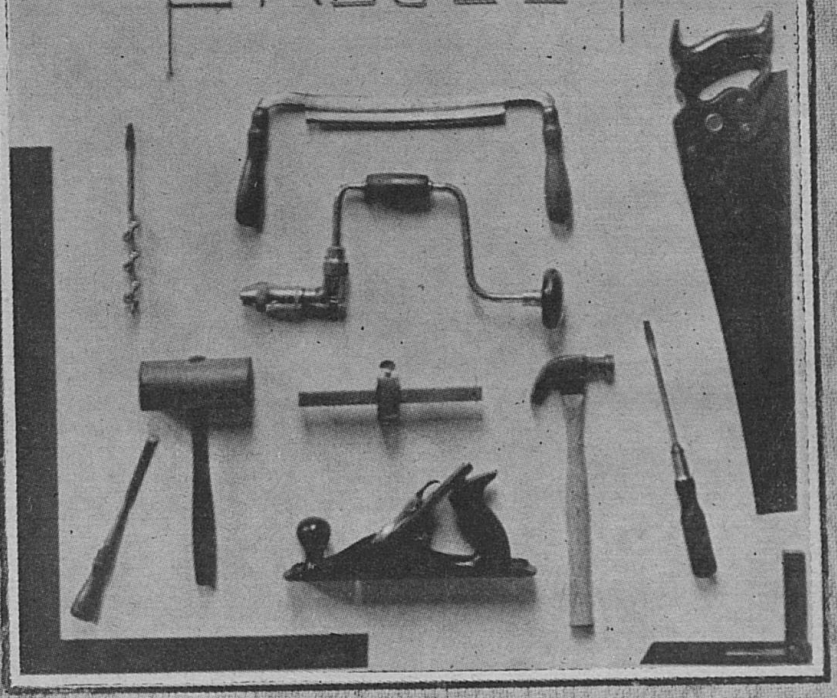
4-H Woodworking Project



Circular 423

UNIVERSITY OF KENTUCKY
College of Agriculture and Home Economics
Agricultural Extension Division

Thomas P. Cooper, *Dean* and *Director*

REQUIREMENTS

1. Rural boys and girls between the ages of 10 and 18 may enroll in this project.

2. Enrollment may take place at any time recommended by the county agent.

3. Each member or group of members should ask the leader for suggestions with regard to buying tools and materials, organizing the work, and setting up the workshop.

4. Each member must finish at least six articles, following instructions contained in this circular. The articles to be made should be selected by the club member and project leader and approved by the county agent.

5. Each member will keep a record of the materials used and their cost, and the time required to make each article.

6. Each member should exhibit the finished articles at a fair or show.

7. To get the greatest amount of development from 4-H Club work, a member should attend all meetings of his club and take part in its activities.

ORGANIZATION

Before beginning this project, a "project group" should be organized. Five or more boys who are ready to start may form the project group. They should elect one boy as captain and then find some older person for their project leader. This leader should agree to help the individual members with their problems such as getting tools, working space, and materials, and give advice about the work. The group should decide on the articles to be made, and all should work on the same kind of article at the same time, if possible. The leader should approve each article as completed before the member is permitted to start work on the next article. -Space for leader's approval is provided in the record in this circular, page 19. Working in a group makes this project more interesting. The project captain will report progress of the group at regular club meetings, when asked to do so by the leader.

This circular is a revision of
Circular 325

4-H Woodworking Project, Unit I

By J. B. Brooks and E. R. Young

The purpose of this project is to encourage club members to have well-equipped farm shops in order that they may learn the fundamentals of woodworking, the identification of native woods, the selection, care and use of tools, the reading of plans, and the painting or finishing of woodwork. Articles have been selected which may be made with the limited materials, tools, and equipment commonly found on the farm. Knowledge gained by mastering this project will give club members more self-reliance and ability in planning and doing the more difficult jobs of repair and improvement needed in the home and on the farm.

SUGGESTIONS

1. Read carefully the requirements and organization suggestions on page 2 of this circular before enrolling in this project.

2. Before beginning work on an article, study the drawings, list of materials, and directions. The drawings give dimensions, details, and method of putting the parts together into a finished article. Although the materials needed are given in exact sizes, it is not expected that the pieces will be purchased in these sizes from a lumber dealer. When selecting materials from which to make these articles, get regular stock sizes of such lengths and widths that various parts of the article may be cut out with the least waste of material.

3. Accuracy, economy of time, neatness, mechanical skill, and clear thinking are some of the things to strive for in this project.

4. Upon completing work for the day, clean the shop or work space and put all tools away. Club members will find it pleasant to work in a well-kept shop. The old saying,"Keep your shop and your shop will keep you," is a good motto for every club member enrolling in this project. An orderly work space also leads to greater success in reaching the aim and purpose of this project.

THE WORK SPACE

Even though a well-equipped farm shop is a very profitable investment, it is not necessary to have a separate building for a shop in

order to do the work required in this project. Working space may be found in a school building, basement of the house, or in one corner of a machinery shed, tobacco barn, tobacco stripping shed, or other outbuilding. Any well-lighted, well-ventilated room having enough floor area for a bench and work space may be used. Provision should be made for heating the work space, as most of the work on this project may be done during cold or rainy weather. The brick brooder stove illustrated in Kentucky Extension Leaflet 44 might be used for this purpose.

WOODWORKING TOOLS

Which Tools to Get

Club members will not necessarily have to buy a large number of tools in order to enroll in this project, for some may be already available on the farm. Those that are out of order should be repaired and sharpened (see the section on care and repair of tools on page 5). If tools must be bought, choose well-known makes, of good quality and proper size to use for general repair work on the farm. Tools made from good materials last longer and are easier to keep in good condition. If you don't have the money to buy all the tools you want, buy those you need most. Then buy more after you have more experience and undertake more difficult jobs.

The tools shown in Fig. 1 will be needed in making the articles described in this circular. They may be placed on a rack as shown in Fig. 1.

The following is a list of tools which are desirable and should be added to the shop as funds permit.

