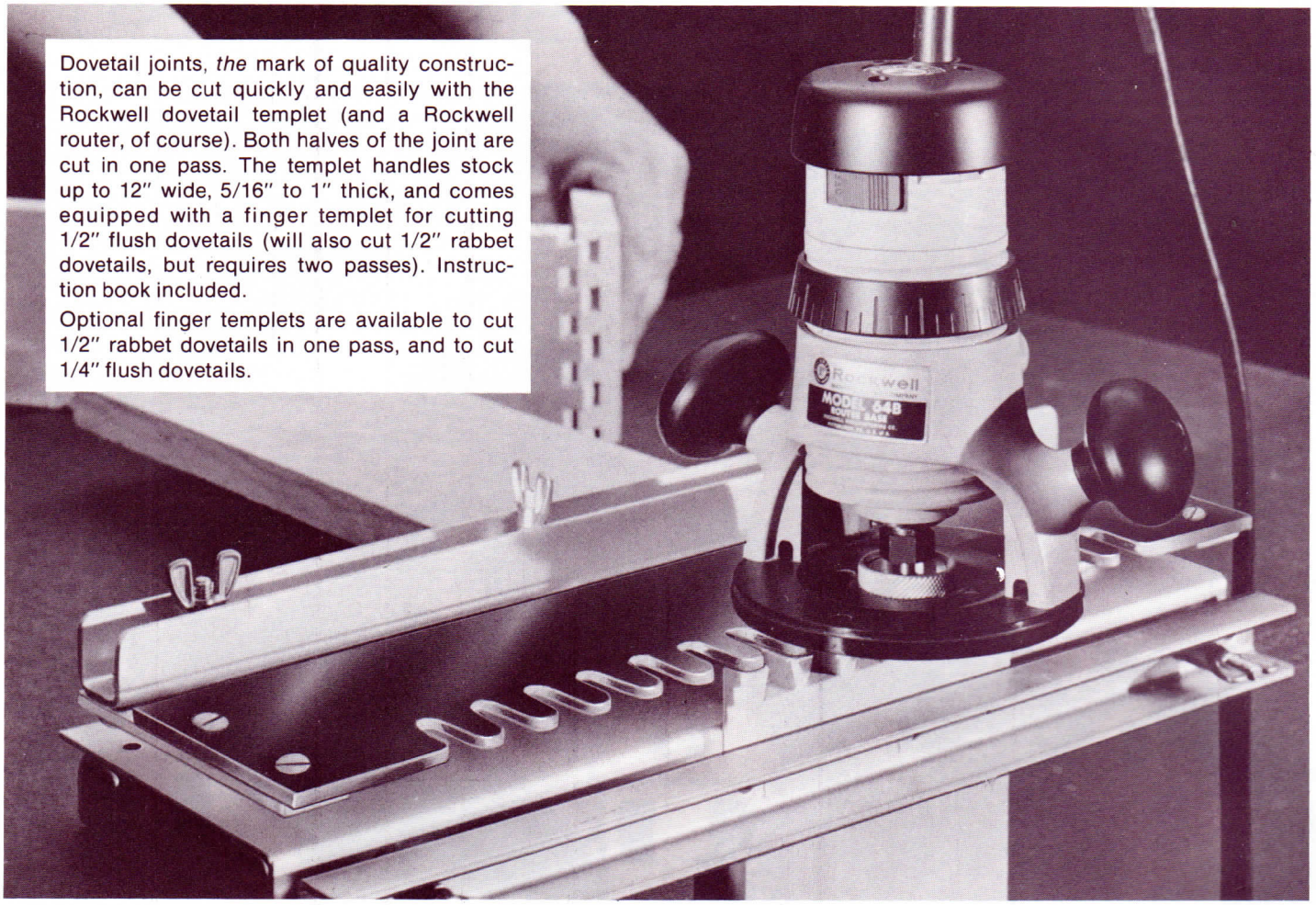
flying chips

MAY-JUNE 1972

Shaker village in Hancock, Massachusetts. Woodcut from an 1839 engraving by John Warner Barber.

BEGINNING A SERIES ON SHAKER FURNITURE

TO GIVE YOUR WORK A PROFESSIONAL TOUCH . . .



Dovetail joints, *the* mark of quality construction, can be cut quickly and easily with the Rockwell dovetail templet (and a Rockwell router, of course). Both halves of the joint are cut in one pass. The templet handles stock up to 12" wide, 5/16" to 1" thick, and comes equipped with a finger templet for cutting 1/2" flush dovetails (will also cut 1/2" rabbet dovetails, but requires two passes). Instruction book included.

Optional finger templets are available to cut 1/2" rabbet dovetails in one pass, and to cut 1/4" flush dovetails.

TO CUT 1/2" FLUSH DOVETAILS (ALSO CUTS 1/2" RABBET DOVETAILS IN TWO PASSES)

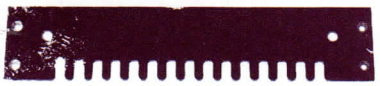
Model 5008 Dovetail Templet $29.95
Comes equipped with No. 10 DT finger templet
No. PR139Y Dovetail Accessory Kit . . . . . $ 4.95
Includes DT416J 1/2" dovetail bit, B93 templet guide, and 140-17 lock nut.

TO CUT 1/4" FLUSH DOVETAILS

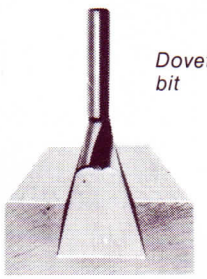
Model 5008 Dovetail Templet $29.95
No. 11 DT Finger Templet . . . . . $ 6.70
No. DT408J 1/4" Dovetail Bit . . . . . $ 3.10
No. B116 Templet Guide . . . . . $ 1.50
No. 140-17 Lock Nut . . . . . $ .50

TO CUT 1/2" RABBET DOVETAILS IN ONE PASS

Model 5008 Dovetail Templet $29.95
No. PR139Y Dovetail Accessory Kit . . . . . $ 4.95
Includes DT416J 1/2" dovetail bit, B93 templet guide, and 140-17 lock nut.
No. 12 DT Finger Templet . . . . . $ 7.25



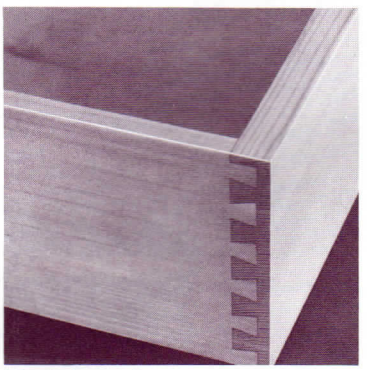
Finger templet



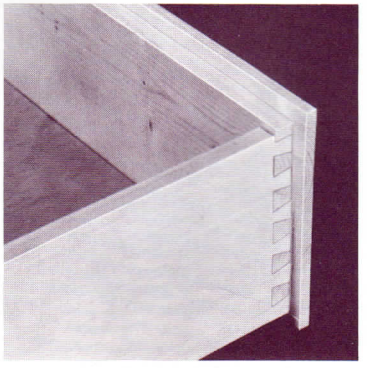
Dovetail bit

Templet guide

Lock nut



Flush dovetail



Rabbet dovetail

Rockwell

Rex Moore — Editor
Bill Matthews — Technical Advisor
Jim King — Managing Editor

Vol. 41 Issue No. 3 May-June, 1972

Rates: 30 cents Per Copy
1 year (6 issues) $1.75
3 years (18 issues) $4.00
5 years (30 issues) $6.00

Foreign countries add 50 cents per year extra for postage and handling.

flying chips

This is a Rockwell publication written and edited for the home shop owner by the Power Tool Division of the Rockwell Manufacturing Company.

Every attempt is made to satisfy the needs of the home shop owner for a well rounded selection of project material and crafting tips. The Flying Chips is published six times a year. Subscriptions may be purchased from your authorized Rockwell Power Tool Dealer or direct from the Advertising Department of the Power Tool Division of Rockwell Manufacturing Company, 550 North Lexington Avenue, Pittsburgh, Pa. 15208.

NOTE: When changing your address be sure to give us the expiration date marked on the back cover of the magazine and also your old and new address. Allow four weeks for the first copy to reach you at the new address.

All correspondence regarding projects and editorial material should be addressed to the editor of the Flying Chips, Power Tool Division, Rockwell Mfg. Co., 550 N. Lexington Ave., Pittsburgh, Pa. 15208.

SHAKER FURNITURE AND A WEEKEND TRIP

With this issue, we've started our series on Shaker furniture. The religious philosophy of these people had a profound effect on their furniture designs, so we've included a brief history of the Shakers in hopes that it will help you to understand and enjoy the quiet beauty of their furniture.

Over the Memorial Day Weekend, I took a short trip into East-central Ohio and saw a collection of carvings that are just plain unbelievable. The Warther Museum in Dover, Ohio, contains dozens of models of locomotives and other machines, all hand-carved by Ernest Warther. Made from walnut, ebony, and ivory, the models are beautifully detailed down to the last bolt. I took a batch of pictures; if they turn out, we'll try to find space for a few of them in a future issue. Incidentally, the only power tool I saw in Mr. Warther's shop was an old, but apparently still healthy, Delta drill press. For anyone who is interested in the Shakers and other American communistic societies of the 19th century, the nearby village of Zoar is worth a visit. Many of the original buildings are in good repair, and others have been restored.

I've enjoyed these last few months as editor of FLYING CHIPS more than I can say, thanks in large part to the many readers who have written in praising, criticizing, and helping out with such things as entries for the "Sources Index", photos and letters for the "Reader Comments" section, etc. If you've sent us something for one of these sections and don't see it in this issue, give us another issue or two to get caught up. And thanks!

The praise and criticism we get in your letters is a lot more important than you might think. Praise tells us where we're on the right track. And criticism tells us where we should improve. We probably can't satisfy everybody in 32 pages, but we try. So let us know what you think, good and bad — it's your magazine.

Rex Moore

Rockwell will pay $25 to $50 in merchandise certificates for project ideas used in this publication. Ideas submitted should include photographs of the finished item, and plans or sketches showing construction.

Delta Citation entries should include photos of the entrant, his shop, and as many pieces of his work as possible. Each Citation winner receives a plaque with his name on it and several copies of the Citation article, suitable for framing. Photo tips: black-and-white (not color) snapshots or Polaroids are fine. Avoid cluttered backgrounds. When possible, take pictures outdoors, or indoors in a bright room without flash. If you use flash, avoid straight-on shots of shiny surfaces (the flash will reflect in the photo). Get a little extra space around the subject being photographed. Don't cut off corners, table legs, etc.

TABLE OF CONTENTS

THE SHAKERS

Arthur J. Pulos, FIDSA and Rex Moore

Shaker costumes: Figures 1 and 7 show the worship costume of a man and woman; Figure 2, that of the field and shop laborer; Figure 3, an Elder; Figures 4 and 5, traveling costume; and Figure 6, a half-dress costume. (Harper's Magazine, 1857.)

"Put your hands to work and give your hearts to God" declared Ann Lee, the spiritual leader of the Shakers. This principle inspired both the religious society she founded and one of the most interesting of American traditions in furniture design and construction. Below we offer a brief history of Shaker religion and life not only because we think it's interesting, but also because the beliefs and the way of life of this fascinating people had a profound effect upon their crafts, especially their furniture.

HISTORY AND RELIGION

The Shakers were the first, largest, and most prosperous of the many communitarian societies that sprang up in America in the late 1700's and early 1800's. Virtually all of these societies were founded for religious reasons; most of them were born in Europe and moved to America to escape harassment in their native countries and to find cheap, fertile land.

The "Shaking Quakers" (soon shortened to "Shakers") were named for the spiritual seizures that caused them to tremble violently, whirl, jerk, leap, shout, speak in tongues, and otherwise manifest the "Power of God." The sect began as an offshoot of the Quaker faith, being founded in England about 1747 by Jane and James Wardley. In 1774, eight members emigrated to America and settled at Watervliet, near Albany, New York, under the leadership of Ann Lee. Called "Mother Ann" by her followers, she had joined the sect in 1758 and had risen to a position of leadership by 1770. In 1770, or soon afterwards, it was "revealed" to her that she was Jesus Christ in his second coming, and later revelations inspired the move to America where "the second Christian Church would be established." It should be mentioned that Ann Lee married in 1762, after joining the Shakers, and bore four children, all of whom died in infancy, before she began preaching the doctrine of celibacy that became a central feature of Shaker religion and life.

Beginning about 1780, a general religious revival swept through New York and the New England states. In this climate, the spiritualism and celibacy preached by Mother Ann and her followers won many converts, and several congregations were formed. But it was not until several years after her death in 1784 that the congregations were formally organized into societies founded on communal property and separation from the world.

Rapid growth followed. By 1827, there were 18 Shaker settlements in 7 states (Maine, New Hampshire, Connecticut, Massachusetts, New York, Ohio, and Kentucky), and about 1850 they reached their greatest membership, about 6000 people. After the Civil War the sect declined rapidly due to socioeconomic changes so that by 1900 there were only about 1000 members left. The last major village at Hancock, Massachusetts, was abandoned in 1960 and today there is only a small handful of sisters left at Sabbathday Lake, Maine, and Canterbury, New Hampshire.

In their religious life, the Shakers were not mere spiritualistic dreamers. Indeed, they probably came as close as any large group of people ever has to living practical, useful lives based entirely upon religious conviction. Their creed was based on the twelve Christian "virtues" of Faith, Hope, Charity, Honesty, Continence, Innocence, Simplicity, Meekness, Humility, Prudence, Patience and Thankfulness; and the seven "eternal" laws, Duty to God, Duty to Man, Separation from the World, Practical Peace, Simplicity of Language, Right Use of Property, and a Virgin Life. Among their neighbors, their few hired workers, journalists who visited them, and in their commercial relationships, they had the reputation of living up to these high ideals in full.

Shaker public worship must have been a beautiful and curious thing to behold, judging from reports that spectators crowded the Shaker meeting halls to watch. The central features of their services were a graceful dance or march performed by both men and women; singing of hymns revealed to them, they said, by God; and discourses by their Elders.

"Separation from the world," as interpreted by the Shakers, was a far cry from the isolated, hermit-like existence that the phrase suggests. Newspapers were avidly read, and extensive libraries of nonfiction works were maintained in all their settlements. They were particularly interested in the political and scientific developments of the day, and made good use of the latter as we shall see.

SOCIAL STRUCTURE AND ECONOMY

Within each of their villages, the Shakers were organized into from 2 to 7 families, consisting of from 15 to 80 persons. Men, women, and children lived together under one roof, but strict regulations forbade any contact between the sexes that might lead to "worldly" thoughts or behavior. Each family was ruled in both temporal and spiritual matters by two Elders and two Eldresses; the Shaker creed gave full equality to women in all matters, including authority.

Simplicity, cleanliness, and quiet prosperity characterized the everyday life of the Shakers. Journalists who visited them remarked on the solid construction and spaciousness of all their buildings; the extreme neatness and cleanliness throughout their villages; the excellent, though simple, food they ate; and the complete lack of ornamentation in their buildings, furnishings, and dress.

Honest manual labor was so highly regarded that even Elders and Eldresses, when not occupied

Sister in everyday costume. (Harper's Magazine, 1857.)

with spiritual or administrative duties, engaged in manual occupations. Yet the Shakers did not make work a toilsome, dreary penance. No one had to work more then he cared to, and work assignments were rotated often enough to avoid boredom. They were "not in haste to be rich and they have found that for their support, economically as they live, it is not necessary to make labor painful. Many hands make light work; and where all are interested alike, they hold that labor may be made a pleasure."

In keeping with their cheerful, commonsense attitude toward work, and in true Yankee fashion, they loved all kinds of labor-saving devices, which they both purchased from "the world" and invented themselves. Their most thorough historian, E. D. Andrews, credits them with the invention of Babbitt metal, the circular saw, the common clothes pin, metal pens, flat brooms, and many other improvements in the areas of agricultural, manufacturing, and domestic equipment. Shakers also attended to their own physical comfort through constant improvement of their heating, lighting, and ventilating systems, and their buildings and furniture — no Spartans, these people!

While the mainstay of the Shaker economy was farming, they were also engaged in most of the light manufactures of their day to fill their own requirements and for sale. They were justly famous for the quality of their livestock, garden seeds, produce, furniture, machinery of several kinds, herbs, spices, and extracts; and their goods commanded premium prices in the marketplace.

For the maintenance and growth of their numbers, the celibate Shakers were dependent on converts and orphans. They took in foundling children through most of their history, continuing this practice even when it became apparent that not one in 10 would stay with the society and "make a good Shaker". Perhaps they continued it from purely charitable motives, or perhaps, in part at least, because they felt the presence of children had a healthy effect on the entire community.

FURNITURE

In the furniture they made, the Shakers expressed their beliefs as truly as they did in their religious and social life. Three factors account for the unique art form they created in their furniture: the complete determination to avoid considerations of "beauty", the insistence that their products should be perfectly suited to their purposes, and excellent workmanship.

If a Shaker craftsman heard us describe his products as "beautiful", he would be upset. The Shakers associated beauty with ornament, which they resented as a waste of time and as being, therefore, morally repulsive. Their creed was "let it be plain and simple, of good and substantial quality, unembellished by any superfluencies which add nothing to its goodness or durability." Elder Frederick Evans of the Mount Lebanon, N.Y., society declared that "the beautiful is absurd and abnormal. It has no business with us." Thus, while Shaker furniture evolved from Colonial and essentially rural products, these were stripped of their ornamentation as the Shakers simplified them in construction in order to make them more suitable for their utilitarian purposes.

