

UNIVERSITY OF KENTUCKY

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COLLEGE OF AGRICULTURE

EXTENSION DIVISION THOMAS P. COOPER, Dean and Director

Published in connection with the agricultural extension work carried on by cooperation of the College of Agriculture, University of Kentucky, with the U.S. Department of Agriculture and distributed in furtherance of the work provided for in the Act of Congress of May 8, 1914.

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 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.

4. Each member will keep a record of the materials, their cost,

and the time required to make each article.

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

6. 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.

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 a prospective club member starts this project, he should become a member of a project group. 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. Working as 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.

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Circular No. 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 executing 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 the second page 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 assembling parts into a finished article. Altho 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, regular stock sizes should be obtained 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 one should strive to develop in this project.
- 4. Upon completing work for the day, the shop or work space should be cleaned and all tools put 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 attaining the aim and purpose of this project.

THE WORK SPACE

Even tho 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 sufficient floor area for a bench and work space may be used. Provision should be made for heating the work space, since most of the work on this project may be done during cold or rainy weather. The brick brooder stove illustrated in Kentucky Extension Circular No. 157 might be used for this purpose.

SELECTING WOODWORKING TOOLS

Club members will not necessarily have to buy a large number of tools in order to enroll in this project as some of them 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 purchased, select 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 the funds for buying tools are limited, buy those which are most needed. Additional tools may be acquired as experience is gained and the more difficult jobs are undertaken.

TOOLS NEEDED

The tools shown in figure 1 will be needed in making the articles described in this circular. They may be placed on a rack as shown in figure 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
7%" to 3" expanding 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 proper 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 figure 1). At a glance one can see where each tool belongs and missing tools can be easily identified.

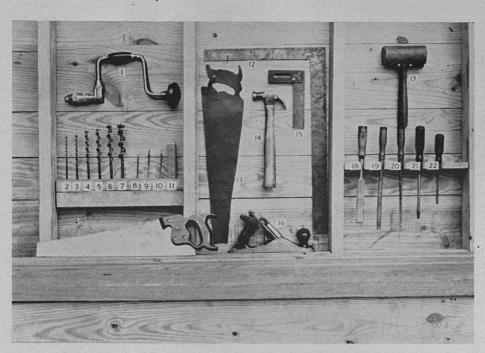


Figure 1. Tools needed in Unit I, each in its proper place back of the work bench, except the saw which has been taken down. Its place is shown with the black paint.

10" ratchet brace 1. 10" ratchet brace 2-3-4-5-6-7. auger bits, 1/4", 3/8", 1/2", 5/8", 3/4", 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)

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14. 1 lb. claw hammer
15. 6" try square
16. 11" jack plane (1 3/4" cutter)
17. wooden mellet

wooden mallet

18-19-20. wood chisels 1", 1/2", 1/4" 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.

Literature 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 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. The wood should be planed and rubbed with fine sandpaper or steel wool to remove all mill marks and imperfections. All the smoothing processes should be done 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. A finish should be chosen 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.

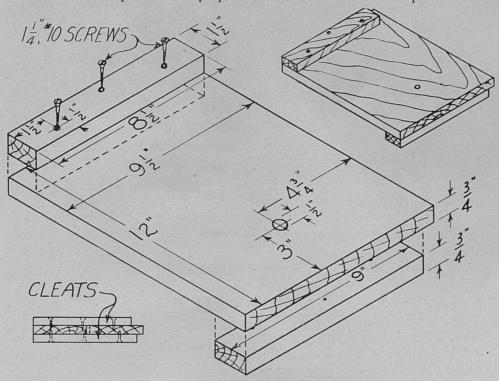


Figure 2. Bench hook.

MATERIALS NEEDED

1 pc. ¾" x 9½" x 12" 1 pc. ¾" x 1½" x 8½"

1 pc. ¾" x 1½" x 9"

6, 14", 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 3/4" x 51/2" 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.

AW TABLE Zx6x6

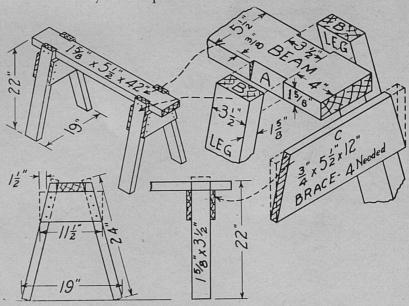


Figure 3. Sawhorse.