14″ compass saw
26″ rip saw, 5½ point
Back saw for miter box
Coping saw with metal handle
10″ drawknife
Hand-axe
Spoke-shave
Sliding T bevel
8″ dividers
Marking gage
⅞″ to 3″ expansive bit
Countersink
Nail sets
6″ combination pliers
12″ half-round wood rasp
12″ round wood rasp
10″ flat file
8″ triangular file
6″ slim tapered triangular file
Oil-stone, 1″ x 2″ x 7″
Emery wheel for sharpening tools
Saw set
Saw vise

Care and Repair of Tools

Club members should cultivate a desire for good tools and learn how to keep them in good condition. It is easier to do accurate work with clean, sharp tools than with rusty, dull ones.

Tools should be kept in a clean, dry place convenient to the workbench. They may be placed on a rack, in a cabinet or in the drawers of the workbench. The space for each tool may be indicated by a painted picture of the tool where it is to be placed (see Fig. 1). At a glance one can see where each tool belongs and missing tools can be easily identified.

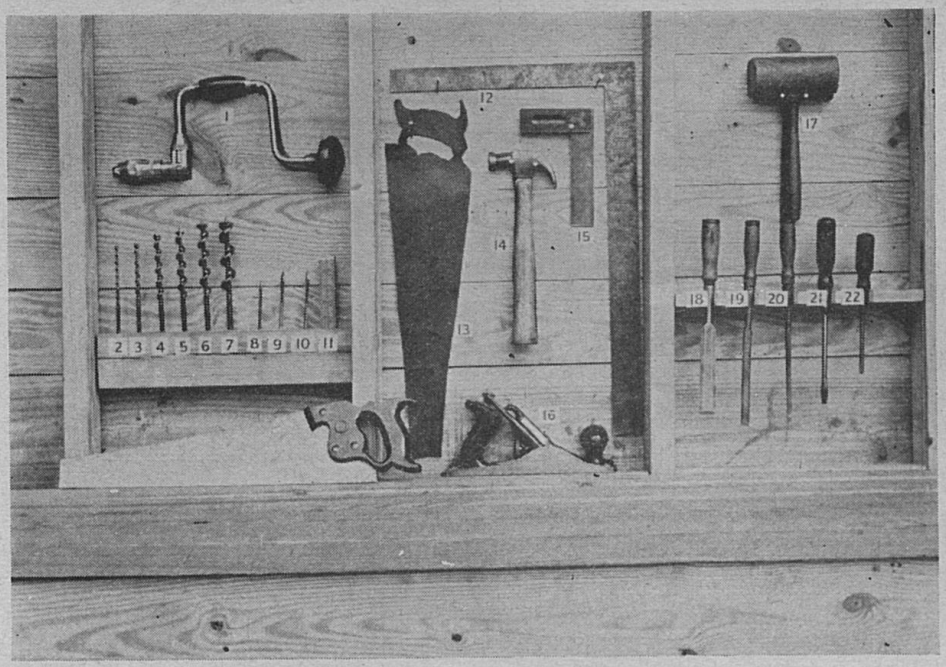


Fig. 1.— Tools needed in Unit 1, each in its proper place back of the work bench, except the saw which has been taken down. Its place is shown with the black paint. The tools pictured, and their numbers on the rack are—

1. 10" ratchet brace
2-3-4-5-6-7. auger bits, ¼", ⅜", ½", ⅝", ¾", 1"
8-9-10. gimlet bits, 5/32", 6/32" 7/32"
11. 2 ft. boxwood rule
12. framing square, 24" x 16"
13. 24" hand cross-cut saw (10 point)
14. 1 lb. claw hammer
15. 6" try square
16. 11" jack plane (1¾" cutter)
17. wooden mallet
18-19-20. wood chisels 1", ½", ¼"
21-22. screwdrivers, 6", 4"

All metal parts of woodworking tools should be given a thin coat of oil to prevent rusting when they are not in use. Rusty tools may be cleaned by rubbing them with oil and powdered pumice stone or fine sandpaper.

Information on sharpening and repairing woodworking tools may be obtained from the various tool manufacturers or from local hardware dealers. It is advisable for the club members to have an experienced person to teach them how to sharpen and repair the tools they will use in this project.

SELECTION OF LUMBER

The grade of lumber and kind of wood to use in making an article depend upon the strength and finish desired. Oak, gum, beech, hickory, or other strong wood should be used in making articles such as milking stools and hammer handles. Since unusual strength is not required in such articles as the bird house, tool box, flower box and feed hoppers, such woods as pine, cypress and basswood may be used. In making book ends, door stops, or other articles to be used in the home, woods that may be given an attractive finish should be used. Woods such as maple, walnut, cherry and gum are considered among the finer furniture woods which excel in strength and beauty when properly finished.

FINISHING WOODWORK

The first thing to do in finishing an article after it is assembled is to prepare the surface. Plane and rub the wood with fine sandpaper or steel wool to remove all mill marks and imperfections. Do all the smoothing with the grain of the wood, as cutting across the grain mars the surface and shows in the finished work. Stain, wood filler, shellac, varnish, wax, enamel, or a combination of these may be used to finish articles for the home. Choose a finish that blends with other pieces of furniture in the house. Articles to be used outside the house may be given two or three coats of paint. Local paint dealers can furnish information regarding the selection of paints and finishing materials and their application to different kinds of wood.

ARTICLES TO BE MADE

1. Bench hook
2. Sawhorse
3. Homemade jig saw
4. Hammer handle
5. Cutting board
6. Hog trough
7. Tool, nail and bolt box
8. Milking stools
9. Chick feed hoppers
10. Bird house
11. Book ends
12. Flower box

BENCH HOOK

The bench hook is used to help hold materials for sawing, chiseling, planing, or sanding. It is a very handy device and should be one of the first pieces of equipment made for the work space.