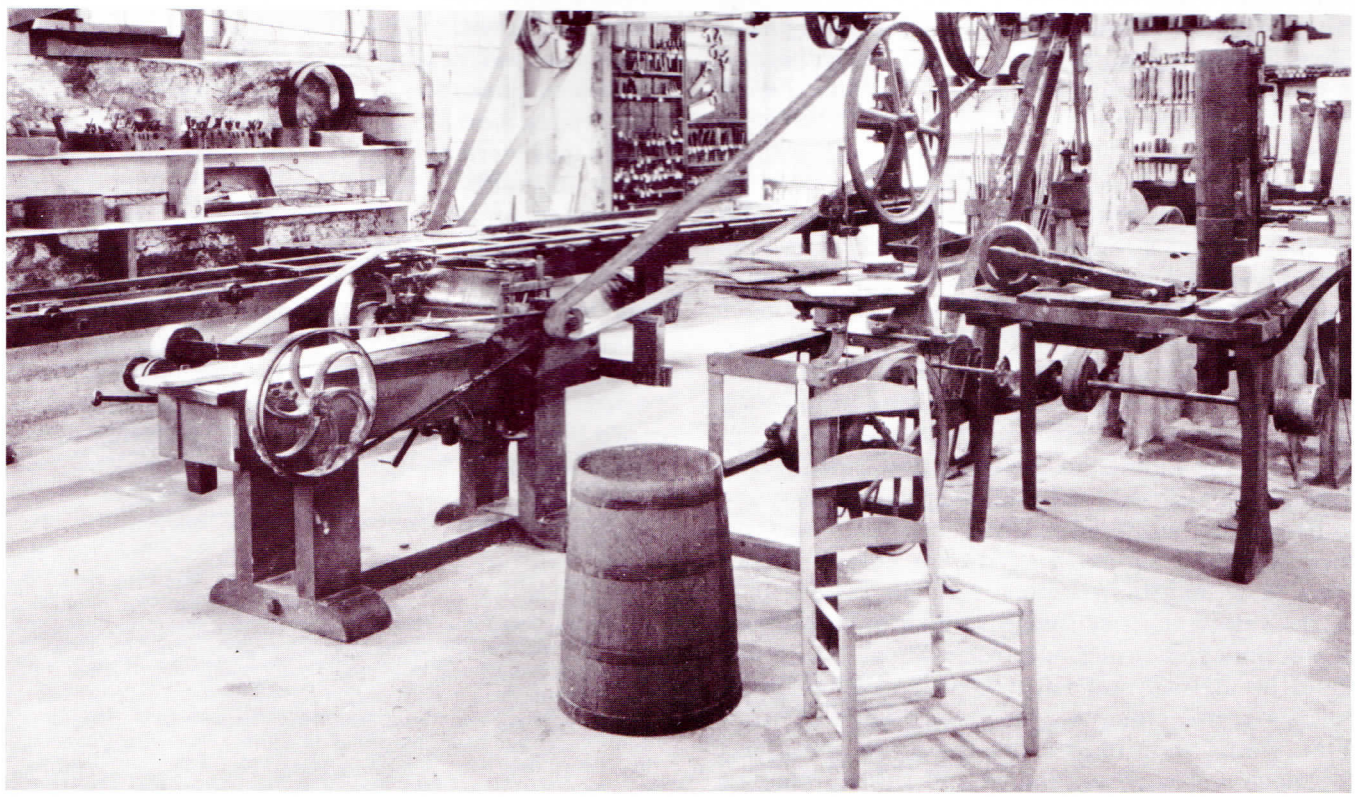
The Shakers insisted that their products should serve their functions as perfectly as possible. Long before the present-day interest in "human factors" they took great pains to adjust the dimensions of their pieces in order to better fit the human beings who would use them. Each form was refined again and again until it had reached absolute perfection in their eyes. Only then could it be reproduced in quantity for their own use or for sale. Joseph Meacham, another Mount Lebanon Elder, admonished the Believers to "seek out forms and techniques which would serve function with economy of means." Elder Meacham spoke more than a century before the words "form follows function" became accepted as the basic principle of modern design.

The solid excellence of their workmanship is almost legendary. All their products, from their livestock and garden seeds to their furniture and housewares, commanded premium prices in the markets of their time. Products for sale "had to pass the inspection of the deacons before they were sent out, whatever was inferior or faulty being retained for domestic or charitable use." (E. D. Andrews, "The People Called Shakers".)

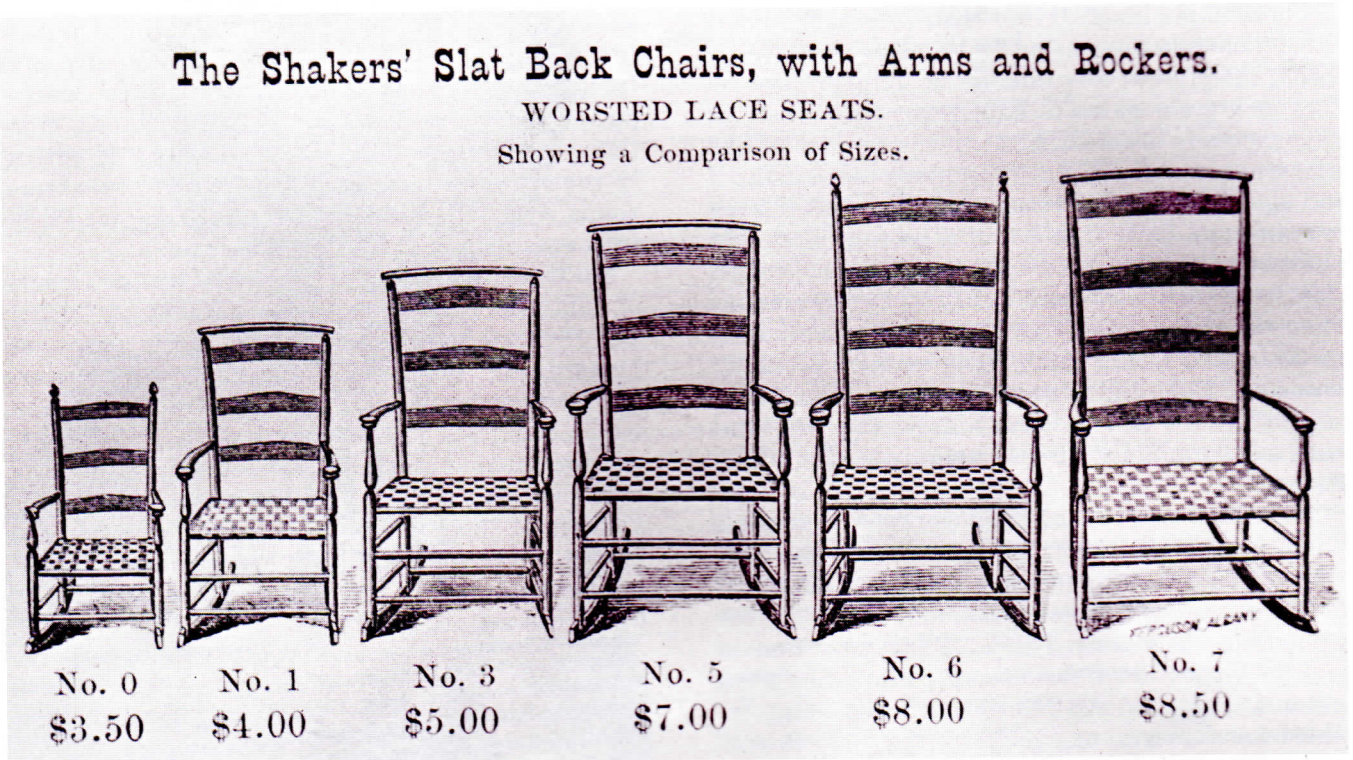
The Shakers did not spare any effort to produce furniture of the finest quality. In the process, they welcomed every new method or machine that would improve the quality of their products. Whenever an opportunity presented itself, they applied their ingenuity to the development of labor-saving devices and invented new machines, including a tongue-and-groove machine, a planer, and treadle-operated scroll saws. They used water-power and pulley systems to operate lathes, mortising machines and other equipment. It is entirely reasonable to believe that if their furniture shops were still in operation today they would be fully equipped with the best power tools.

For their furniture they employed a wide variety of domestic woods much of which they cut, dried, and finished themselves. Maple, birch, pine, oak hickory, ash, butternut, cherry and walnut were all used as the occasion demanded. Thus pine, which could be cut into broad boards, found ready use for table tops and cabinet sides. They combined various woods freely in order to take advantage of the particular properties of each. For example, a chair might have maple legs and posts for strength, while the rungs would be made of hickory or ash for flexibility.

Woodworkers of today are often limited by the availability of wood in standardized dimensions, whereas the Shaker craftsman was free to modify the dimensions of his material to suit his structural purposes. On a simple bench the top might be one thickness, the supports another, and the braces still another. Chair legs might be tapered at the top and bottom to make the chair lighter, while the rungs might be thickened in the center to provide stiffness, tapering to smaller ends to be dowelled into the supports.



Box and chair shop, The Shaker Museum, Old Chatham, N.Y. *(Photo by Lees Studio.)*



A page from an early catalog of R. M. Wagan's manufactory at Mount Lebanon, New York. Wagan's shop, which finally shut down in the 1930's, was the last of the Shaker industries.

The Shakers developed joinery to a fine art to achieve strong, lightweight structures. Metal fasteners such as screws and nails were scarce for most of the early Shaker period, but even after they became readily available they were avoided where possible in favor of interlocking wood joints. They invented a tongue and groove machine and employed it for joining flat panels. They also used rabbets and splines, as well as pegged or wedged mortise-and-tenon joints, and lap joints of various kinds. Their work is particularly characterized by dovetail joinery which was used for boxes and cabinets where strength was important. A unique half-dovetailed brace was used for benches with particular effectiveness. Their dovetails and finger joints and laps provided pleasant visual details that relieved the severe lines of their furniture.

Despite their rejection of ornamentation they approved the use of bright colors within a code set down by the Elders for buildings as well as furniture. The code decreed that meeting houses were to be painted white with a blue interior trim, with dwellings and shops to be darker colors. Floors were to be anything from a reddish yellow to a bright yellow. Utility furniture was to be painted in various red tones, whereas "nice" furniture could be stained and varnished or oiled to bring out the grain. Opaque colors were used at first; later, stains were used to let the grain show and the piece was then varnished and rubbed smooth with pumice, or treated with boiled linseed oil.

Of the great variety of furniture produced by the Shakers, they were most prolific in the manufacture of chairs and rockers that were made in one village or another from about 1790 until the 1930's when the manufactory of Robert Wagan was shut down. Tables were made mostly for their own use and ranged from small round pedestal tables to dining tables as long as twenty feet. A surprising variety of small benches, foot-stools, and steps were produced, along with long benches with and without backs. Much of their cabinetry consisted of floor-to-ceiling built-ins, somewhat like the "storage walls" of today. One of their most interesting innovations was the peg-rail seen in many of their rooms, which was used to hang up everything from clothing to chairs.

On the following pages, we offer two projects, a pedestal table and a small bench. In future issues, we'd like to offer projects in most of the other areas listed above.

Art Pulos, who got us started on this Shaker series, is Executive Vice President of the Industrial Designers Society of America, and Chairman of the Department of Design at Syracuse University. His design firm, Pulos Design Associates, Inc., is a product-design consultant to Rockwell and many other companies. Art has been interested in Shaker Furniture for years and lately he's been itching to spread the word, so we turned him loose in this issue. We hope you'll like the results as well as we do.

FINISHING SUGGESTIONS

Colors and kinds of finishes permissible for use by Shaker craftsmen were determined by the Elders, who were often craftsmen themselves. All of the earliest furniture was painted, usually in various shades of red and brownish orange. Early in the 19th century they began to use thinned paint as a stain, and then oil-base and water-base stains, followed by varnish, to allow the natural wood-grain to show through. The earliest stains were generally similar in color to the paints used previously: shades of red, orange-brown, and reddish yellow were common. Later furniture was often stained in mellow, fairly light brown tones.

In short, most fairly light stains, especially those with distinct reddish or orange tones, can legitimately be used on Shaker reproductions. Spray lacquer will provide a good imitation of a Shaker varnish finish with a lot less time and effort.

Darker woods, especially walnut and cherry, were often finished with linseed oil. There is a considerable variety of opinion on oil-finishing methods. Here's ours: after finish-sanding the wood with 220-grit paper, steel-wool it with 4/0 (superfine) steel wool. Apply *boiled* linseed oil straight from the can with a rag and rub it in some (no need to wear your arm out). After the oil has had anywhere from 5 minutes to an hour to soak in, wipe off *all* the excess with a dry rag. Dispose of rags in a fireproof container or burn them immediately; this is a good policy with all oils and finishing materials, but linseed oil is especially notorious for spontaneous combustion.

After 4 or 5 days, another coat of linseed oil may be applied if desired, and 10 days later a good paste wax may be applied if a lustrous finish is desired.

MUSEUMS AND PUBLIC COLLECTIONS OF SHAKER FURNITURE

If you wish to visit one of the following, we suggest you phone them to ask about hours and admission fees.

DELAWARE — Winterthur
Henry Francis DuPont Winterthur Museum

DISTRICT OF COLUMBIA
New National Museum, Smithsonian Institution

KENTUCKY — Auburn (18 mi. S W Bowling Green)
Shaker Museum

KENTUCKY — Bowling Green
Kentucky Museum

KENTUCKY — Harrodsburg (25 mi. S W Lexington)
Shakertown at Pleasant Hill, Inc.

MAINE — Sabbathday Lake (23 mi. N. Portland)
Shaker Museum

MASSACHUSETTS — Boston
Boston Museum of Fine Arts

MASSACHUSETTS — Harvard
Fruitlands Museum

MASSACHUSETTS — Pittsfield
Hancock Shaker Community, Inc.

NEW HAMPSHIRE — E. Canterbury (15 mi. NE Concord)
Canterbury Shaker Museum

NEW YORK — Old Chatham (17 mi. from Albany)
Shaker Museum

OHIO — Cleveland
Shaker Historical Society Museum

OHIO — Cleveland
Western Reserve Historical Society Museum

OHIO — Lebanon
Glendower (historic house museum)

OHIO — Lebanon
Warren County Historical Society Museum

PENNSYLVANIA — Philadelphia
Philadelphia Museum of Art

BOOKS

The following is a list of some of the best books available on Shaker history and furniture.

Andrews, Edward D. & Faith
SHAKER FURNITURE
Quality paperback, 135 pages plus 48 pages of photos.
Background and history of Shaker craftsmanship as well as specific pieces of furniture with overall dimensions. Dover Publications. (1950)

Andrews, Edward D. & Faith
RELIGION IN WOOD
Hardbound, 106 pages including 71 pages of photos with overall dimensions of pieces. Indiana Univ. Press. (1966)

Andrews, Edward D.
THE PEOPLE CALLED SHAKERS
Quality paperback, 351 pages, 33 illustrations. A comprehensive history. No special emphasis on crafts. Dover Publications. (1953)

Nordhoff, Charles
THE COMMUNISTIC SOCIETIES OF THE UNITED STATES
Quality paperback, 439 pages, 38 illustrations.
A contemporary view of all the important communistic societies in the United States in 1874, by a journalist who visited most of them.

Shea, John G.
THE AMERICAN SHAKERS AND THEIR FURNITURE
Hardbound, 208 pages, hundreds of photos and illustrations, including measured drawings of about 90 pieces. Complete discussion of Shaker woodworking, including tools, materials, methods, shops, etc. Van Nostrand Reinhold. (1972?)

MAIL-ORDER SOURCES FOR ABOVE BOOKS

DOVER PUBLICATIONS, INC.
180 Varick St.
New York, New York 10014

On orders under $6.00 add 20¢ for postage and handling. While you're at it, ask for their free "ANTIQUES CATALOG" which lists books by Chippendale and Hepplewhite, and other books about antique furniture.

SHAKER FURNITURE	$ 2.75
THE PEOPLE CALLED SHAKERS	$ 3.00
THE COMMUNISTIC SOCIETIES OF THE UNITED STATES	$ 2.50

THE SHAKER MUSEUM
Old Chatham, New York 12136

Prices include postage and handling.

SHAKER FURNITURE	$ 3.15
RELIGION IN WOOD	$ 6.35
THE PEOPLE CALLED SHAKERS	$ 3.40
THE COMMUNISTIC SOCIETIES OF THE UNITED STATES	$ 2.90
THE AMERICAN SHAKERS AND THEIR FURNITURE	$13.50

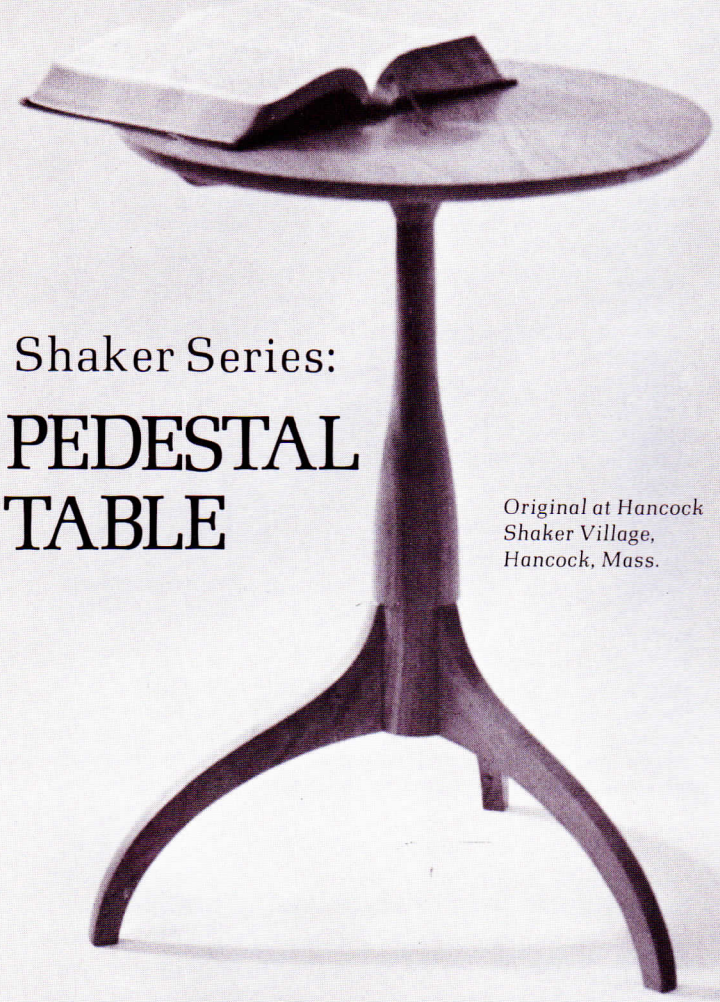
SHAKER FURNITURE KITS

COHASSET COLONIALS
Cohasset, Mass. 02025
Catalog 50¢, 24 pages

SHAKER WORKSHOPS, INC.
Box 710
Concord, Mass. 01742
Catalog 50¢

Shaker Series:

PEDESTAL TABLE



Original at Hancock Shaker Village, Hancock, Mass.

BILL OF MATERIALS

1	3 x 3 x 18 cherry
—	3/4" cherry boards (enough to make 18" dia. table top)
1	3/4 x 3½ x 15 cherry
3	3/4 x 4 x 14 cherry
4	No. 10 x 1¼ fl. hd. screws
—	glue
—	finishing materials
—	scrap wood for jig

POWER TOOLS AND ACCESSORIES

This list is for mortise-and-tenon construction (See Plan II). If dovetails are used, a dado blade is not required, and if dovetails are cut by hand a router is not required.

POWER TOOLS	SPECIAL ACCESSORIES
Table saw or radial saw	Dado blade
Jointer (or long hand plane)	—
Wood lathe	—
Router	1/4" and 3/8" bits, 3/4" O.D. templet guide
Band saw, scroll saw, or portable jig saw	—
Portable disc sander or belt sander	—
Finishing sander	—
Portable drill	1¼" wood-boring bit

This handsome cherry table is a classic expression of the Shaker philosophy of design. Completely devoid of ornamentation, it's beauty is entirely the result of craftsmanship seeking a truly utilitarian form. Thus the graceful shape of the turned center post is the result of trimming away excess material (and weight) where it's not needed for strength; and the elegant, tapered curve of the legs provides most material at the point of greatest stress (the joint with the center post), and follows the grain of the wood for maximum strength.