MATERIALS NEEDED

1 pc. 1%" x $5\frac{1}{2}$ " x 42" for beam 4 pcs. 1%" x $3\frac{1}{2}$ " x 24" for legs 4 pcs. $3\frac{1}{4}$ " x $5\frac{1}{2}$ " x 12" for braces

2 doz. 1¾", No. 10, flat-head wood screws

8, 3", No. 14, flat-head wood screws

HOMEMADE JIG SAW*

The homemade jig saw shown in figure 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 21/2" entrance holes for the bird house shown in figure 12. For such enclosed curves, a small hole should be bored with an auger bit, one end of the saw blade released and inserted thru this hole, then the saw blade replaced in the saw arm.

All pieces except the $\frac{3}{4}$ " x $\frac{31}{2}$ " x $\frac{30}{2}$ " upright and the saw table should be made of hard wood. The saw table may be made of plywood.

^{*} Plans and directions for building the homemade jig saw were furnished by Mr. Raymond Layne, leader of the West Union 4-H Club. The saw was demonstrated at Junior Week by this club, in 1938.

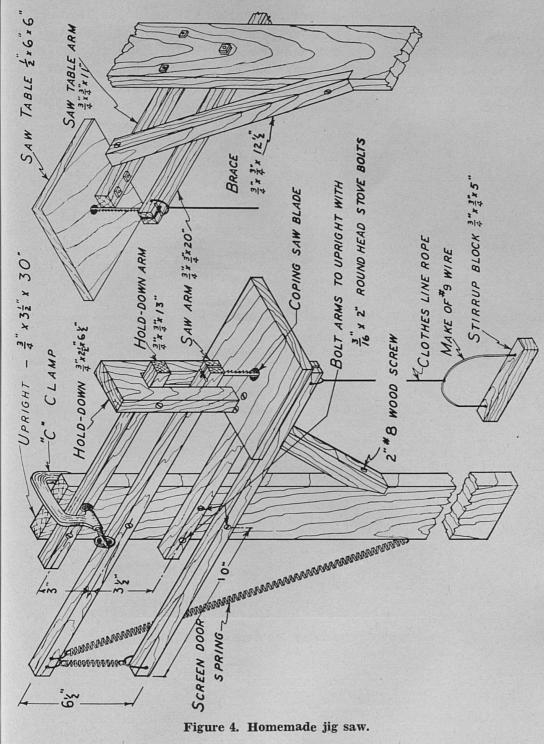


Figure 4. Homemade jig saw.

The jig saw may be clamped to a standard made for the purpose as shown in figure 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.

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Figure 5. Operating the homemade jig saw.

When starting to make a cut with the jig saw, the hold-down should be adjusted 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 work. 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

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

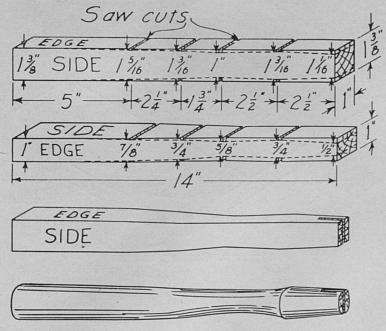


Figure 6. Hammer handle.

axe and finished with a draw-knife, wood rasp or a good, sharp, pocket knife. The handle should then be smoothed with sand-paper. 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 figure 6.

MATERIAL NEEDED

1 pc. clear, well-seasoned hickory, 1" x 1%" 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.

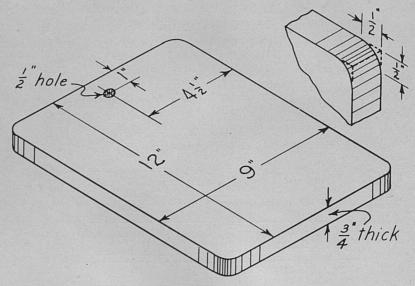


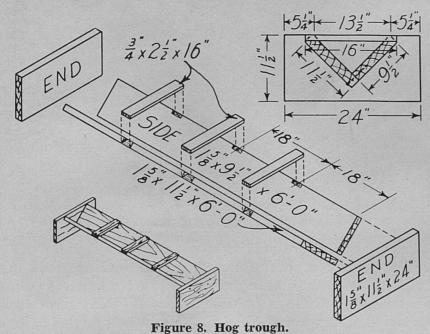
Figure 7. Cutting board.

MATERIAL NEEDED

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.



MATERIALS NEEDED

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 3/4" bit and complete the operation with a chisel. The box may be painted or given a coat of linseed oil.