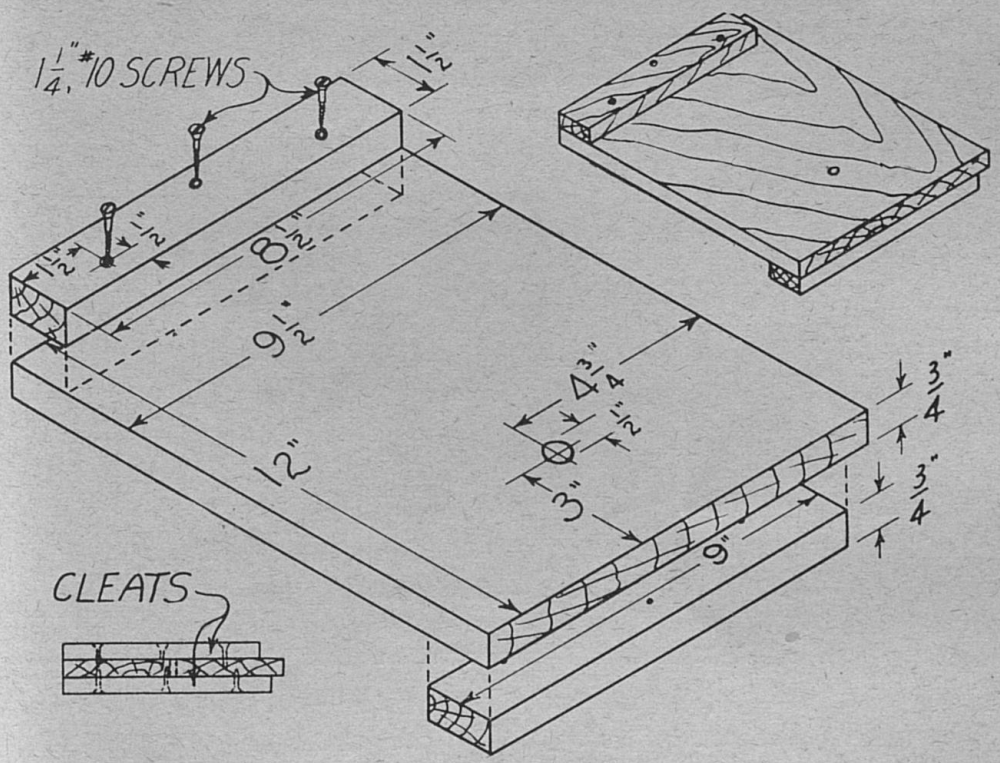


Fig. 2.— Bench hook

Materials Needed for Bench Hook

1 pc. ¾" x 9½" x 12"
1 pc. ¾" x 1½" x 8½"
1 pc. ¾" x 1½" x 9"
6, 1¼", No. 10 flat-head wood screws

SAWHORSE

At least two sawhorses are required in the shop. The sawhorse should be made of material surfaced on all sides and edges. Before starting to lay out the material, make a careful study of the drawing to determine angle cuts. After sawing and chiseling out slots "A" in the beam, hold the legs against the beam in the slots and mark the cuts "B" with a straight-edge laid on top of the beam. After the legs are cut, screw them to the beam holding them at the correct slant. Then mark and cut the four ¾" x 5½" x 12" braces "C."

The sawhorse should be fastened together with wood screws. It is not necessary to use paint or other finish on the sawhorse.

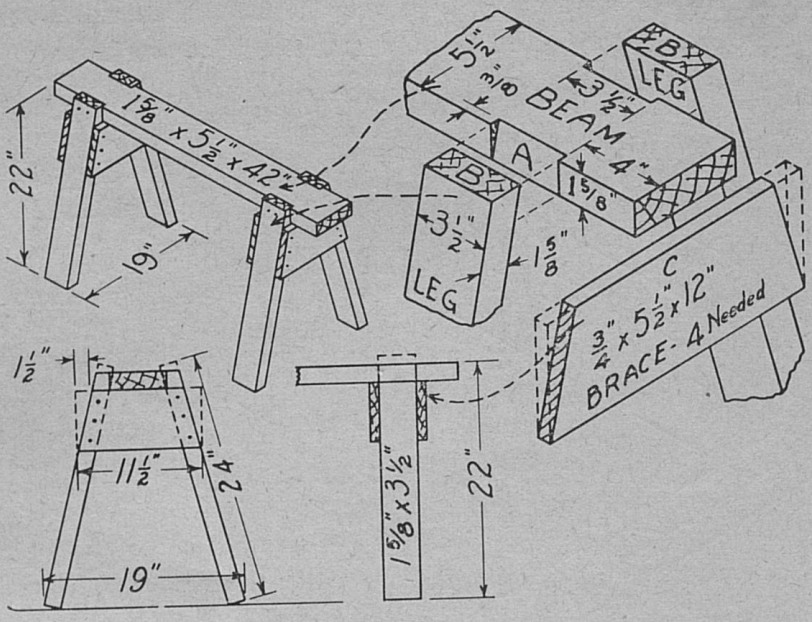


Fig. 3.— Sawhorse

MATERIALS NEEDED FOR SAWHORSE

1 pc. 1⅝" x 5½" x 42" for beam
4 pcs. 1⅝" x 3½" x 24" for legs
4 pcs.. ¾" x 5½" x 12" for braces
2 doz. 1¾", No. 10, flat-head wood screws
8, 3", No. 14. flat-head wood screws

HOMEMADE JIG SAW[1]

The homemade jig saw shown in Fig. 4 is used to cut curved or irregular lines where a hand saw could not be used. This saw may also be used for cutting enclosed curves such as the 2½" entrance holes for the bird house shown in Fig. 12. For such enclosed curves, bore a small hole with an auger bit, release one end of the saw blade and insert it through this hole, then replace the saw blade in the saw arm.

All pieces except the ¾" x 3½" x 30" upright and the saw table should be made of hard wood. The saw table may be made of plywood.

[1] Plans and directions for building the homemade jig saw were furnished by Mr. Raymond Layne, leader of the West Union 4-H Club.