From the modern craftsman's point of view, the trickiest part of this project is the dovetailed leg joint. While it can be cut with a router or hand tools by those who have the patience and skill required, our directions offer a simpler mortise-and-tenon joint that will provide adequate strength, thanks to modern glues. If you have the skill to try the dovetail joint (shown in Plan II), you probably don't need our help anyway.

Whew! That's a lot of power tools to duplicate a piece that was made almost entirely with hand tools!

DIRECTIONS

1. Joint edges of enough 3/4" boards to make an 18" circle and glue them together (the laminating jigs in our last issue will be helpful for this job). When the glue is dry, level both faces of the piece with a portable disc sander or belt sander.

2. Set the table of your band saw or scroll saw, or the base of your portable jig saw, at 30° and cut an 18" circle. The edge can be rounded to the contour of the templet in Plan I with a finishing sander and 60-grit paper, as shown in Figure A, which will reduce the finished diameter to about 17¾". Finish-sand the edges and the top surface. (If preferred, the top may be turned on the outboard end of the lathe.)

3. Make the cleat shown in Plan II.

4. Make a full-size turning templet for the center post, using the squares method and Plan I. Turn and sand the center post with its bottom end *at the right end of the lathe.*

5. Make the jig shown in Figure B. Rout three mortises in the center post as shown in Figure C, cutting them 1/2" deep with a 1/4" bit first, and then 9/16" deep with a 3/8" bit. Use a 3/4" templet guide (RMC B92) on the router and position the work with the lathe's indexing head. Note: guide the router firmly against the back side of the slot in the jig.

6. Draw the leg pattern shown in Plan II onto one of the leg boards. Set the miter gage of your table saw or the arm of your radial saw at 38° and cut the ends of the legs.

7. Refer to Figure D. With a dado blade, cut a 3/16" x 1/2" rabbet in one side of each leg. (Use the leg with the pattern drawn on it to set up a stop block that will position the cuts properly in all the legs.)

8. Reset the miter gage or radial arm at 38° to the other side, and again use the first leg to set up a stop block that will position the cuts in all the legs. Gradually adjust the depth of cut to make a tenon that fits the mortises in the center post.

9. Cut out the leg with the pattern drawn on it. Use this leg as a pattern for the other two. (Or the three legs may be stacked and cut at one time with a band saw.)

10. Finish-sand the legs. Assemble the table, attaching the cleat to the top *across* the grain with screws and glue for maximum strength. Refer to the finishing suggestions on page 73.

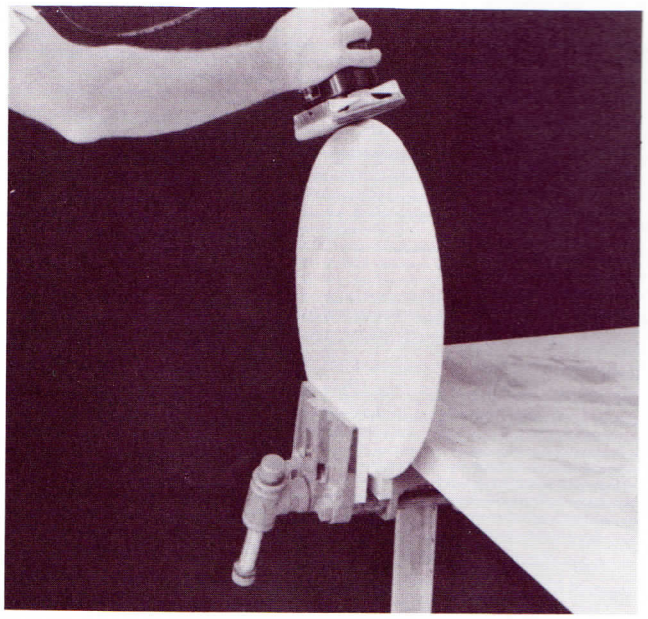


Figure A. Contouring the table edge.

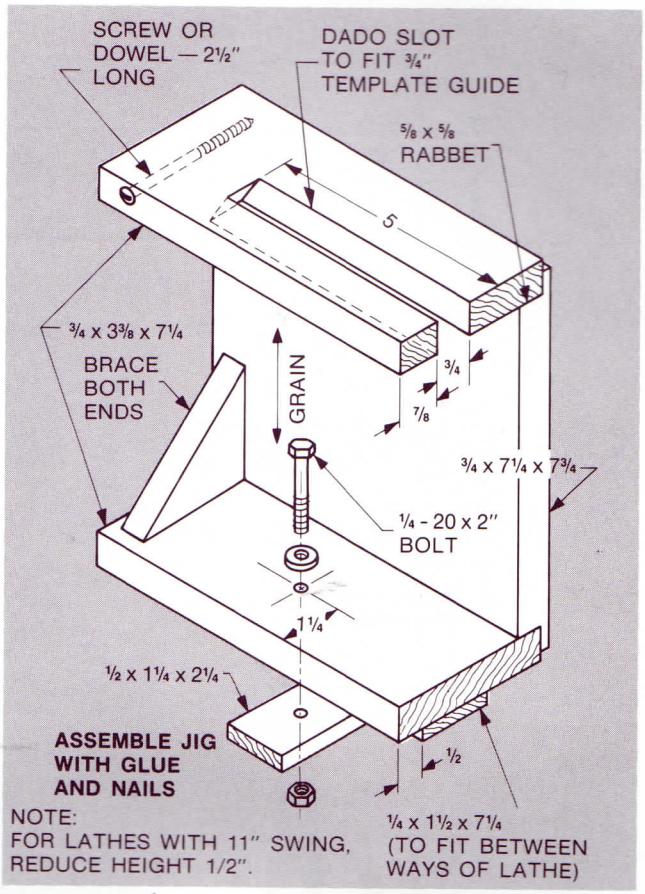


Figure B. Jig for routing mortises in center post.

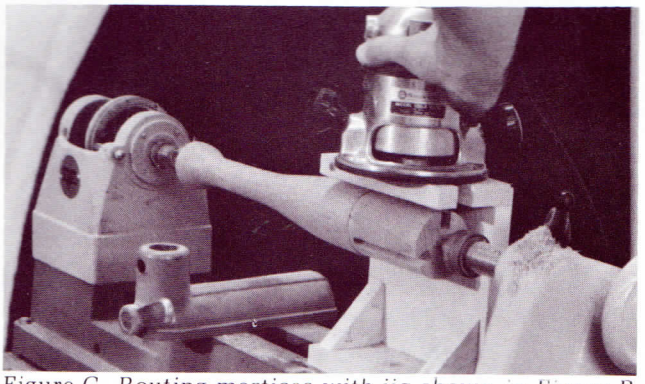


Figure C. Routing mortises with jig shown in Figure B.

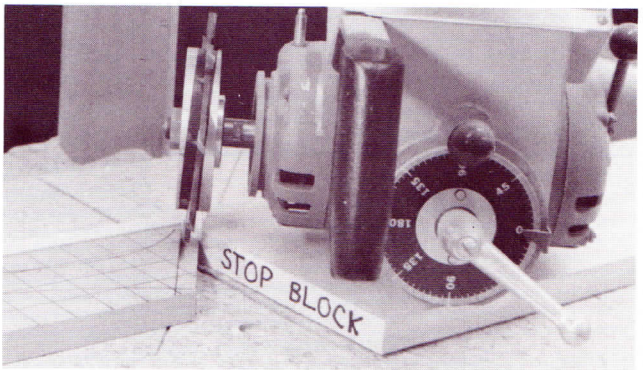
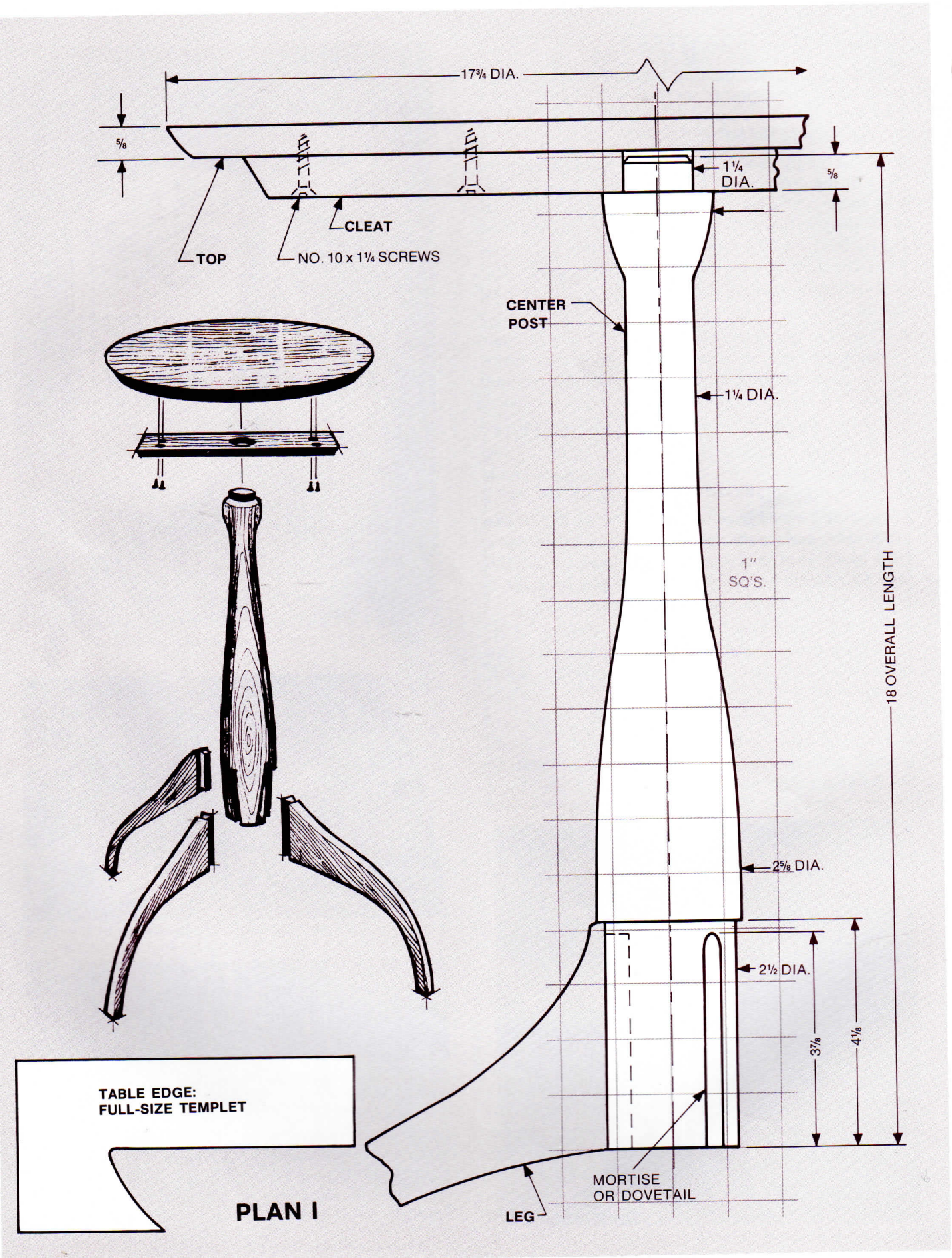
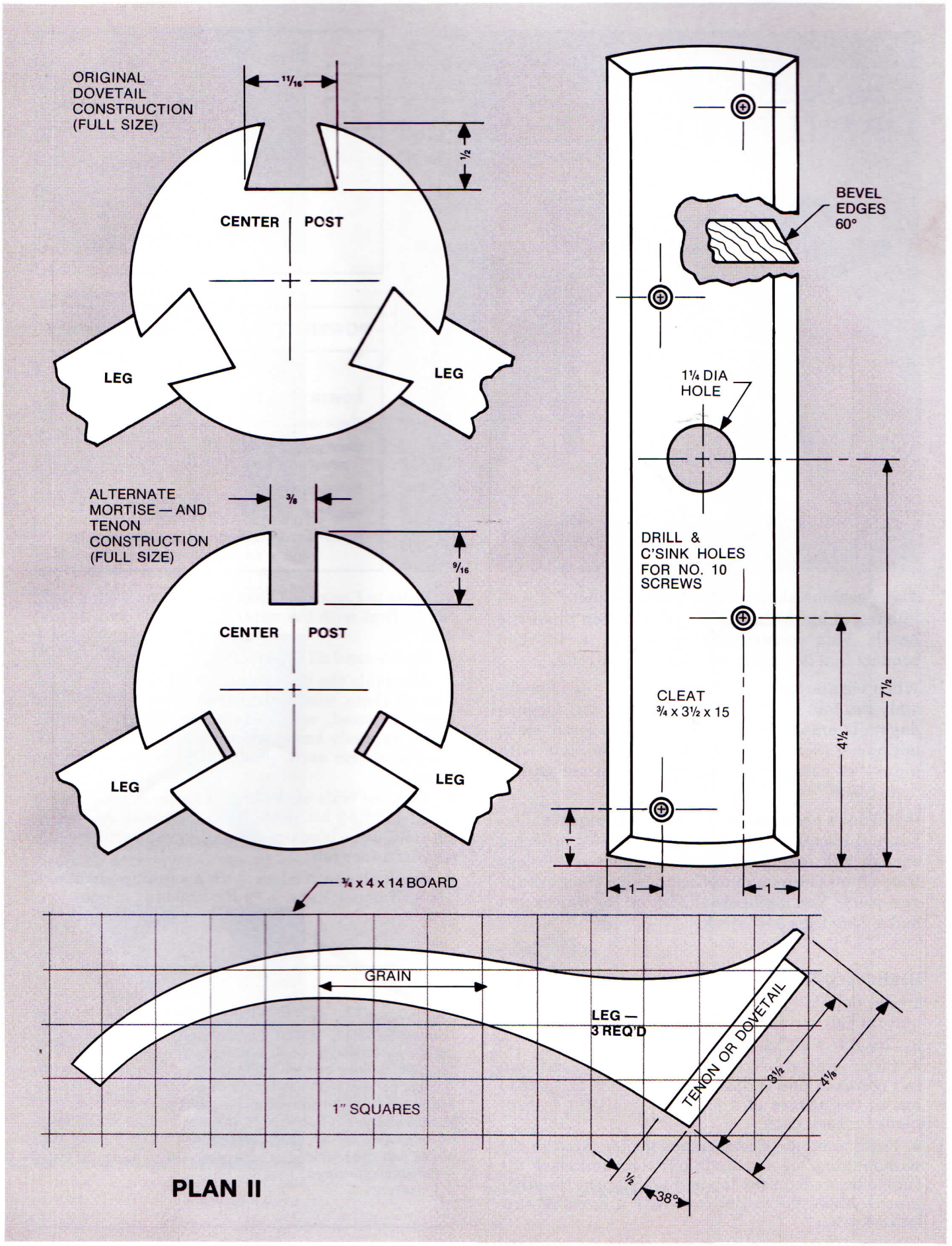


Figure D. Cutting the first rabbet in the leg. The second rabbet is cut in the same way, but with the radial arm (or miter gage) swung to the opposite side.

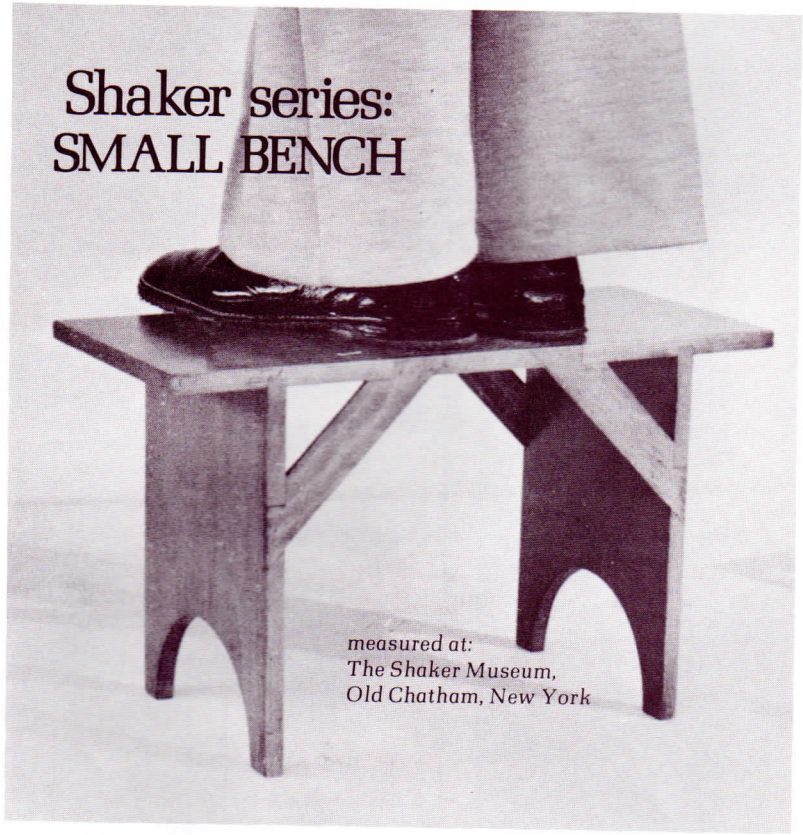
*Blade guard removed for clarity. Use guard!


17¾ DIA.
⅝
TOP
CLEAT
NO. 10 x 1¼ SCREWS
1¼ DIA.
⅝
CENTER POST
1¼ DIA.
1" SQ'S.
18 OVERALL LENGTH
2⅝ DIA.
2½ DIA.
3⅜
4⅛
MORTISE OR DOVETAIL
LEG
TABLE EDGE: FULL-SIZE TEMPLET
PLAN I


ORIGINAL DOVETAIL CONSTRUCTION (FULL SIZE)
1 1/16
1/2
CENTER
POST
LEG
LEG
ALTERNATE MORTISE — AND TENON CONSTRUCTION (FULL SIZE)
3/8
9/16
CENTER
POST
LEG
LEG
BEVEL EDGES 60°
1¼ DIA HOLE
DRILL & C'SINK HOLES FOR NO. 10 SCREWS
CLEAT
¾ x 3½ x 15
7½
4½
1
1
1
¾ x 4 x 14 BOARD
GRAIN
LEG — 3 REQ'D
TENON OR DOVETAIL
3½
4⅛
1" SQUARES
½
38°

PLAN II

Shaker series: SMALL BENCH



measured at:
The Shaker Museum,
Old Chatham, New York

BILL OF MATERIALS

1	1/2 x 8 x 17 pine
2	1/2 x 8 x $9^{15}/_{16}$ hard maple
4	3/16 x 1¼ x 7¼ hard maple
8	cut nails or 1" brads
—	white glue
—	finishing materials

POWER TOOLS AND ACCESSORIES

POWER TOOLS	SPECIAL ACCESSORIES
Table saw	Dado blade
Band saw, scroll saw, or portable jig saw	—
Finishing sander	—

HELPFUL BUT NOT NECESSARY

Router and 1/4" panel pilot bit (RMC PP408J)

The ingenious simplicity of Shaker joinery is well illustrated by the half-dovetail joints on this little bench. This construction results in a finished product that is surprisingly light and strong.