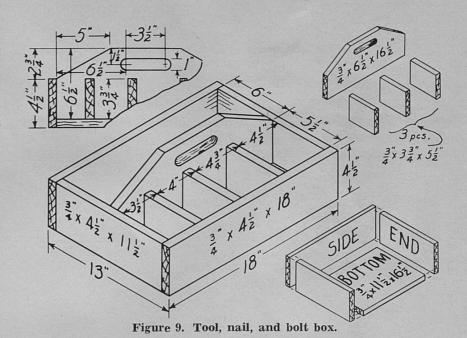
MATERIALS NEEDED

2 pcs. $\frac{3}{4}$ " x $\frac{4}{2}$ " x $\frac{11}{2}$ " ends 2 pcs. $\frac{3}{4}$ " x $\frac{4}{2}$ " x $\frac{18}{2}$ " sides

1 pc. ¾" x 11½" x 16½" bottom

1 pc. $34'' \times 6^{1}2'' \times 16^{1}2''$ center piece with handle 3 pcs. $34'' \times 3^{3}4'' \times 5^{1}2''$ partitions for nails, etc.

4 doz. 6d finishing nails



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MILKING STOOLS

Either one of the two milking stools shown in figure 10 may be built. They 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 $\frac{3}{4}$ " bit, then complete the operation with a chisel. Use a 1" bit in making holes for the three-legged stool. Block A is temporarily nailed on the under

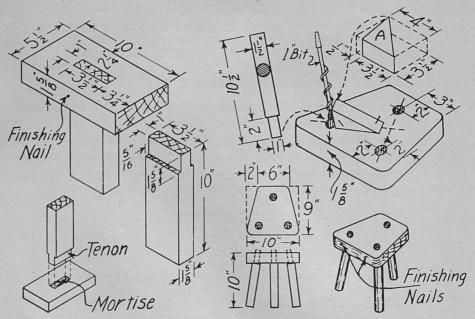


Figure 10. One- and three-legged milking stools.

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

MATERIALS NEEDED

One-legged stool

1 pc. $1\frac{5}{8}$ " x $5\frac{1}{2}$ " x 10" for seat 1 pc. 1" x $3\frac{1}{2}$ " x 10" for leg 2, 8d finishnig nails

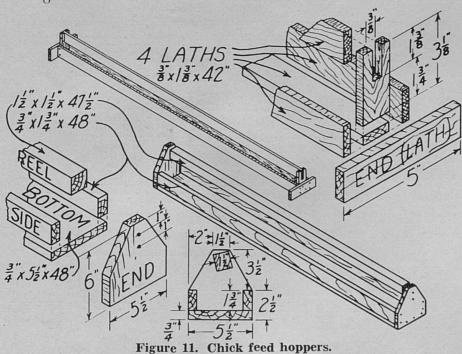
Three-legged stool

1 pc. 1%'' x 9'' x 10'' for seat 3 pcs. 1%'' x 1%'' x 10%'' for legs

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 3/4" 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 to facilitate cleaning.



MATERIALS NEEDED

Lath feeder

4 laths 3/8" x 3/8" x 48"

4 doz. 3d lath nails

Board feeder

2 pcs. $\frac{34}{7}$ x $5\frac{1}{2}$ x 6 ends 1 pc. $\frac{34}{7}$ x $5\frac{1}{2}$ x 48 bottom

2 pcs. ¾" x 1¾" x 48" sides 1 pc. 1½" x 1½" x 47½" reel

4 doz. 6d finishing nails

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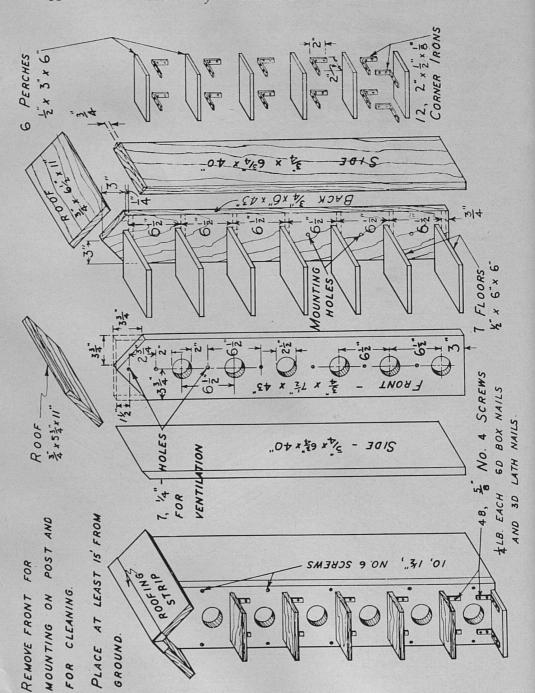


Figure 12. Bird house.