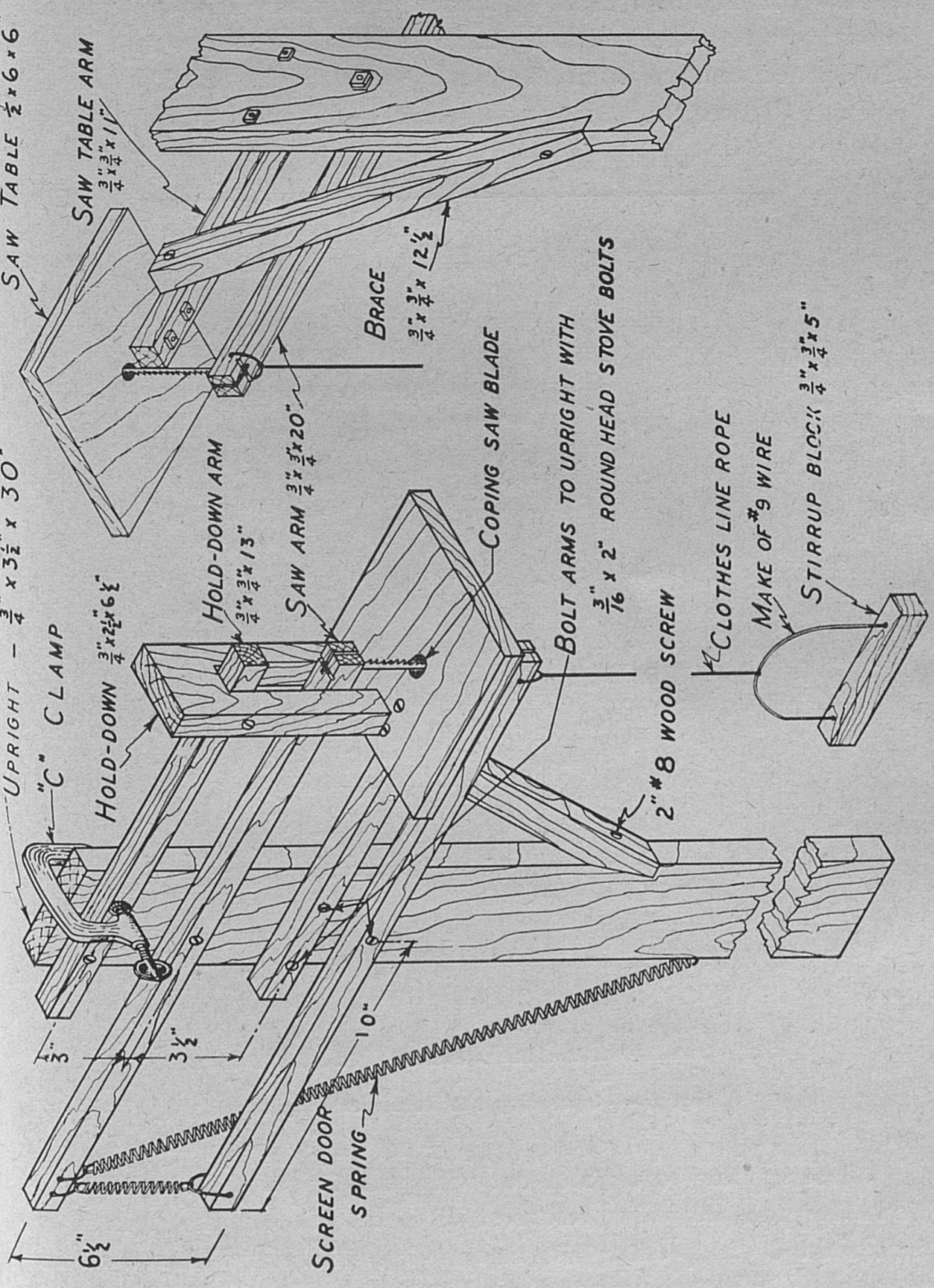


Fig. 4. — Homemade jig saw

The jig saw may be clamped to a standard made for the purpose as shown in Fig. 5 or it may be screwed or clamped to any suitable bench, box, or post in a convenient location. The stirrup rope should be adjusted so that when the upper saw arm is pulled completely down to the saw table, the stirrup block just touches the floor.

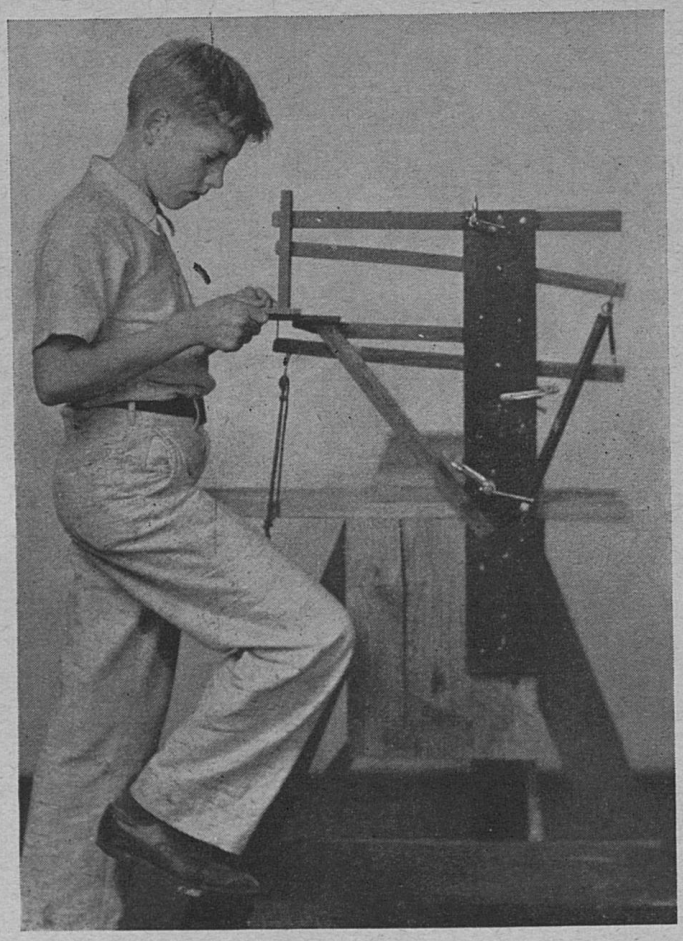


Fig. 5.— Operating the homemade jig saw

When starting to make a cut with the jig saw, adjust the hold-down for the particular thickness of stock. To set the hold-down, loosen the C clamp enough so that the hold-down arm can be pushed up slightly. Place the piece of wood to be sawed near the blade and lower the hold-down until it nearly touches the piece of wood. Tighten the C clamp and the wood being cut will then be held on the table and not permitted to move up and down with the blade.