When we started to plan this project, we immediately ran into an interesting problem: the doggone dovetails are designed to be cut with hand tools, not power tools. So we made the initial cuts with a dovetail saw and then cleaned them out with a dado blade.

If you don't have access to a planer to surface lumber to the required thickness, we suggest ordering enough 1/2" maple for the top as well as the legs from either Craftsman or Constantine (Sources Index, p. 93). You might cheat a bit on the braces and make them from 1/4" stock.

DIRECTIONS

1. Cut boards to sizes shown in Bill of Materials, and cut half-circles in legs.

2. Cut 1/4" x 1/2" dadoes in top to fit legs.

3. Miter ends of braces and cut notches as shown in Figures A and B. (Glue the full-size templet to one of the braces and use it to position a stop-block for each cut.)

4. Refer to Figure C. Assemble one leg into the top without glue, lay a brace in position, and mark the cuts to be made in the top and leg. Repeat for other braces. Make the initial cuts with a dovetail saw or backsaw.

5. Refer to Figure D. Clean out the cuts with a dado blade, first with the miter gage at 90° and then at 45°.

6. Finish-sand all the pieces before assembly.

7. Assemble the bench with white glue and nails. The Shakers used square-cut nails and left the heads exposed, which made an attractive detail. (Does anybody know where to get these?) If ordinary brads are used, countersink them and fill the holes.

8. Trim the ends of the braces flush. A router with a self-piloting bit (RMC PSD 408) will do this in jig-time, but a block-plane and/or rasp will also do a satisfactory job.

9. Break all sharp edges with a sanding block and 150-grit paper. Refer p.73 for finishing suggestions.

This bench comes from the collection of The Shaker Museum founded by John S. Williams at Old Chatham, N.Y., (about 20 miles from Albany), which covers the entire range of Shaker life from clothing and furniture to inventions and workshops. A large portion of the collection came from the Mt. Lebanon settlement (12 miles away) which was the most important Shaker community. Mr. Robert F. W. Meader, director of the museum, was kind enough to let us measure this bench and other pieces, and also provided us with some of the illustrations used in the article starting on page 68.

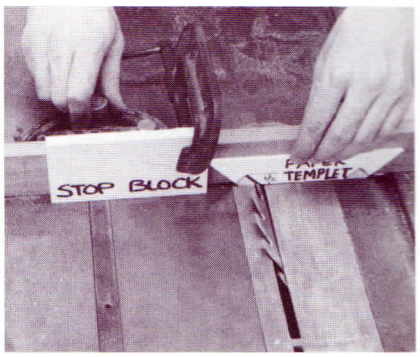


Figure A. Starting notches in braces.

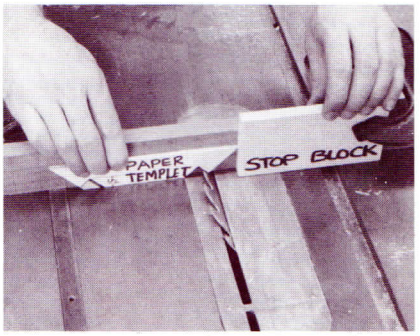


Figure B. Completing notches in braces. In making this second cut, hold the work very tightly; the blade may snag the scrap corner, producing a mild kick that will damage the work if it is held loosely.

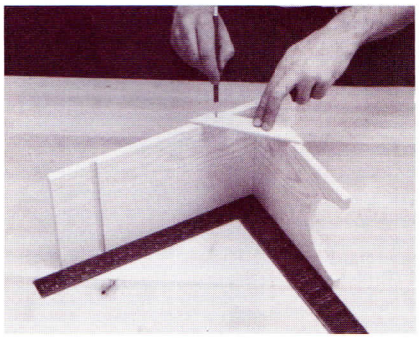


Figure C. Marking position of dadoes in top and leg.

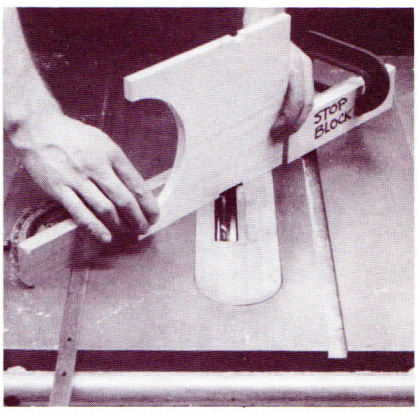
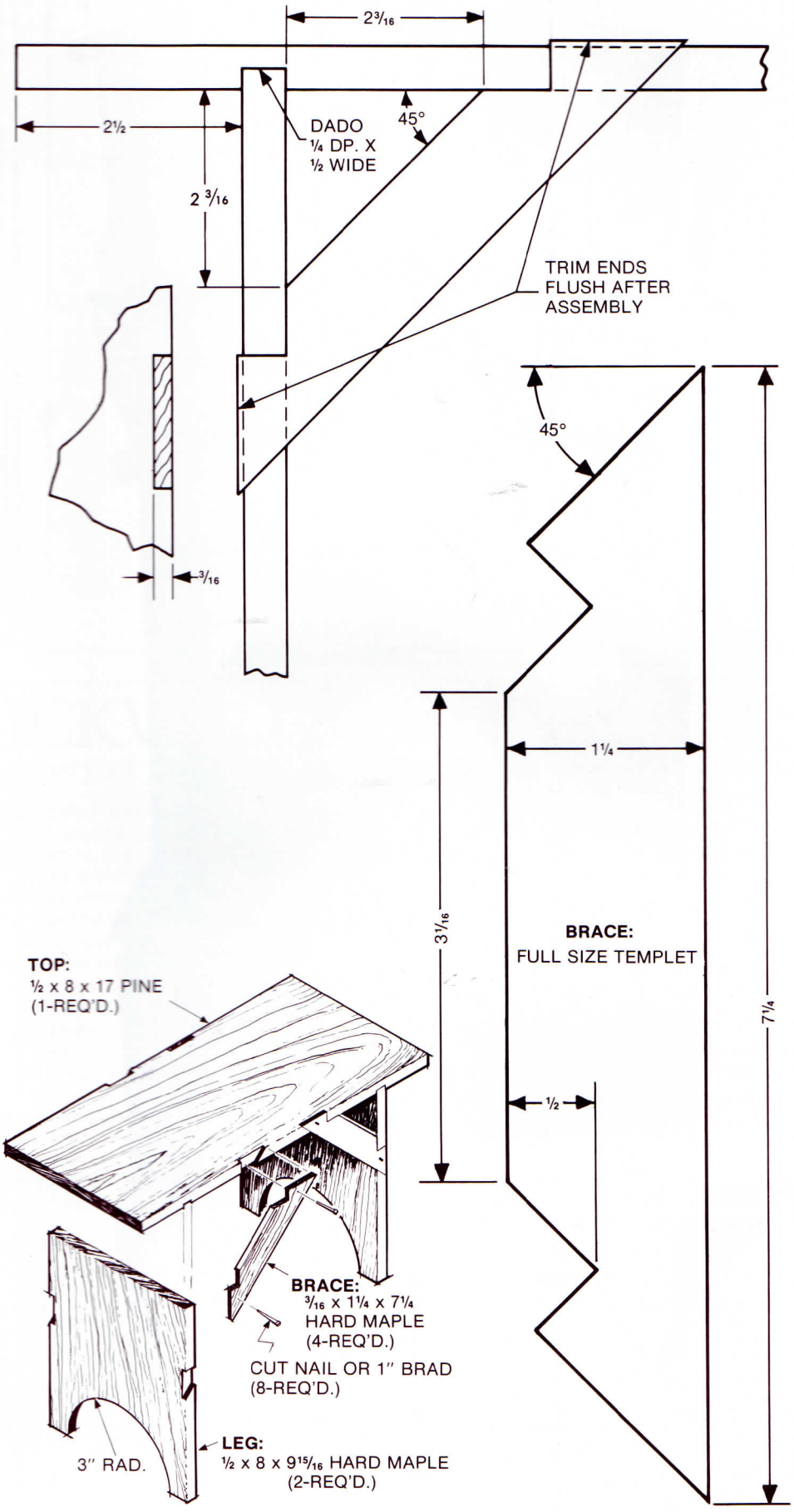


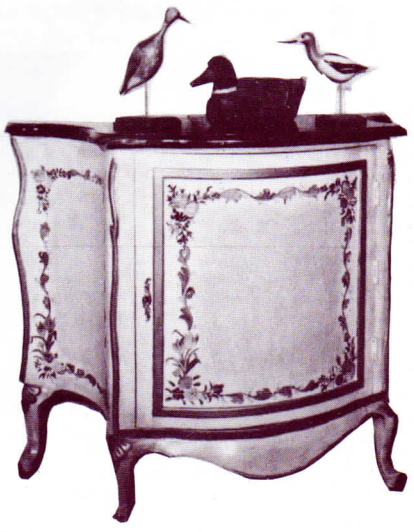
Figure D. Cleaning out dadoes. Initial cuts were first made with a dovetail saw.

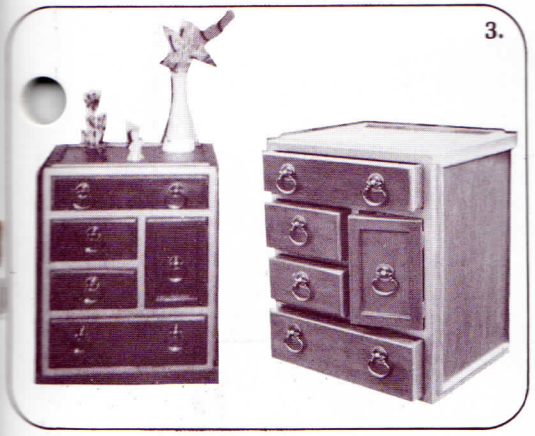


1.

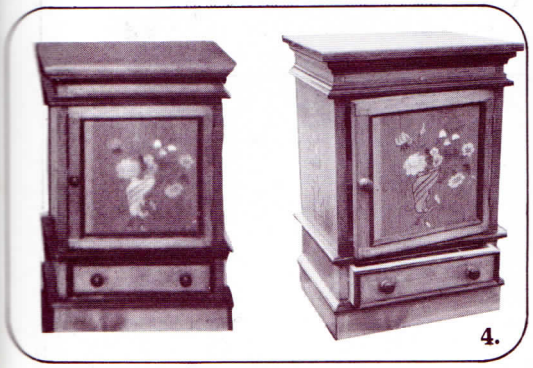
2.

6.



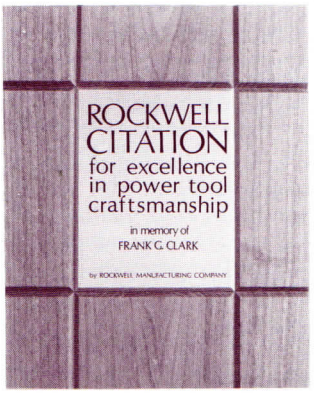


3.



4.

5.



ROCKWELL CITATION

in memory of FRANK G. CLARK

When we wrote Frank Clark to tell him he had won the Rockwell Citation, Mrs. Clark wrote back saying that he had passed away. We decided to go ahead with the award, however, hoping it will be a fitting tribute to a very accomplished craftsman.

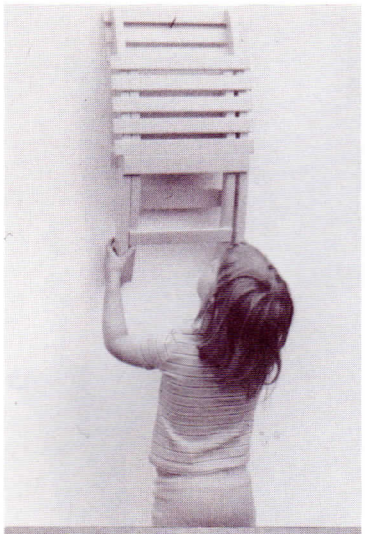
Frank lived in Portland, Oregon, where he retired as Superintendent of Parcel Post in 1958. Soon afterward, he bought a lathe and saw from one of his sons-in-law, not knowing what he would do with them; his only training in woodworking had been in grade school, over 40 years before. Then Chown Hardware and Machinery, a Rockwell distributor in Portland, had a "Sawdust Party" and Frank attended for a whole season. From his work, it's easy to see that he came a long way on his own, but we're still very proud that one of our distributors got him started, and we're sure the people at Chown are even prouder. By the time he submitted his Citation entry, Frank's shop had grown to include a radial saw, table saw, jointer, shaper, band saw, drill press, scroll saw, lathe, and hand tools of all kinds, which have since been divided between his sons-in-law. To quote him, "It's hard for a person to go wrong using tools such as Rockwell and Delta."

Mrs. Clark did most of the finishing of Frank's work, including the decorative tole-painting that accents some pieces so effectively.

We're sure the work of Frank's hands will be used and cherished by his family for generations. Few men leave behind them such beautiful and durable memories.

Photographs

1. *Queen Anne highboy; solid walnut, built from plans.*
2. *French china cabinet; birch, painted gold. Built from sketches and notes made by Mrs. Clark on a trip.*
3. & 4. *Trinket chests; built from plans as gifts for children and grandchildren. Photos at right show doors and drawers partly open.*
5. *Chippendale lowboy; solid cherry, hand-carved.*
6. *The wall cabinet was Frank's first project(!), and the floor cabinet was his second. The floor cabinet, with polished myrtlewood top, was made from a picture 1½ inches square. Both are painted white and antiqued. The duck and birds are also some of his early work.*
7. *Satinwood mirror.*



LAWN CHAIR

When Fred Taylor sent us this design, he said the chair was comfortable, took very little storage space, and was easy to put together and take apart. After building a few, we not only agree, but have to add that it is lightweight, very easy to build, and surprisingly strong (our favorite 247-pound chair tester gave up before the chair did).

We tried the adult-size chair out on assorted people from 5′2″ to 6′3″ and all of them found it comfortable. The child-size chair will fit most kids from 3 to 7. If you'd like to make an in-between size for ages 5 to 10, we suggest using the child-size plan and 1½″ squares. All the parts should be scaled up accordingly.

BILL OF MATERIALS

ADULT-SIZE (PLAN I)

1	3/4 x 9¼ x 48
1	3/4 x 9¼ x 34
2	3/4 x 3 x 18½
2	1/2 x 1½ x 16½
16	1/2 x 1½ x 19¾
12	No. 8 x 1½ fl. hd. wd. screws
36	No. 8 x 1 fl. hd. wd. screws
—	Epoxy or other waterproof glue
—	Finishing materials
18x38	Cardboard for templets

CHILD-SIZE (PLAN II)

1	3/4 x 7¼ x 25¼
1	3/4 x 5¼ x 20½
2	1/2 x 1½ x 11½
2	5/16 x 1⅜ x 9½
13	5/16 x 1⅜ x 12¾
8	No. 6 x 1¼ fl. hd. wd. screws
30	No. 6 x 3/4 fl. hd. wd. screws
—	Epoxy or other waterproof glue
—	Finishing materials
11¼x25½	Cardboard for templets

Fred Taylor of Roseville, Illinois, was the Delta Citation winner in March/April 1969. In sending us plans for this chair, he honestly admitted that the design is not his original, but we sent him a $35.00 merchandise certificate anyway. After all, we wouldn't have used it if he hadn't sent us the idea. Thanks, Fred!

POWER TOOLS AND ACCESSORIES

POWER TOOLS	SPECIAL ACCESSORIES
Band saw, scroll saw, or Portable jig saw	—
Portable drill	Countersink

HELPFUL, BUT NOT NECESSARY

Finishing Sander
Table saw or radial saw
Drill Press
Belt sander or disc sander
Planer

MATERIAL AND FINISH SELECTION

To ensure adequate strength, the wood used must be clear, straight-grained, and free from cracks and checks. We recommend white pine, yellow pine, or most any hardwood except oak. Although redwood seems like an obvious choice, we don't recommend it because of its low strength.

The slat sizes shown in the Bill of Materials are approximate; actual size will depend on how you buy your material. If you have a planer and table saw or radial saw, the most economical approach is to use nominal 2" lumber (1½" or 1⅝" thick), rip it into 5/8" strips for the adult-size chair or 7/16" strips for the child-size chair, and plane both sides to finished thickness. If you don't have a planer, we suggest 1/2 x 1⅝ door stop for the adult-size, or 5/16 x 1⅜ lattice stock for the child-size.

The finish used should provide resistance to decay. If the chair is to be painted, we suggest an oil-base primer followed by two finish coats — all exterior-grade. If a natural finish is desired, a wood-preservative stain may be used, or an exterior stain followed by two coats of exterior varnish.

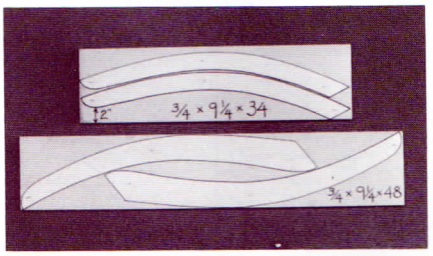


FIGURE A. Layout for adult-size chair.

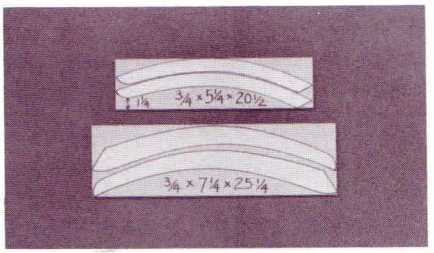


FIGURE B. Layout for child-size chair.

DIRECTIONS

1. Using the squares method, make full-size cardboard templets for the seat and back members shown in Plan I (adult-size) or Plan II (child-size).

2. Trace the seat and back members onto clear, straight-grained boards as shown in Figure A (adult-size) or Figure B (child-size). Follow the layout shown in the photo *closely* to ensure proper grain direction for maximum strength.

3. Cut out the seat and back members with a band saw, scroll saw, or portable jig saw. Smooth the outside edges with a belt-sander, disc-sander, or hand plane. Use a coarse flat file for the inside edges.

4. Cut the slats and braces to size and drill holes in locations shown in Plan I or II. Hole location is the only difference between seat slats and back slats.

The holes may be drilled with a portable drill, but a drill press and the jig shown in recent CRAFTSHEETS will make a whole lot of holes in a very short time, Figure C.

5. Countersink all the screw holes and round the sharp edges of all the pieces, especially the top edges of the slats. Finish-sand all the pieces before assembly.

6. Assemble the chair with flat-head screws and waterproof glue (epoxy or resorcinol resin), locating slats and braces as shown in the plans. Use 3/32" pilot holes for No. 8 screws or 5/64" holes for No. 6 screws.

7. Refer to Figure D. File notches about 1¼" wide in the lower back brace where the seat rests on it. The notches should be at an angle so that the seat rests more or less flat in the bottom of the notch. File the notches a little at a time; reassemble the chair and try it for comfort after each cut. The deeper the notches, the further the back will slant.

8. Saw the corners of the front and top slats round, and sand them smooth (Plan III).

9. For finishing suggestions, see "MATERIAL AND FINISH SELECTION" above.

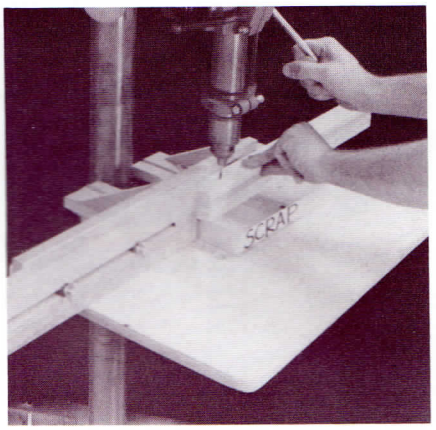


FIGURE C. Hold the work down tightly so it doesn't come up with the drill.

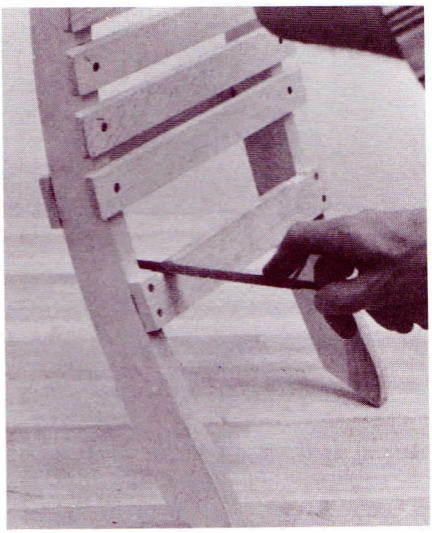
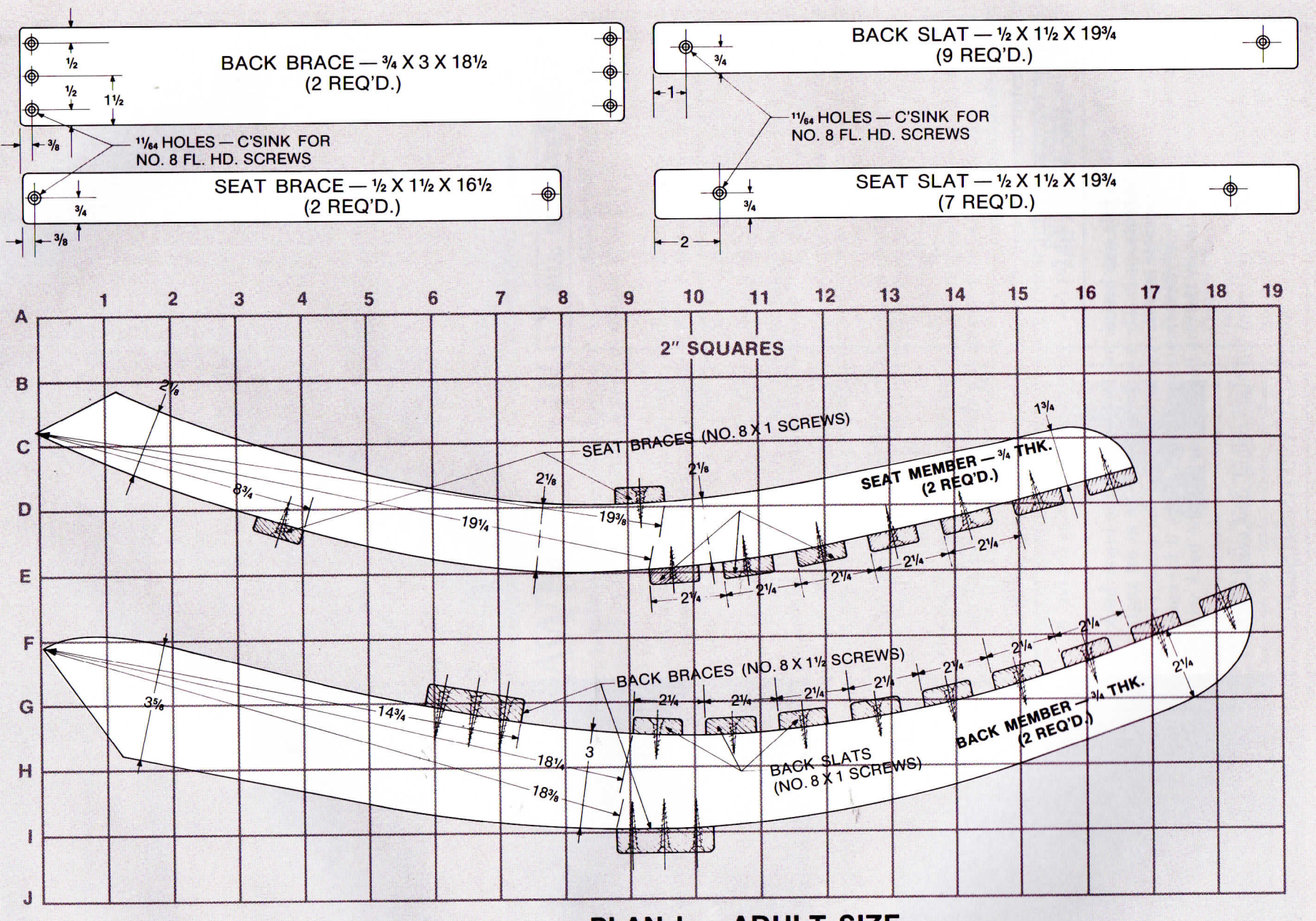
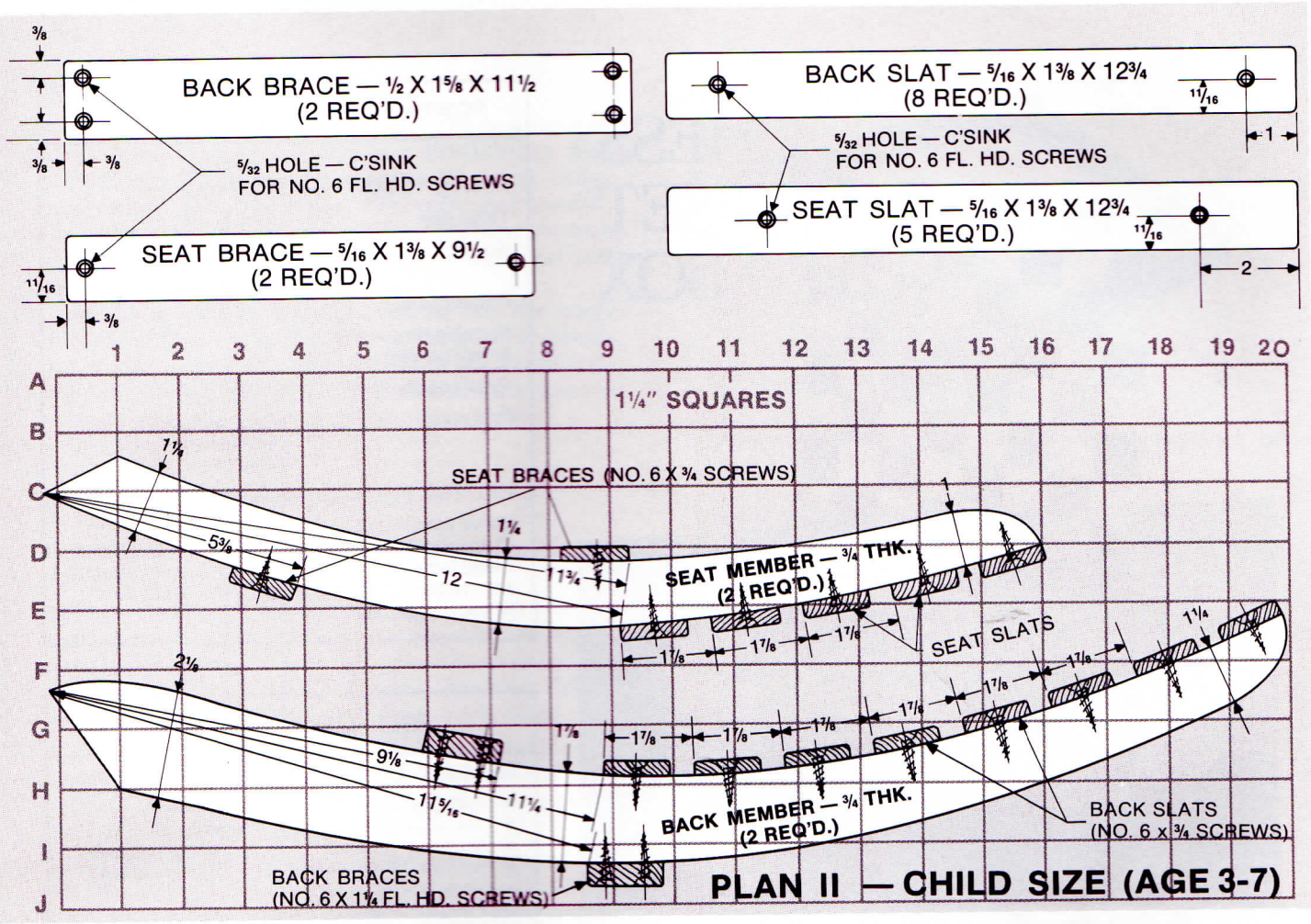


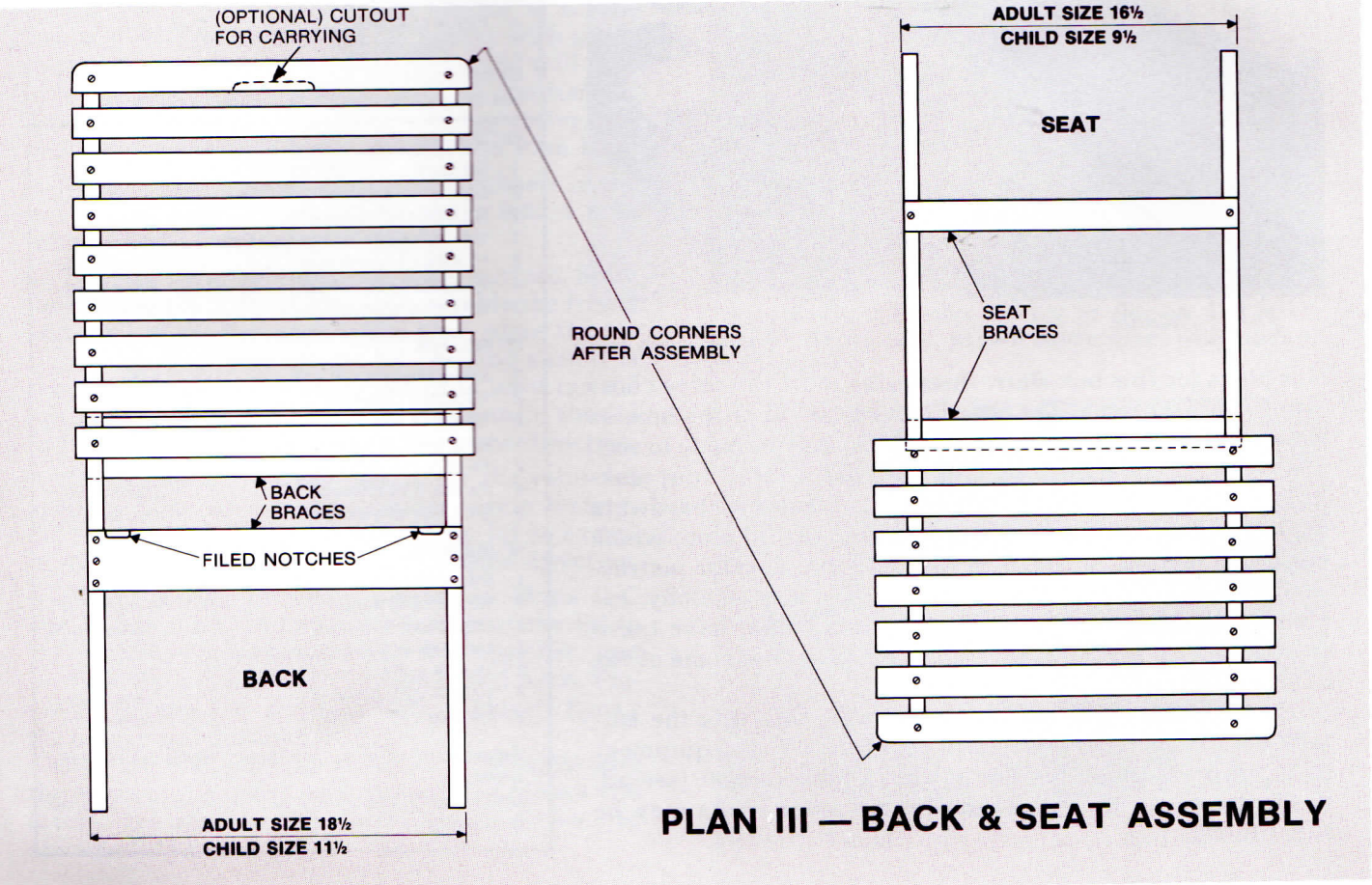
FIGURE D. Cutting notches for the seat.



PLAN I — ADULT SIZE

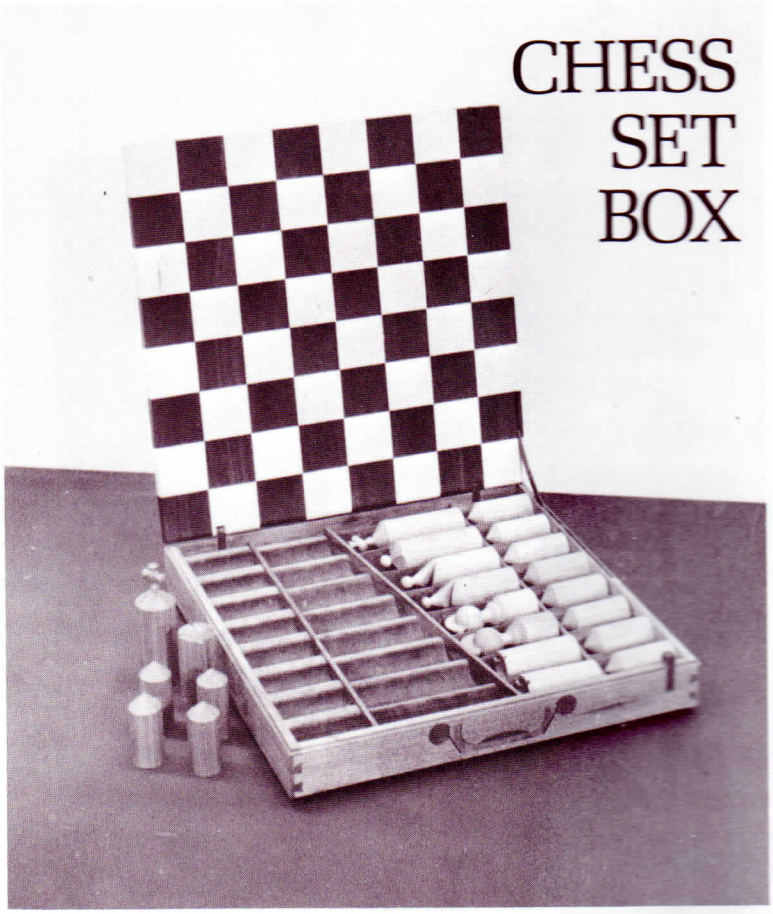


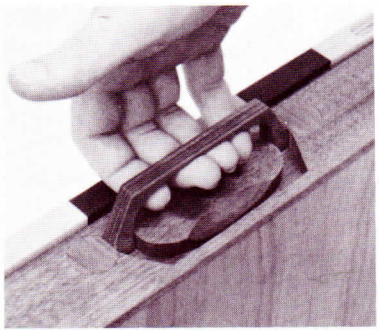
PLAN II — CHILD SIZE (AGE 3-7)



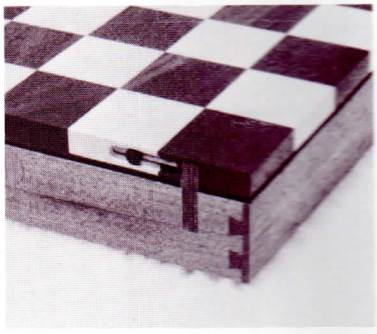
PLAN III — BACK & SEAT ASSEMBLY

CHESS SET BOX





Handle



Latch

Our plans for this box show three sizes to fit the three chess sets in our last issue. The board can be the lid of the box, as shown, or another lid, at least 5/8" thick, may be made to suit.

We went to ridiculous lengths (and had a lot of fun) making all-wood hardware for the box. Conventional hardware may be substituted for everything except the lid stop, which has to be made so it won't hit the chess pieces. Our instructions for the optional wood hardware are very sketchy; explaining these parts in our usual fashion would have taken several extra pages and we'd have had to cut out some of the other projects in this issue. Good luck!

Dovetail joints are very easy to make (this was the editor's first attempt) and we advise their use if the equipment required won't make too big a dent in your budget (see ad, p. 66). However, box joints or splined miter joints may be substituted.

POWER TOOLS AND ACCESSORIES

POWER TOOLS	SPECIAL ACCESSORIES
Table saw	Dado blade
Router	1/2" dovetail templet, bit, etc. (see ad, p. 66)
Portable drill	—
Portable disc sander or belt sander	—
Finishing sander	—
Drill press	Wood-boring bits (see diameters K, R, and S in Plans III and IV-B)

HELPFUL BUT NOT NECESSARY

Scroll saw (lid stop and wood handle, Plan II)
1" plug-cutter, RMC 15-539 (wood handle, Plan II)
Wood lathe (feet, Plan I; and latch button, Plan II)
1/2"-radius corner-round router bit, RMC E416 (wood hinges, Plan II)

BILL OF MATERIALS

ALL SIZES (13" SQUARE, 15" SQ., AND 19" SQ.)

3	1/28 x 2 x 7½ walnut veneer	Lid stop
3	1/4" dowels 3/4 long	Lid stop
4	No. 10 x 2" fl. hd. screws	Temp. tray ass'y.
4	No. 10 x 4" fl. hd. screws	Temp. tray ass'y.
—	White glue	—
—	Filled epoxy cement	—
—	Wood plastic — walnut	—
—	Felt or velveteen (enough to cover all trays)	Tray lining

Standard hardware: hinges, handle, latch, and feet; or use all-wood hardware in Plan II and feet in Plan I.