When large pieces or difficult designs are being sawed, two members can work together to advantage, as the person guiding the work can then give full attention to the saw.

If a discarded sewing machine is available, this jig saw may be mounted on it in such a manner that the saw is operated by the treadle.

Materials Needed for Jig Saw

1 pc. ¾" x 3½" x 30" upright
1 pc. ¾" x ¾" x 13" hold-down arm
1 pc. ¾" x ¾" x 20" saw arm
1 pc. ¾" x ¾" x 11" saw table arm
1 pc. ½" x 6" x 6" saw table
1 pc. ¾" x 2½" x 6½" hold down
1 pc. ¾" x ¾" x 12½" saw table brace
1 pc. ¾" x ¾" x 5" stirrup
1 4", iron C clamp
8 3/16" x 2" stove bolts
1 3/16" x 3" stove bolts
1 2" No. 8, wood screw
1 18" pc. No. 9, wire
1 12" pc. baling wire
1 30" pc. clothes line rope
1 6½" coping saw blade
1 screen door spring

HAMMER HANDLE

For a hammer handle, select a clear, well-seasoned piece of hickory which has straight grain extending the full length of the handle. Shaping the handle may be started with a saw and hand axe and finished with a draw-knife, wood rasp or a good, sharp, pocket knife.

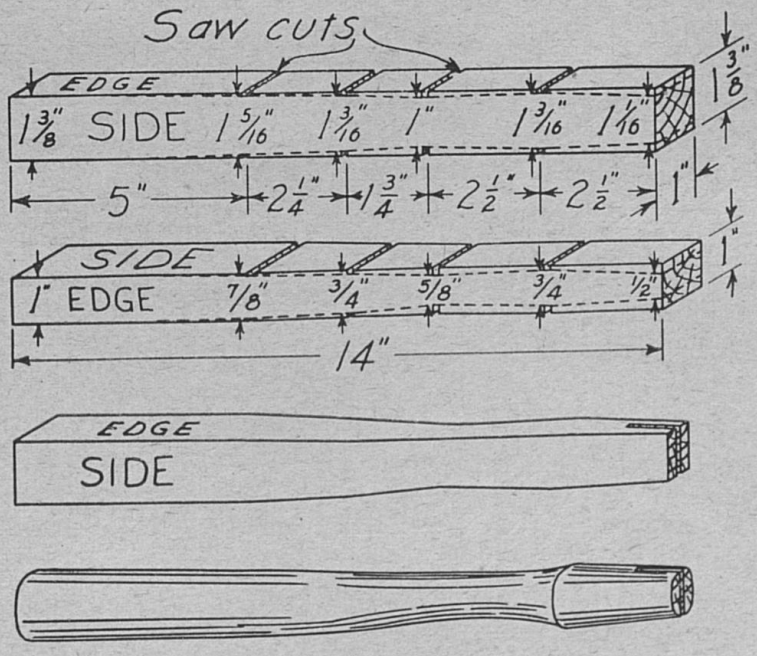


Fig. 6.— Hammer handle

The handle should then be smoothed with sandpaper. Soaking the handle in linseed oil for 24 hours ensures longer service. The handle is held in the eye of the hammer head with a metal or wooden wedge. Make a slot for the wedge by sawing the handle along the long diameter as shown in Fig. 6.

MATERIAL NEEDED FOR HAMMER HANDLE

1 pc. clear, well-seasoned hickory, 1″ x 1⅜″ x 14″

CUTTING BOARD

The cutting board should be made of yellow poplar, maple, cherry, or other close-grained wood. The board should be free from cracks or dents which would make it hard to keep clean. Finish by sandpapering the entire surface. Do not apply paint or any other finishing preparation.

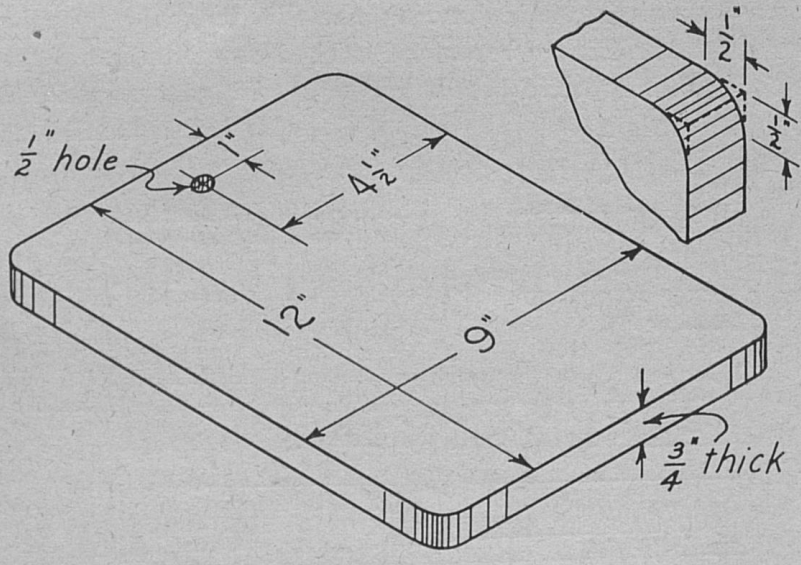


Fig. 7.— Cutting board

MATERIAL NEEDED FOR CUTTING BOARD

1 pc. ¾″ x 9″ x 12″

HOG TROUGH

A hog trough is easy to build and is a useful article for club members who raise hogs. The trough should be built of strong, durable wood, such as oak. No finish is needed.