13" SQUARE

1	5/8 (or thicker) x 13 x 13	Lid
2	1/2 x 2⅜ x 13 walnut*	"Fronts"
2	1/2 x 2⅜ x 12⅝ walnut*	"Sides"
1	1/4 x 12¾ x 12¾ walnut plywood+	Bottom
2	1½ x 2⅜ x 14 softwood	Pawn trays
4	1⅜ x 2⅛ x 14 softwood	Piece trays
3	1/4 x 1¾ x 12¾ walnut+	Dividers

15" SQUARE

1	5/8 (or thicker) x 15 x 15	Lid
2	1/2 x 2⅜ x 15 walnut*	"Fronts"
2	1/2 x 2⅜ x 14⅝ walnut*	"Sides"
1	1/4 x 14¾ x 14¾ walnut plywood+	Bottom
2	1⅜ x 2⅞ x 16 softwood	Pawn trays
4	1¼ x 2½ x 16 softwood	Piece trays
3	1/4 x 1¾ x 14¾ walnut+	Dividers

19" SQUARE

1	5/8 (or thicker) x 19 x 19	Lid
2	1/2 x 2⅜ x 19 walnut*	"Fronts"
2	1/2 x 2⅜ x 18⅝ walnut*	"Sides"
1	1/4 x 18¾ x 18¾ walnut plywood+	Bottom
2	1¼ x 3⅜ x 20 softwood	Pawn trays
4	1⅛ x 3¼ x 20 softwood	Piece trays
3	1/4 x 1¾ x 18¾ walnut+	Dividers

**Adjust length of "sides" and "fronts" if lid is oversize or undersize.*

+Lengths given are slightly oversize; trim to fit finished box exactly.

MATERIALS

We suggest walnut for the shell of the box because of its looks, machinability, and availability from both Constantine and Craftsman (Sources Index, p. 93) in the required sizes. The softwood used for the trays should be of fairly even texture, without alternating hard and soft growth rings that will cause the drill to "wander".

Felt or velveteen may be used to line the trays. Velveteen is more troublesome because it ravels, but we think its richer look is worth the extra time. We managed to find a remnant of brown velveteen that matches the color of walnut very nicely.

SHELL CONSTRUCTION

1. Make the lid first, or use the chess board from our March/April issue.

2. Refer to Figure A. Cut the fronts and sides to size, adjusting length if lid is oversize or undersize. Mark "inside" faces, number the corners, and mark "right" and "left" corners. The two "right" corners are diagonally across from each other.

3. Set up and rout the dovetails as explained in the instruction manual, with one exception: the *right* corners are cut at the *left* end of the templet, as shown in Figure B, and vice versa.

4. (Wood handle.) Trace Plan II-A onto one side of the box, drill 1" holes, complete cutout with a scroll saw, and carve finger recess. Rout area behind handle and glue in veneer. The handle is scroll-sawed from a 13-layer stack of veneer with grain in alternate directions. A stack 2¾" x 5¼" will provide the hinges and latch as well as the handle. The 1" plugs are best made with a plug-cutter, but may be turned. Note grain direction in Plan II-A.

5. Refer to Plan I. Dado the 1/8 x 1/8 rabbets in the top outside edges of all sides and the 9/32 x 9/32 rabbets in the bottom inside edges.

6. Turn the lid upside down on a flat surface. Shim the corners till it doesn't rock. Assemble the fronts and sides of the box with white glue, place the assembly upside down on the lid (making sure it is oriented properly if a chess board is used for the lid), and weight or clamp it to conform to the lid so that both will be warped in the same direction.

7. Cut the bottom of the box to fit the rabbeted opening. Glue the bottom in place, again weighting or clamping the box down on the lid so everything will end up cockeyed in the same direction.

8. (Wood hinges and latch.) Refer to Plans II-C and II-D. Round the lower back edge of the lid to 1/2" radius. Clamp the lid and box together, and rout mortises in both for the hinges and latch. Figure C. Square the mortises with a chisel. Epoxy the hinges and the latch in place.

Drill the 1/4" holes as straight as possible into the edges of the board and through the hinges and latch. (We started the holes with a dowel jig shimmed off-center.)

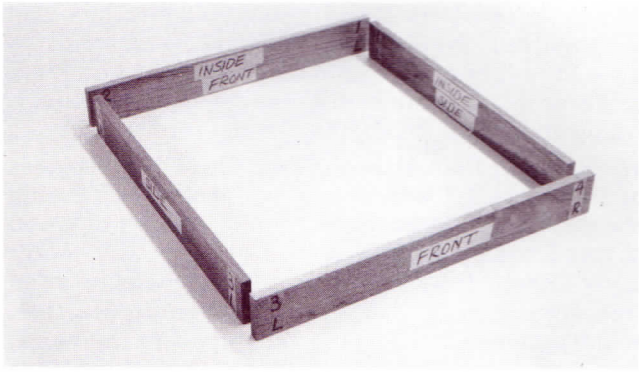


Figure A. All this labeling helps prevent mistakes in cutting dovetails.

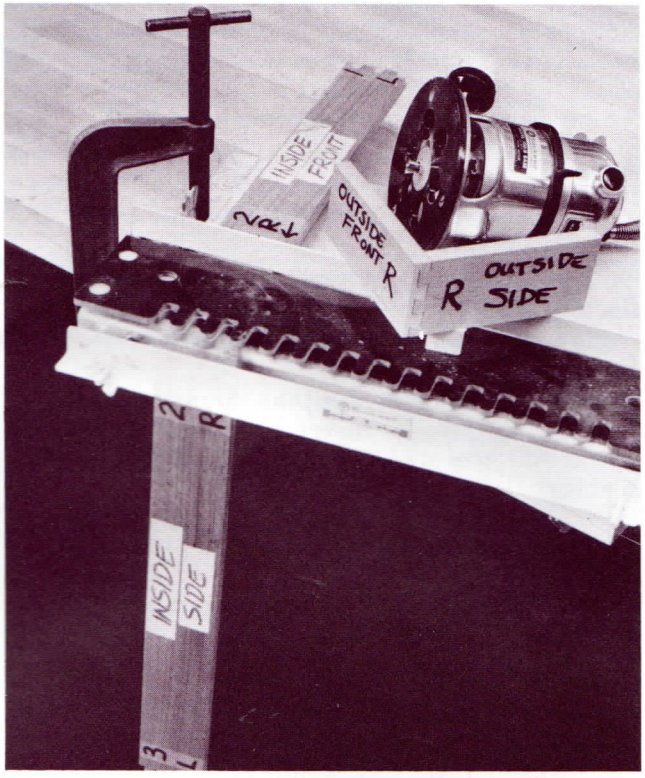


Figure B. Right corners are cut at the left end of the templet. Scrap joint, shown assembled, was made to check setup.

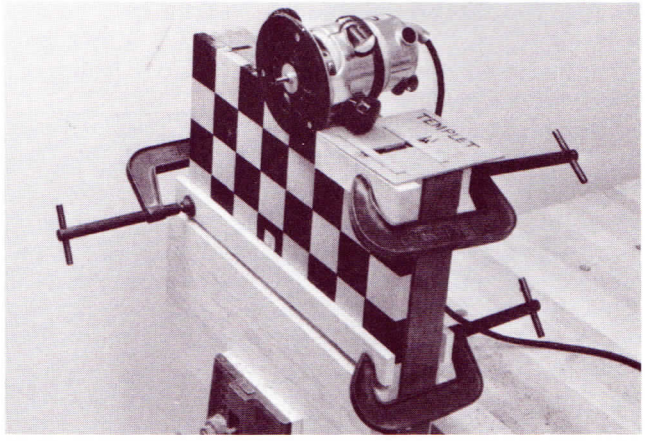


Figure C. Templet used to rout hinge mortises.

9. Fill cracks with wood plastic. Clamp box and lid together, Figure D, with protective strips to keep the edges square, and sand the board and box flush with a portable disc-sander or belt-sander, followed by finish-sanding. Repeat for all sides.

10. Refer to Plan II-B, the lid stop. Glue 3 pieces of 1/28 x 2 x 7½ walnut veneer together, clamping them very tightly between two flat blocks of wood covered with wax paper. The grain of the center layer should run crosswise. Slender brads driven through the stack will keep the layers in position. When glue is dry, trace the lid stop onto the work, drill the two holes indicated, and cut out with a scroll saw or coping saw.

11. The "blind" saw kerfs in the lid and box are cut with a table saw, using stop blocks to control the length of the cut and prevent kickback. This operation is very dangerous if done improperly. If you're not familiar with it, have a qualified person demonstrate it before attempting it yourself.

12. (Wood hinges and latch.) Make the latch dowel and button in Plan II-C. Be sure hinges and latch work properly before making final assembly and plugging holes.

13. (Conventional hardware.) Install hinges, handle, and latch. With conventional hinges, the back edge of the lid should not be rounded as shown in our plans.

14. Refer to Plan II-B. Drill the three 1/4" holes for the lid-stop dowels. Insert dowels "dry" and be sure the stop works properly before gluing them in place.

15. Sand the bottom of the box and finish the box inside and out, except for the inside of the bottom.

TRAY CONSTRUCTION AND FINAL ASSEMBLY

16. Cut softwood tray parts to size.

17. Screw the two pawn trays together and drill holes as indicated in Plan III. Take the screws out, trim trays to fit the box, and they're done (almost).

18. Because of the limited stroke of most drill presses, we show the two piece-trays made in 4 pieces. Screw the pieces together as shown in Plan IV-A and drill through blocks 1 and 2 into blocks 3 and 4 (Plan IV-B). Remove blocks 1 and 2 and drill the rest of the way through 3 and 4 (Plan IV-C and Figure E.)

Glue block 1 to block 3, using the original screws for alignment and clamping (Plan IV-D). Repeat for blocks 2 and 4.

19. Refer to Plan IV-E and Figure F. Trim length of piece trays to fit box, and taper-rip them to dimensions C and D in Plan I. Be sure to make two "right hands" or two "left hands", and to make the wider end of each tray at the end with the larger holes in it.

20. Cut the dividers to fit the box and trim the pawn trays till all parts fit in the box without being forced.

21. Round the sharp edges between the troughs with 80-grit sandpaper. Cut lining fabric oversize and glue it into each tray, working gradually from end to the other. If you used felt, use a sharp knife to trim the fabric flush with the tray. If you used velveteen, apply glue to the bottom of the fabric around the edges of the tray, rubbing it in with your finger (this keeps the fabric from raveling). When the glue is dry, trim the fabric flush with a sharp knife.

22. Glue the trays and dividers into the box with epoxy and allow to dry.

23. Refer to Plan I. Use conventional rubber or metal feet, or drill holes in the bottom of the box, turn the feet, finish them, and glue them in.

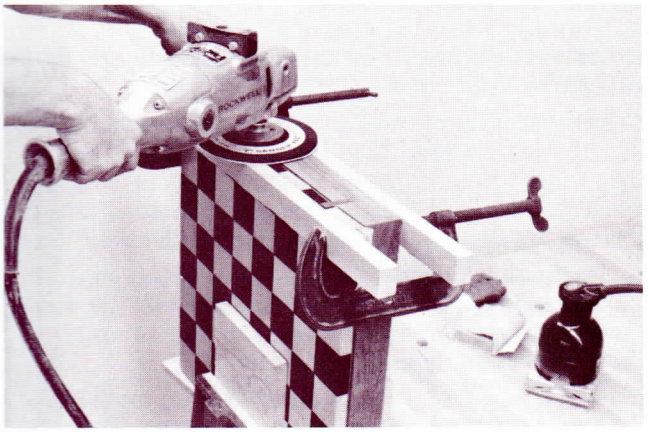


Figure D. Note protective strips used to keep edges square.

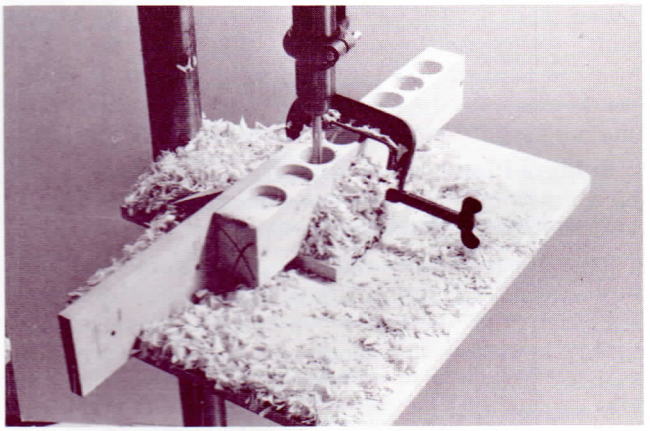


Figure E. Completing the holes in the piece trays.

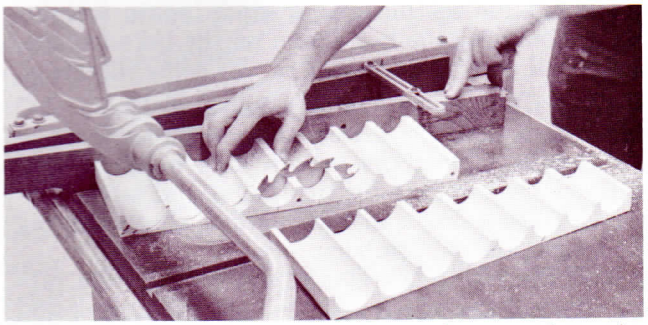
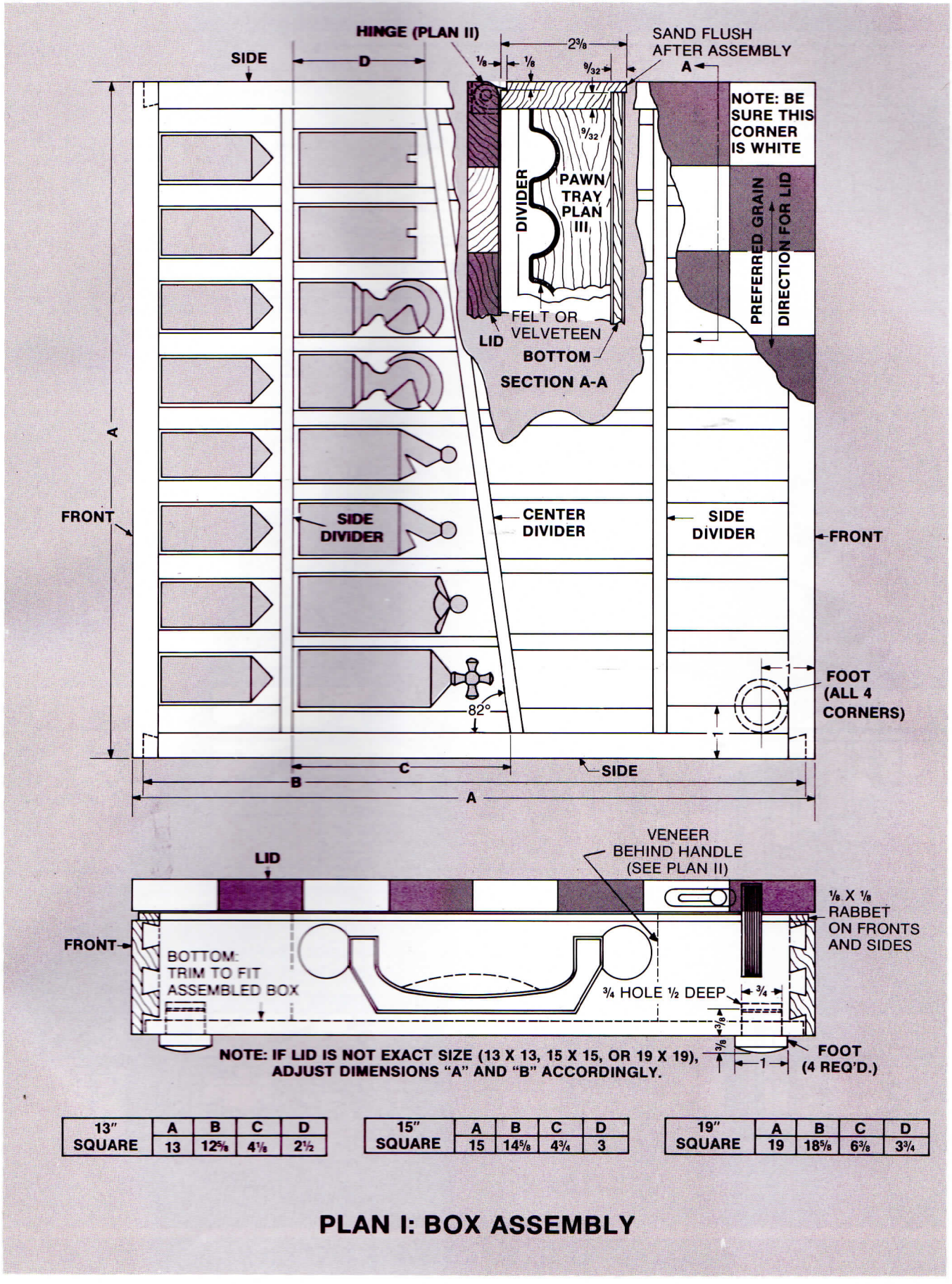


Figure F. Taper-ripping piece trays. The jig is from the July/August 1971 CRAFTSHEET.

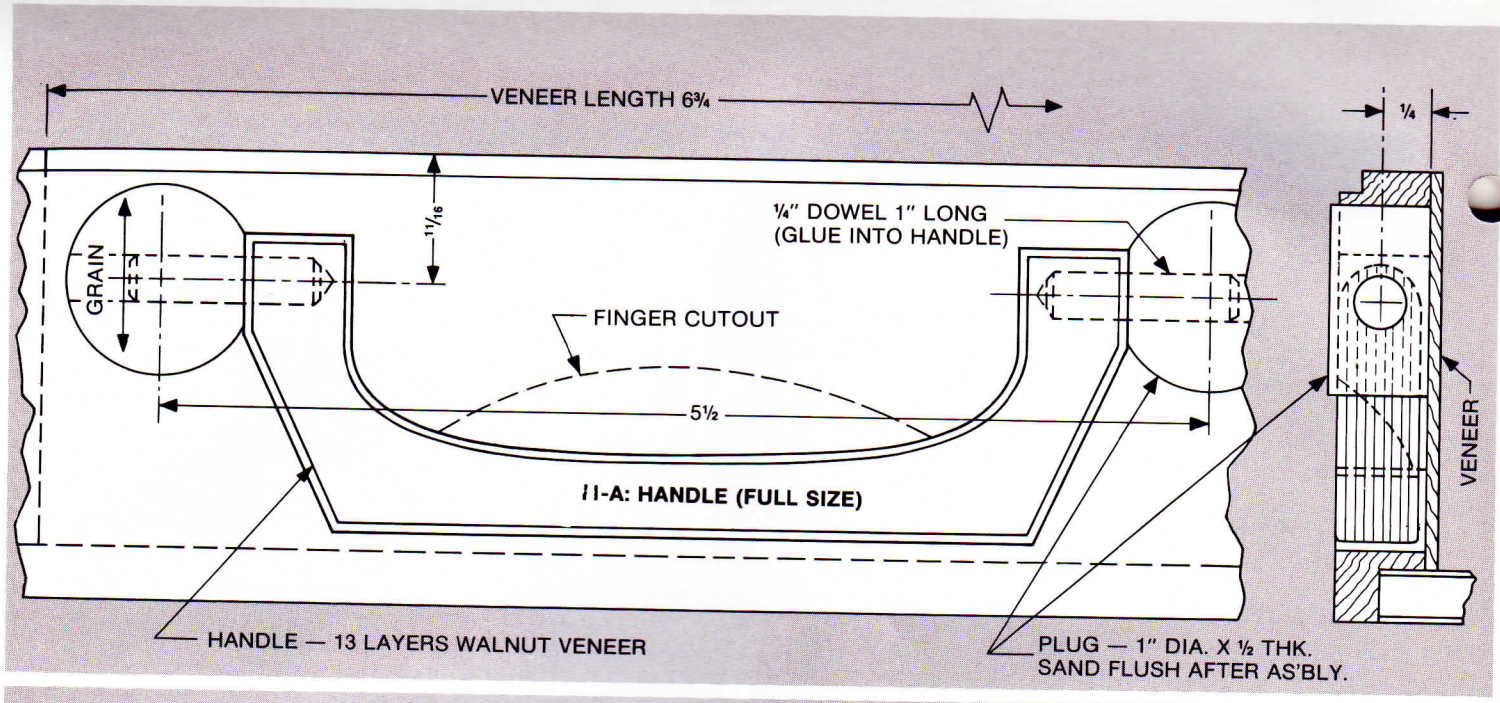


13" SQUARE	A	B	C	D
	13	12⅝	4⅛	2½

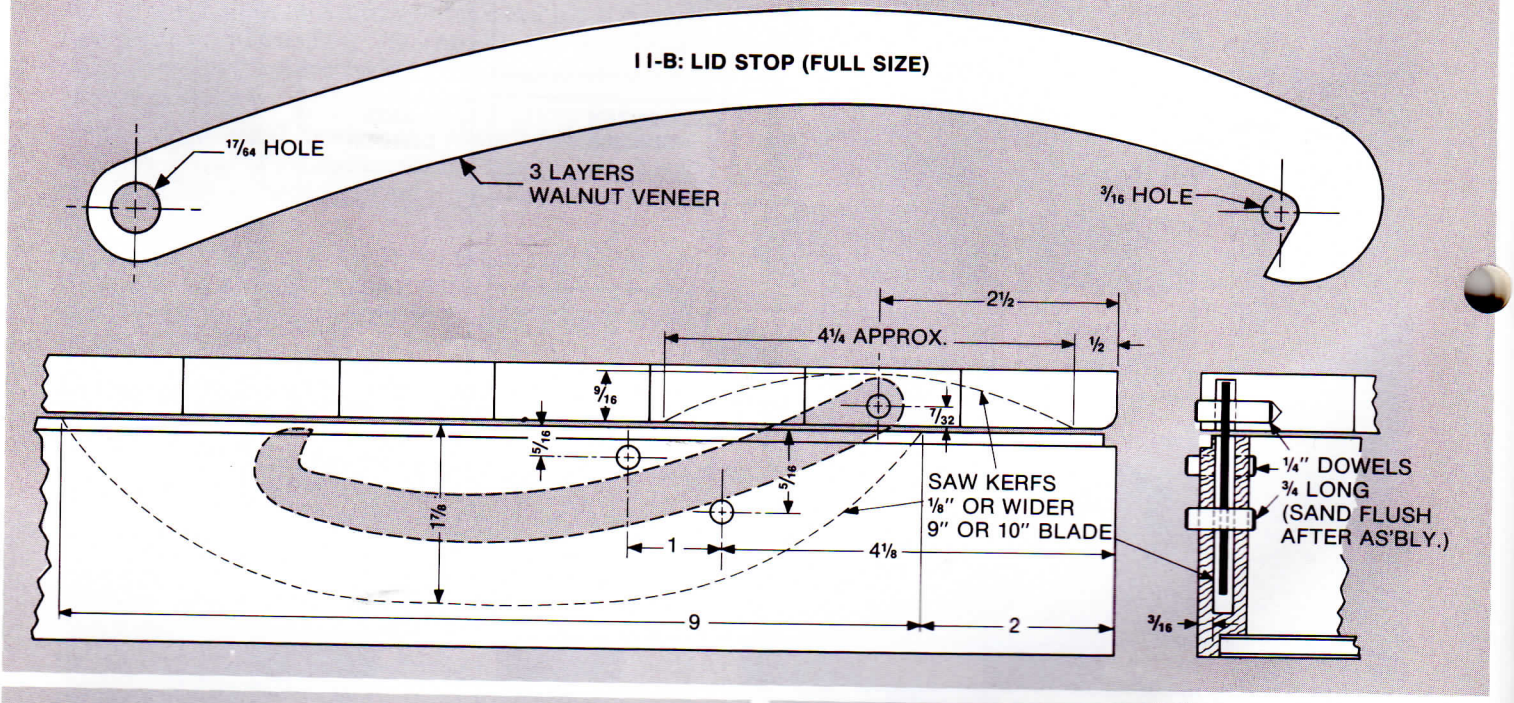
15" SQUARE	A	B	C	D
	15	14⅝	4¾	3

19" SQUARE	A	B	C	D
	19	18⅝	6⅜	3¾

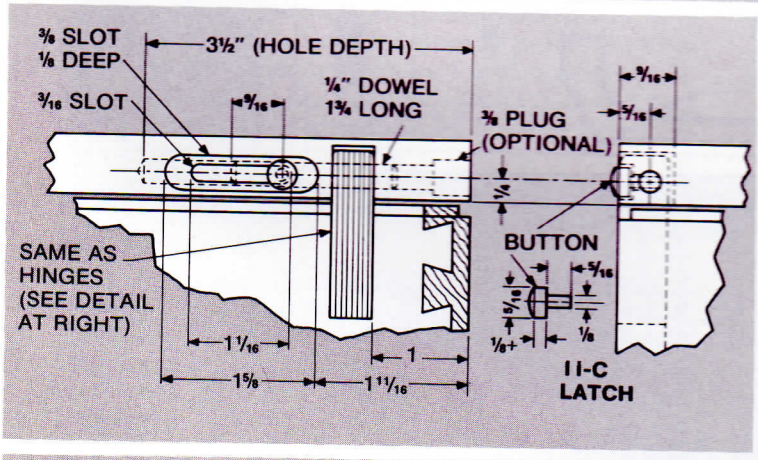
PLAN I: BOX ASSEMBLY



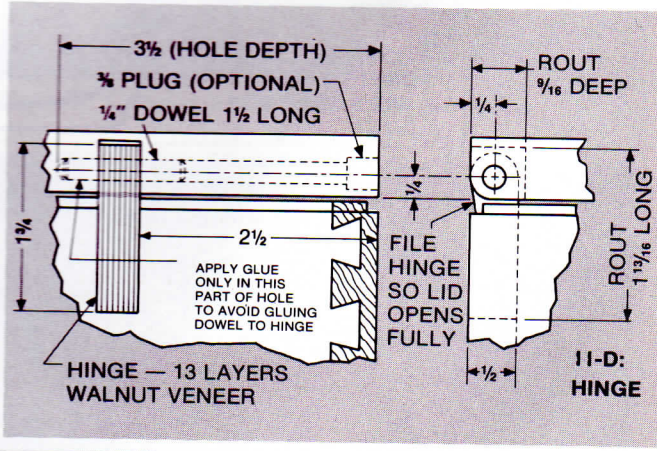
II-A: HANDLE (FULL SIZE)



II-B: LID STOP (FULL SIZE)



II-C
LATCH



II-D:
HINGE

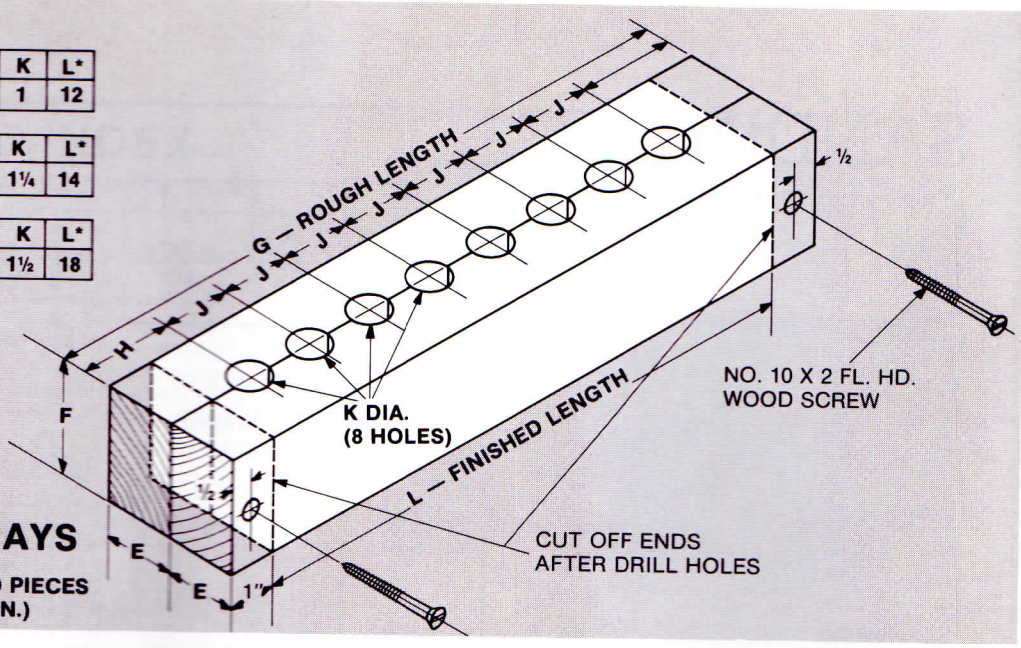
PLAN II: WOOD HARDWARE DETAILS

13" SQUARE	E	F*	G	H	J	K	L*
	1½	2⅜	14	1 15/16	1 7/16	1	12

15" SQUARE	E	F*	G	H	J	K	L*
	1⅜	2⅞	16	2 1/16	1 11/16	1¼	14

19" SQUARE	E	F*	G	H	J	K	L*
	1¼	3⅝	20	2 5/16	2 3/16	1½	18

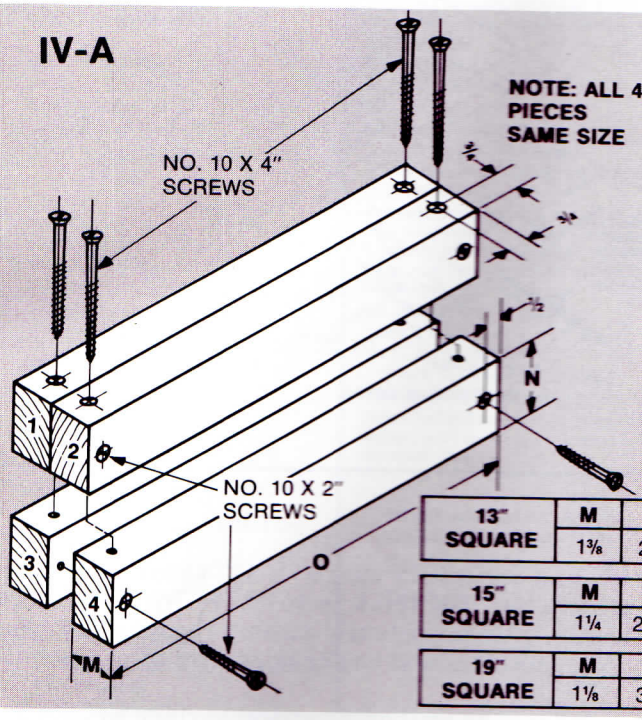
*DIMENSIONAL F AND L ARE APPROXIMATE. TRIM TO FIT FINISHED BOX



PLAN III: PAWN TRAYS

(MAKE TWO BY SCREWING TWO PIECES OF WOOD TOGETHER AS SHOWN.)

IV-A

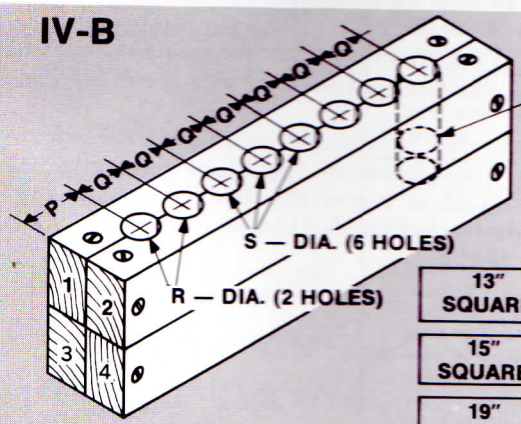


13" SQUARE	M	N	O
	1⅜	2⅛	14

15" SQUARE	M	N	O
	1¼	2½	16

19" SQUARE	M	N	O
	1⅛	3¼	20

IV-B

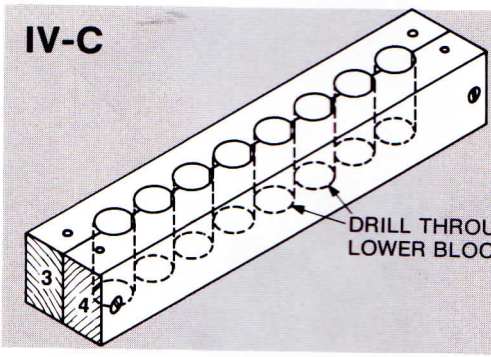


13" SQUARE	P	Q	R	S
	1 15/16	1 7/16	1¼	1⅛

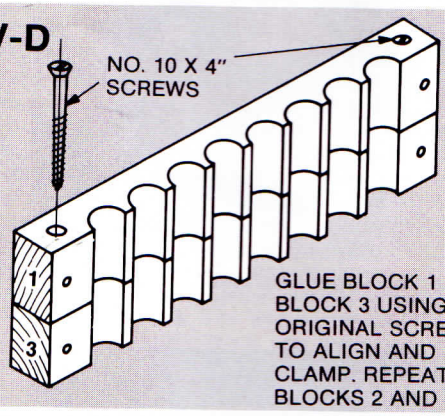
15" SQUARE	P	Q	R	S
	2 1/16	1 11/16	1½	1⅜

19" SQUARE	P	Q	R	S
	2 5/16	2 3/16	2	1¾

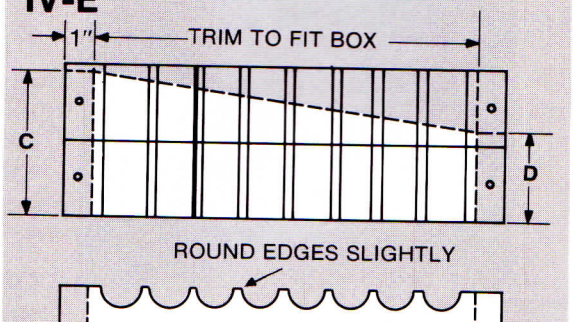
IV-C



IV-D



IV-E

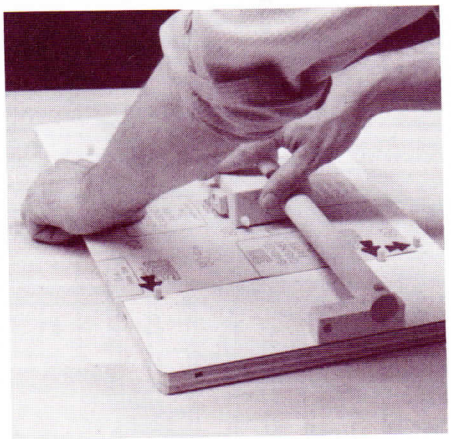


DIMENSIONS C AND D SHOWN IN PLAN I

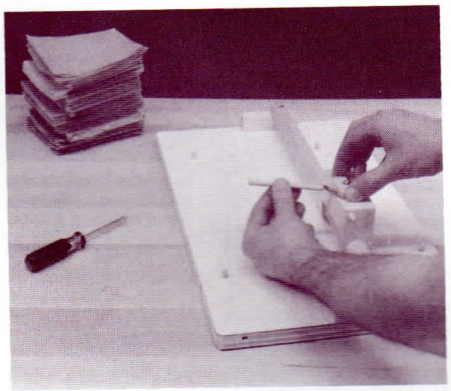
PLAN IV: PIECE TRAYS

SANDPAPER CUTTER

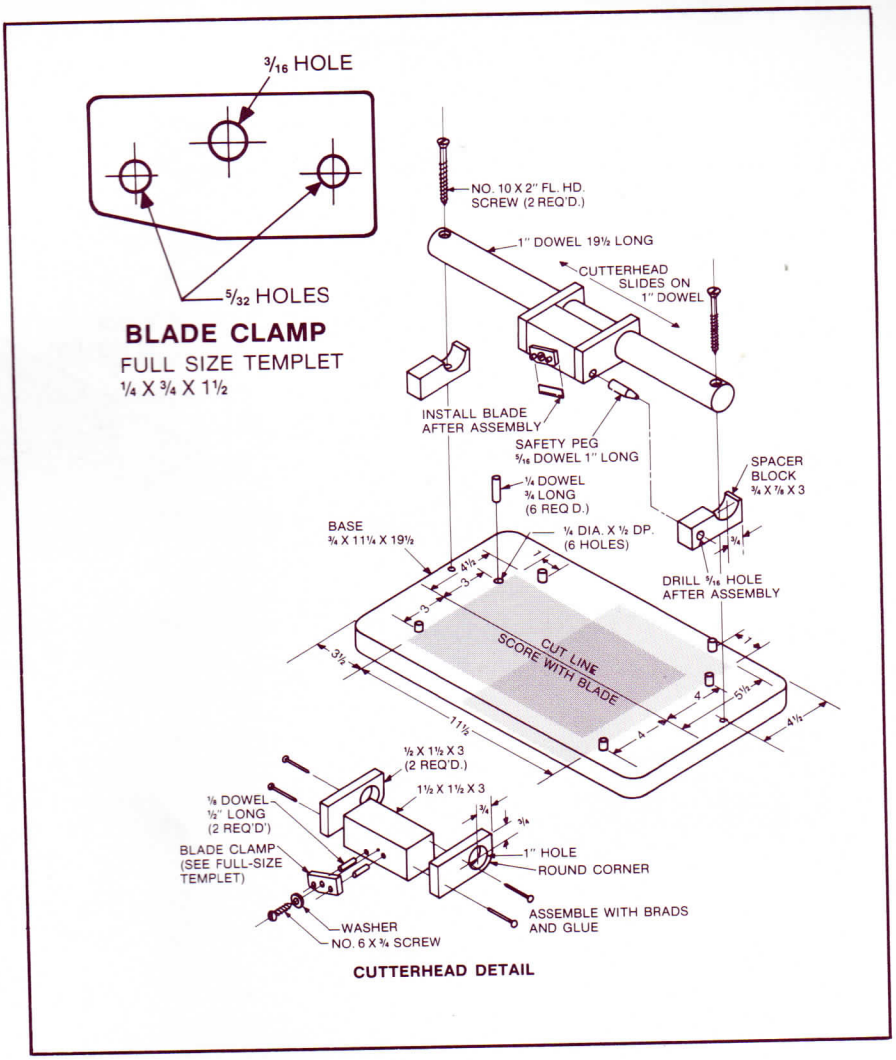
Cutting paper lengthwise. Use pegs at top.