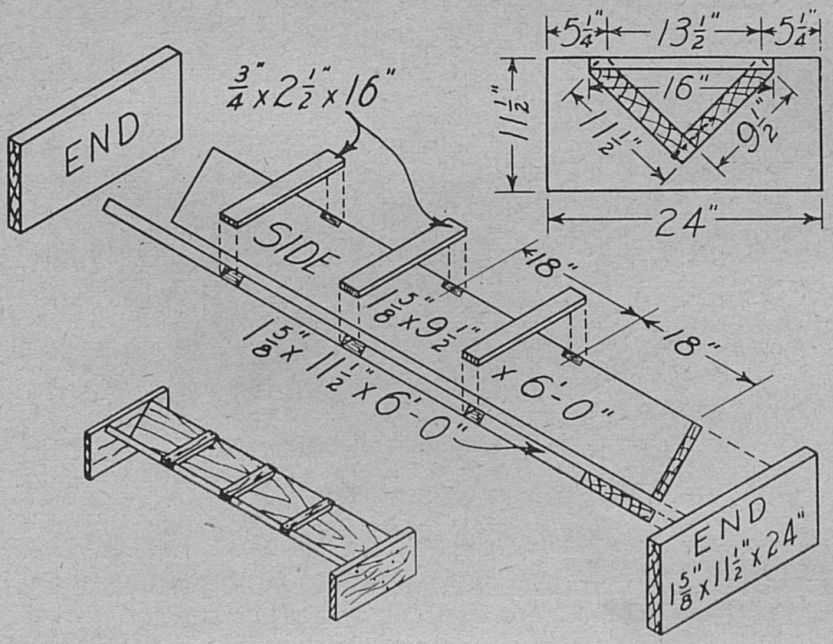


Fig. 8.— Hog trough

Materials Needed for Hog Trough

2 pcs. 1⅝" x 11½" x 24" ends
1 pc. 1⅝" x 9½" x 6' side
1 pc. 1⅝" x 11½" x 6' side
3 pcs. ¾" x 2½" x 16" braces
2 doz. 6d. common nails
2 doz. 10d. common nails

TOOL, NAIL, AND BOLT BOX

This box is handy for carrying tools, nails, bolts, and staples needed for doing odd jobs around the farm. It should be made of light wood surfaced on both sides and edges. In making the handle shown in the center piece, bore out as much of the hole as possible with a ¾" bit and complete the operation with a chisel. The box may be painted or given a coat of linseed oil.

Materials Needed for Tool, Nail, and Bolt Box

2 pcs. ¾" x 4½" x 11½" ends
2 pcs. ¾" x 4½" x 18" sides
1 pc. ¾" x 11½" x 16½" bottom
1 pc. ¾" x 6½" x 16½" center piece with handle
3 pcs. ¾" x 3¾" x 5½" partitions for nails, etc.
4 doz. 6d finishing nails

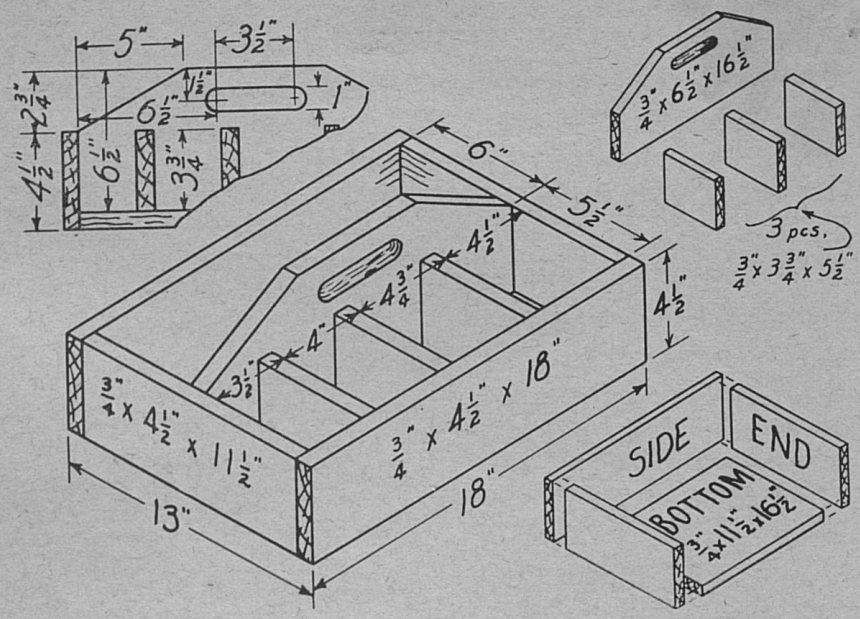


Fig. 9.— Tool, nail, and bolt box

MILKING STOOLS

Either one of the two milking stools shown in Fig. 10 may be built. It should be made from hard wood, such as oak, hickory, or gum. In making the hole in the seat for the one-legged stool, bore out as much of the hole as possible with a ¾" bit, then complete the operation with a chisel. Use a 1" bit in making the holes for the three-legged stool. Block A is temporarily nailed on the under side

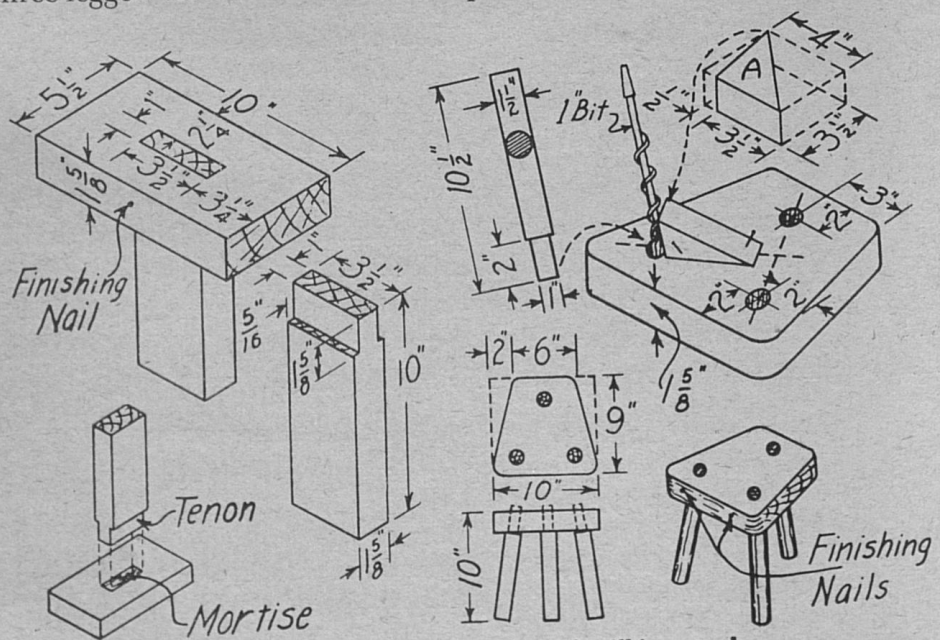


Fig. 10— One- and three-legged milking stools

of the seat to guide the bit. The ends of the legs that go through the seat should be sawed off flush after legs are nailed. Finish the stool with two coats of paint.