Cutting paper crosswise. Use pegs at bottom.



Tilt cutterhead up to change blades. Embedding the blade in a hardwood dowel makes for healthy fingers. We cut the stack of paper shown (grits from 60 to 220) before turning the blade around.



This gadget quickly and accurately cuts 9" x 11" sandpaper in half lengthwise and crosswise. The trick is to score the paper deep enough to tear cleanly, without actually cutting through the paper and into the grit. We found this was easier to control after the blade got a little dull.

The cutter will work just as well on a vertical surface as on a horizontal one. We mounted ours on the side of the sandpaper rack in this issue's CRAFTSHEET; it's always available when needed, but never in the way. It should be mounted around eye-level for convenient operation.

For the base, Formica, tempered hardboard, or particle board (in that order) is preferred to wood because the blade tends to cut deeply into the wood and jam as it comes off the sandpaper. Plywood should work reasonably well, provided the blade travels *across* the grain to minimize this problem.

DIRECTIONS

Make the cutterhead first. Slip it onto the 1" dowel, and mount the dowel on the base. Install a blade and use it to score a "cut line" on the base. Lay out peg locations from the scored "cut line." Finally, drill through spacer block and into cutterhead and install safety peg in cutterhead.

SOURCES INDEX

NEW ENTRIES SHOWN IN BOLD-FACE TYPE

HARDWARE

BALL AND BALL
463 West Lincoln Hwy.
Exton, Pa. 19341
Catalog $1.00, 53 pages
Minimum order $3.00

Fine reproductions of Colonial, Early American, and other styles of cabinet hardware. Will also make "specials" to order.

PLANS

CONSTANTINE,
ALBERT AND SON, INC.
See WOOD

Colonial and Early Am. furniture and accessories (some full-size), workbenches, wooden-gear clocks, toys, bars, lawn cutouts, etc. (many full-size).

CRAFT PRODUCTS CO.
Rt. 64 at Rt. 83
Elmhurst, Ill. 60126
Catalog 25¢, 68 pages
30¢ handling charge on orders under $3.00

Clock specialists — plans, movements, faces, hands, finials, moldings, etc., for grandfather clocks, grandmother clocks, shelf clocks, etc.

CRAFT PATTERNS STUDIO
Elmhurst, Ill. 60126
Catalog 50¢, 106 pages
No minimum order

Furniture and accessories (traditional and modern, lawn furniture and decorations, toys, recreational equipment, boats, bars, etc.

OLD SOUTH PATTERN CO.
Box 11143
Charlotte, N.C. 28209
Plans Pamphlet 25¢, 16 pages
No minimum

Expensive, excellent blueprints for authentic reproductions of American antiques. Tables, chairs, chests, spinning wheel, shelves, etc.

TOOLS

BROOKSTONE COMPANY
Peterborough, N.H. 03458
Catalog 50¢, 48 pages
No minimum order

Hard-to-find hand tools for machinists, woodworkers, mechanics, etc.

WOOD CARVERS SUPPLY CO.
3112 W. 28th St.
Minneapolis, Minn. 55416
Catalog 50¢
Minimum order?

Carving tools and other hand tools. Wood taps and dies: 1/2, 3/4, 1".

WOODCRAFT SUPPLY CORP.
313 Montvale Ave.
Woburn, Mass. 01801
Catalog 50¢, 42 pages
Minimum order $5.00

Broad line of woodworking hand tools; carving tools, planes, wood taps and dies from 1/2" to 2", etc.

WOOD

CONSTANTINE,
ALBERT AND SON, INC.
2050 Eastchester Rd.
Bronx, N. Y. 10461
Catalog 50¢, 85 pages
Minimum order $4.75

Domestic hardwoods — 1/4" to 4", imported hardwoods — 1/4" to 2", domestic and imported veneers, plywood, hard-to-find tools, kits, plans, finishes, inlaid pictures, hardware, etc.

CRAFTSMAN
WOOD SERVICE CO.
2727 S. Mary St.
Chicago, Ill. 60608
Catalog 50¢, 145 pages
50¢ handling charge on orders under $5.00

Domestic hardwoods — 1/8" to 4", imported hardwoods — 1/8" to 2", domestic and imported veneers, plywood, hard-to-find tools, kits, finishes, inlaid pictures, hardware, etc.

MONTEATH, J. H. CO.
2500 K Park Ave.
N. Y., N. Y. 10451
Stock list free (no catalog)
Minimum order $25.00 per item

Domestic hardwoods to 4", imported hardwoods to 2" (to 4" some items), veneers, plywood. Ship via truck.

DOES ANYBODY KNOW OTHER SOURCES FOR:
Roll-top desk plans

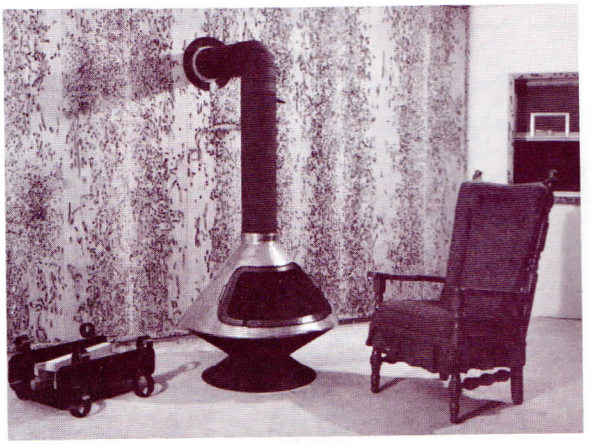
Thanks to: F. Willard Dittmar
Ralph D. Gustin
John D. Latham
Haven Nichols
Charles E. Rife
Andy Rabinowitz
Fred R. Taylor

for all the help with this page, and a special thanks to Brooks Loudin who sent us 23(!) names. Look for more additions in our next issue or maybe the one after that.

We do not accept any paid advertising for this page, nor do any of our staff accept personal favors from companies represented here. If a company or a product is listed on this page, it's because we think it will benefit or interest some of our readers. We neither recommend nor condemn any of the sources listed; we prefer certain sources among these listed, but we know other craftsmen have different preferences, so we try to be as impartial as possible.

The editor

TEREDO-WORM BORED WOOD



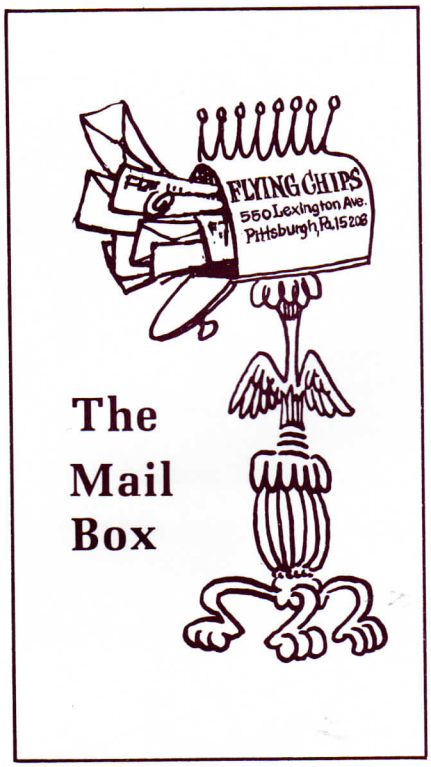
Clarence F. Butz of Heriot Bay, B.C., Canada, sent us these photos and the information below. These boards come from the "boom logs" chained together by loggers to contain 66-ft.-square rafts of logs which are taken to saw mills and pulp mills by tugboat. At first the boom logs float high in the water, but as they are used over and over again, they gradually become so waterlogged and wormeaten that they barely float. Teredo worms attack only the part of the log that is underwater, so the gradual sinking of the log accounts for the hole pattern shown in the photos; one edge of the board is almost clear of holes and the other edge is full of them. The worms die when the log has been out of the water a week, and leave no trace of themselves in the finished lumber (at least in the sample we've seen) except a white papery shell lining some of the holes. The material can be worked, fastened, and finished with most normal methods.

Available species:
Red Cedar
Hemlock
Fir

Sizes:
Standard; 1" x 6" to 16" wide, 8' and longer
Special order; 2"-6" thick; 12"-20" wide

Prices
$1.00/bd. ft., shipped freight collect (no customs charge.)

Address:
Clarence F. Butz
Box 102
Heriot Bay, B.C.
CANADA



WOOD TAPS And DIES

Several readers have written asking for sources of wood taps and dies. We now have two listed in our SOURCES INDEX, preceding page, under "TOOLS".

THAT JACK . . . WHAT A CARD!

FROM THE HOME WORKSHOP OF

JACK WELTY

SPECIALIZING IN

WOOD CHIPS	FRESH SAWDUST
PAINT SPATTERS	HAMMERED THUMB
KINDLING WOOD	FANCY SPLINTERS
DRILLED HOLES	MITERED CORNERS

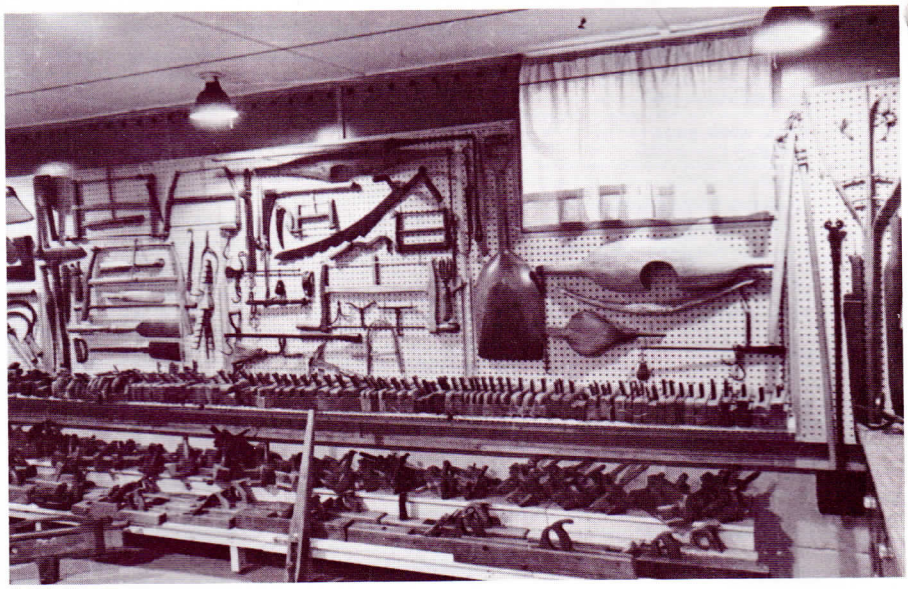
AND SOMETIMES USABLE RESULTS!

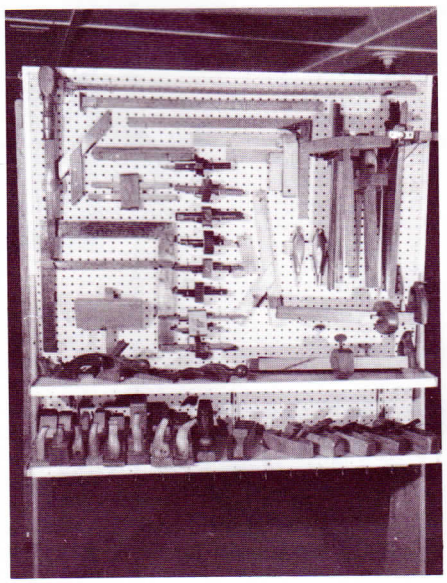
Please feel free to publish my card in Flying Chips. I hope that other readers — and fellow home workshop addicts — will enjoy sharing this fun, for that's what a hobby is all about!

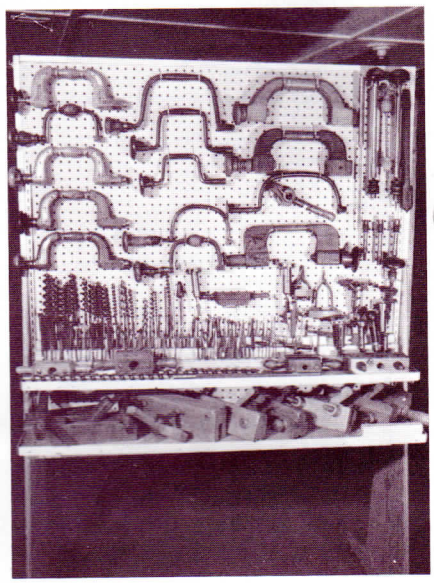
Jack Welty
Riverside, Calif.

Right on, Jack, and thanks . . . that's about the nicest card we've ever seen!

ANTIQUE TOOLS And SPERM OIL







Enclosed are 15 prints showing most of my antique tool collection . . . some 1475 items I have collected in the last 10 years. (I've been retired 12½ years, formerly an electrical engineer with G.E.) When I started collecting, there wasn't much competition from dealers and other collectors, but not anymore. Prices are going up and up.

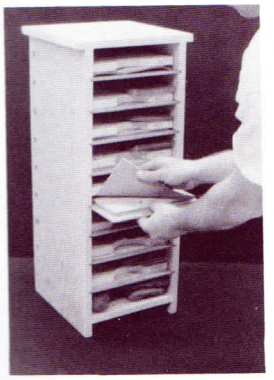
While some of my Delta tools are about 35 years old, there is not a spot of rust on them. A light coat of sperm oil, wiped off with a dry cloth, acts as an effective rust preventative and does not get sticky or gummy. This material is still available from old-time pharmacies, or they can order it for you.

Frank L. Sahlmann
Erie, Pennsylvania

We only had space to show a small part of Mr. Sahlmann's antique-tool collection. Nice, huh? The tip on sperm-oil sounds good, (Mr. S. claims the odor doesn't last). He also sent us some photos of workbenches he built himself — we like them so well we might make a project out of them someday.

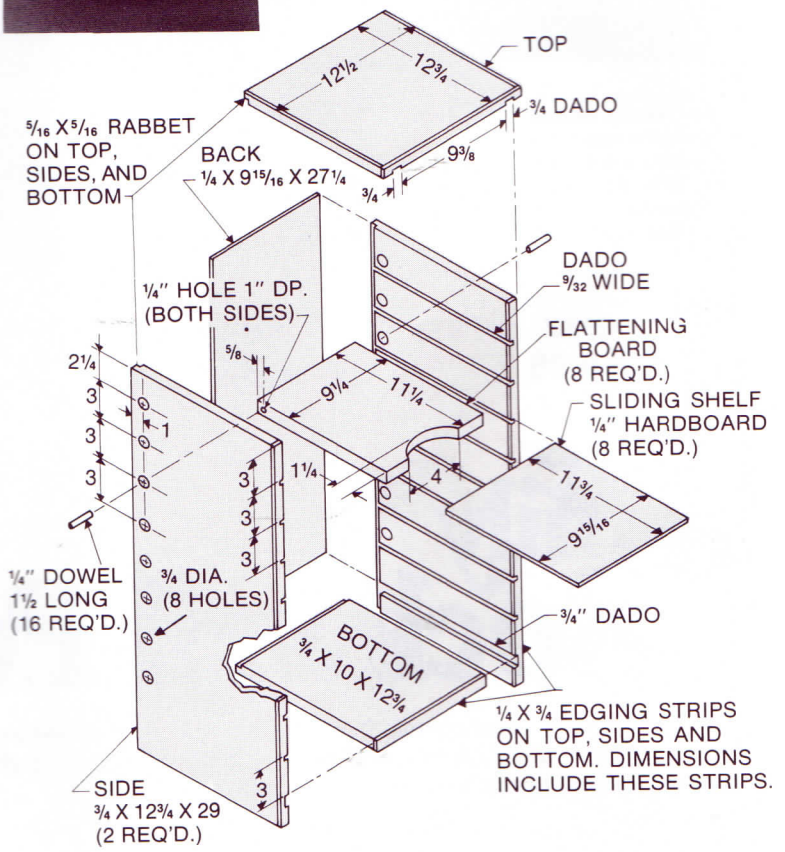
CRAFTSHEET

SANDPAPER RACK

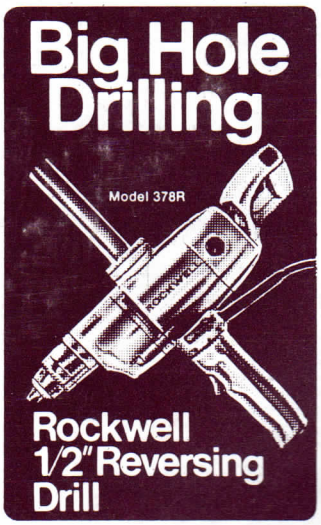


We finally got disgusted with our sandpaper for hiding in inaccessible places and curling up, so we decided to fix it once and for all. Here's the result; we hope it helps you out too.

Our rack has 8 sliding shelves for paper. The bottom of the rack adds a fixed shelf for steel wool. If you need more shelves, add 3" to the height for each shelf. The oversize holes (3/4" dia.) for the 1/4" dowels allow the flattening boards to accommodate stacks of paper from 1 sheet to about 1/2". We use the "waste" space on top of each flattening board to hold cut-up sheets. The rack can stand on a horizontal surface or hang on a wall.



- ALL DADOES ⁵/₁₆ DEEP
- TOP, SIDES AND BOTTOM ARE ¾" PLYWOOD OR PARTICLE BOARD.
- PUT PAPER FACE-DOWN IN RACK.
- ASSEMBLE CABINET BEFORE INSERTING DOWELS IN FLATTENING BOARDS. THEN PUT THE BOARDS IN THE CABINET AND INSERT THE DOWELS THROUGH THE ¾" HOLES.



For drilling holes up to 1" in wood; ½" in steel. Features include:

- Spade-Handle Design
- Powerful 5.0 Amp Motor
- 560 RPM, Forward or Reverse
- Double Reduction Gear Drive
- Ball Bearing Construction

ONLY $69.95

- Drills Up to ½" in Steel, 1" in Wood
- 5.0 Amp Motor, Industrial Chuck
- D-Handle Ball Bearing Equipped

ONLY $54.50

Full 3.0 Amp motor with 0 to 1,000 RPM trigger-controlled variable speeds. In-handle reversing switch and twist-collar drill-to-fastener change-over. Drills ⅜" in metal; ¾" in wood; drives up to No. 10 x 1½ wood screws.

ONLY $79.50

- Trigger-Controlled Variable Speed—Forward or Reverse 0 to 1700 RPM
- High-Torque Double Reduction Gear Drive
- Ball and Needle Bearings
- Full 3 Amp Motor
- Lightweight Aluminum Alloy Housing with All-Position Pistol Grip

ONLY $49.95

Prices subject to change.

the Family of Rockwell Power Tools

Rockwell offers the most complete line of drills and drill presses available anywhere. The four models shown above are just a small part of our commercial-duty line for professional craftsmen. Your Rockwell dealer can help you pick the right drill for your needs, or write for our Catalog 2032.

ROCKWELL MANUFACTURING CO.
FACTORY SERVICE BRANCH
2755 N.E. BROADWAY
PORTLAND, OREGON 288-6888, 89