Materials Needed for Milking Stool

One-legged stool	Three-legged stool
1 pc. 1⅝″ x 5½″ x 10″ for seat	1 pc. 1⅝″ x 9″ x 10″ for seat
1 pc. 1″ x 3½″ x 10″ for leg	3 pcs. 1½″ x 1½″ x 10½″ for legs
2, 8d finishing nails	3, 8d finishing nails

CHICK FEED HOPPERS

Two types of chick feed hoppers are shown. The hopper built of lath strips can be used for chicks up to three weeks of age. For older chicks, the hopper built of ¾″ or 1″ material is recommended. No finish is needed for the feeder made of lath, while a paint finish is recommended for the larger feeder so it will be easier to clean.

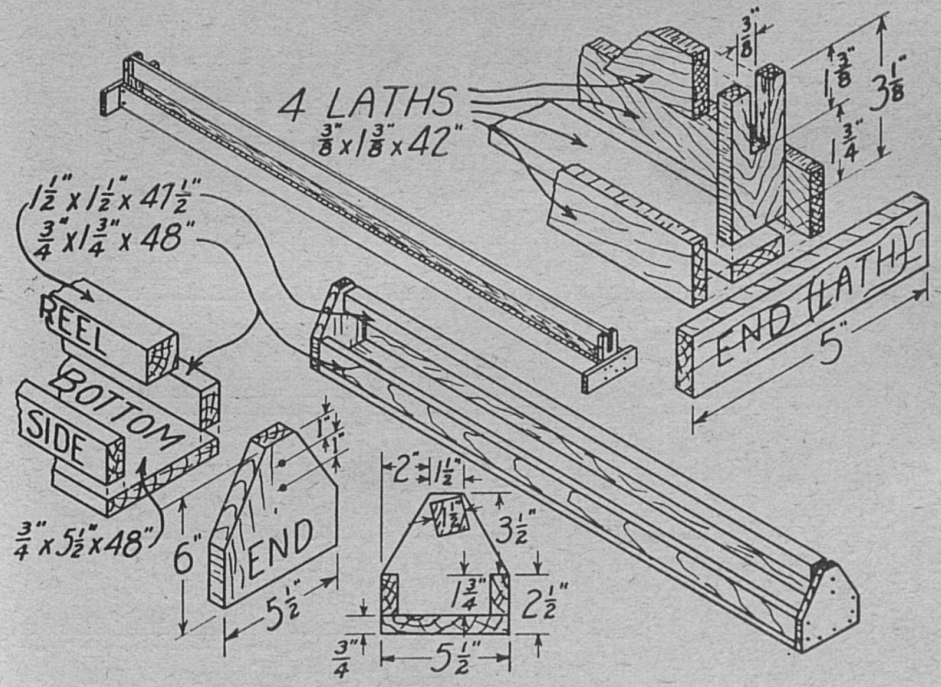


Fig. 11.— Chick feed hoppers

Materials Needed for Chick Feeders

Lath feeder	Board feeder
4 laths ⅜″ x 1⅜″ x 48″	2 pcs. ¾″ x 5½″ x 6″ ends
4 doz. 3d lath nails	1 pc. ¾″ x 5½″ x 48″ bottom
	2 pcs. ¾″ x 1¾″ x 48″ sides
	1 pc. 1½″ x 1½″ x 47½″ reel
	4 doz. 6d finishing nails

Fig. 12.— Bird house

BIRD HOUSE

(For the Purple Martin)

Since purple martins nest together in large numbers, a house of several rooms should be provided for them. The house shown on page 16 has six rooms each 6″ square, 6″ high inside, with a 2½″ diameter entrance 1″ above the floor. More rooms may be added if desired. Fasten the house to a pole at least 15 feet above the ground using screws through the back. The front should be fastened with screws to facilitate cleaning. Brown shades of paint should be used in finishing the house.

Materials Needed for Bird House

2 pcs. ¾″ x 6¾″ x 40″ sides	12, 2″ x ½″ x ⅛″ corner irons
1 pc. ¾″ x 7½″ x 43″ front	¼ lb. 6d box nails
1 pc. ¾″ x 6″ x 43″ back	¼ lb. 4d lath nails
7 pcs. ½″ x 6″ x 6″ floors	4 doz. ⅝″, No. 4 flat-head wood screws
1 pc. ¾″ x 5¾″ x 11″ roof	
1 pc. ¾″ x 6½″ x 11″ roof	1 doz. 1½″, No. 6 flat-head wood screws
1 pc. 3″ x 12″ roofing paper	
6 pcs. ½″ x 3″ x 6″ perches	3, 2″, No. 10 flat-head wood screws

BOOK ENDS

Book ends may be made of oak, walnut, cherry, or other hard wood if a natural finish is desired. Soft wood may be used if the

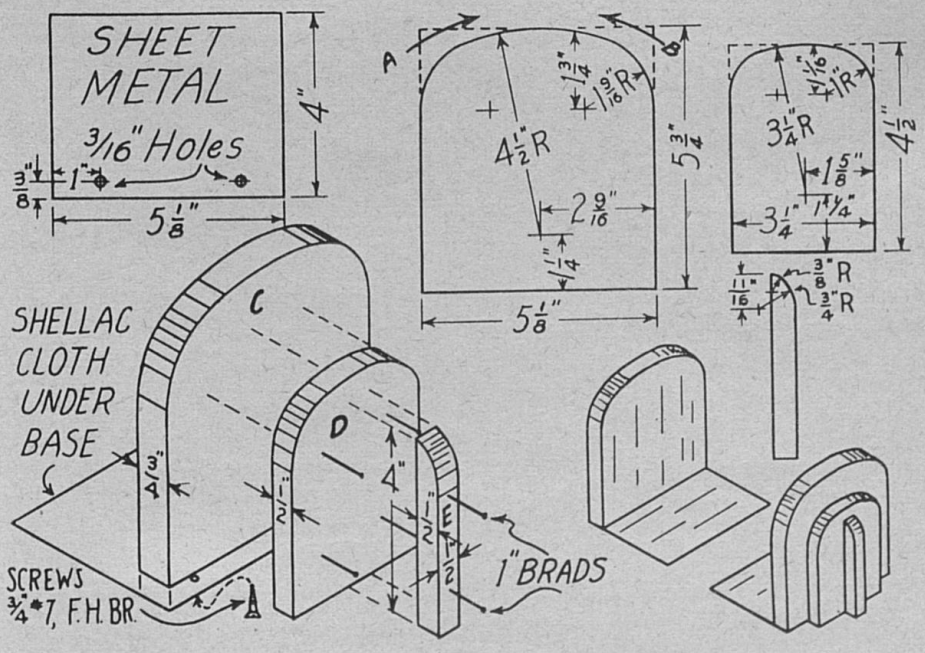


Fig. 13.— Book ends

book ends are to be given a paint or enamel finish. When rounding the corners of the pieces, for book ends, plane or saw in the direction shown by arrows A and B in Fig. 13 to prevent chipping the edges. After all parts are assembled, sandpaper the book ends until they are smooth, then paint, stain or finish them as desired.

MATERIALS NEEDED FOR BOOK ENDS

2 pcs. ¾" x 5⅛" x 5¾" for C
2 pcs. ½" x 3¼" x 4½" for D
2 pcs. ½" x ½" x 4" for E
2 pcs. 4" x 5⅛" heavy sheet metal
2 pcs. 4" x 5⅛" felt or heavy cloth
4, ¾" No. 7 flat-head wood screws
1 doz. 1", No. 16 brads

FLOWER BOX

The flower box should be made of decay-resistant wood such as cypress. However, if it is painted and protected during the winter, it may be built of any wood available. When assembling the parts, the joints should be painted to make them water-tight and to prevent their rotting. The sides should be securely fastened with wood screws to prevent warping of the boards. Sandpaper the entire box and apply two coats of paint.

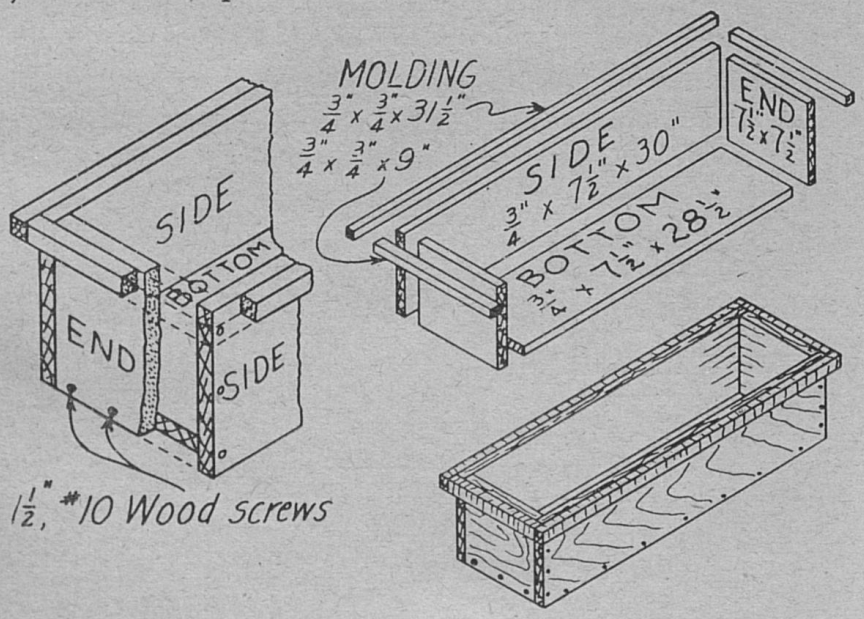


Fig. 14.— Flower box

MATERIALS NEEDED FOR FLOWER BOX

1 pc. ¾" x 7½" x 28½" bottom
2 pcs. ¾" x 7½" x 30" sides
2 pcs. ¾" x 7½" x 7½" ends
2 pcs. ¾" x ¾" x 9" molding
2 pcs. ¾" x ¾" x 31½" molding
2 doz. 1½", No. 10 wood screws
2 doz. 6d finishing nails

REFERENCE MATERIAL FOR LEADERS

For a list of books, magazines, and other publications valuable as reference materials for leaders of the woodworking project, write to the Agricultural Engineering Division of the College of Agriculture and Home Economics, Lexington.

RECORD OF ARTICLES MADE

Article ....

Hours required to make this article

Date													
Hours													

Total hours.............................. Cost of materials..............................

Approved ....
Project Leader

Article ....

Hours required to make this article

Date													
Hours													

Total hours.............................. Cost of materials..............................

Approved ....
Project Leader

Article ....

Hours required to make this article

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Project Leader

Article ....

Hours required to make this article

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Total hours.......... Cost of materials..........

Approved ....
Project Leader

STORY OF THIS PROJECT

(Make this an account of what you have learned and the value of the project to you.)

STORY (Continued)

STORY (Continued)

WOODWORKING PROJECT, UNIT I, OF

Name ..... Age.....

County ..... Date .....

Post Office ..... R. F. D. .....

Years in club work ..... Years in this project .....

Approved .....
County Agent

Date .....

Lexington, Kentucky September, 1946
Cooperative Extension Work in Agriculture and Home Economics: College of Agriculture and Home Economics, University of Kentucky, and the United States Department of Agriculture, cooperating. Thomas P. Cooper, *Director*. Issued in furtherance of the Acts of May 8 and June 30, 1914.
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