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 21/2" 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 thru 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

| 2 | pcs. | 3/4" | X | 634" | x | 40" | sides |
|---|------|------|---|------|---|-----|-------|
|---|------|------|---|------|---|-----|-------|

12, 2" x 1/2" x 1/8" corner irons

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

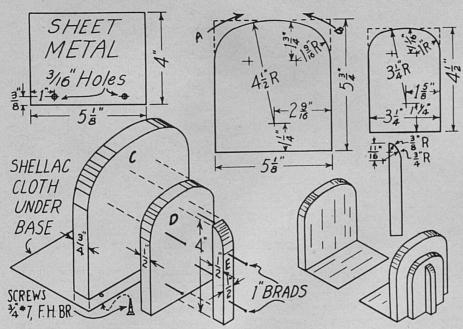


Figure 13. Book ends.

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 figure 13 to prevent chipping the edges. After all parts are assembled, the book ends should be sandpapered until they are smooth, then painted, stained or finished as desired.

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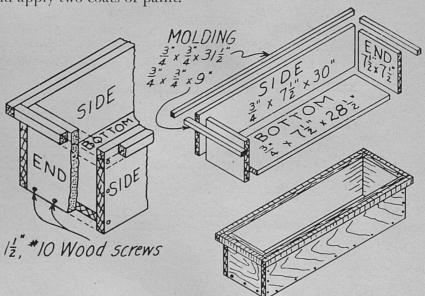
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MATERIALS NEEDED

| 2 pcs. ¾" x 51/8" x 5¾" for C | 2 pcs. 4" x 51/8" heavy sheet metal |
|-------------------------------|---------------------------------------|
| 2 pcs. ½" x 3¼" x 4½" for D | 2 pcs. 4" x 51/8" felt or heavy cloth |
| 2 pcs. ½" x ½" x 4" for E | 4, ¾" No. 7 flat-head wood screws |
| | 1 dog 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.



MATERIALS NEEDED

Figure 14. Flower box.

| 2 pcs. ¾" x ¾" x 31½" molding 2 doz. 1½", No. 10 wood screws 2 doz. 6d finishing nails |
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REFERENCE MATERIAL FOR LEADERS

Books

"Essentials of Woodworking," Griffith, Manual Arts Press, Peoria, Ill. "Woodwork for Secondary Schools," Griffith, Manual Arts Press, Peoria, Ill.

"Farmer's Shop Book," Roehl, Bruce Publishing Company, Milwaukee, Wisconsin.

"Farm Buildings," Foster and Carter, John Wiley & Sons, Inc., New York, N. Y.

"Home Labor Saving Devices," Scott, J. P. Lippincott Company, Philadelphia, Pa.

Circulars of the Extension Division, College of Agriculture, University of Kentucky

No. 107 Housing Farm Poultry

111 List of Farm Building Plans

128 Building Plans for the Dairy Farm

131 Septic Tanks for Sewage Disposal

157 Brooding Chicks Artificially

198 Sunlight Movable Hog Houses

266 Home Storage Structures and Equipment

276 Hotbeds and Cold Frames

Farmers' Bulletins, United States Department of Agriculture

No. 810 Equipment for Farm Sheep Raising

927 Farm Home Conveniences

1452 Painting on the Farm

1456 Homes for Birds

Magazines

Home Craftsman, Walker Turner Company, Plainfield, N. J.

Home Craft, General Publishing Co., Chicago, Ill. What to Make, Popular Mechanics, 200 East Ontario St., Chicago, Ill.

Popular Mechanics, 200 East Ontario St., Chicago, Ill.

Popular Science, 353 Fourth Ave., New York, N. Y.

Fellow Crafters, 739 Boylston Street, Boston, Mass.

Other Publications

12 New Plans for Low-Cost Damage-Proof Projects, Douglas Fir Plywood Bulletin, E. W. Camp Plywood Company, Inc., Commerce and Plum Sts., Cincinnati, Ohio.

100 Handy Helps, Southern Pine and Its Uses, Southern Pine Association New Orleans La.

tion, New Orleans, La.
"You Can Make It," United States Department of Commerce, Government Printing Office, Washington, D. C., 10 cents.

The Farm Workshop and Woodlands, E. C. Atkins & Company, 402 South Illinois St., Indianapolis, Ind.

Manual on Wood Finishing, Dutch Kraft Corporation, Grand Rapids,

Better Wood Finishing, Grand Rapids Wood Finishing Company, Grand Rapids, Mich.

Literature on Saws, E. C. Atkins & Company, Indianapolis, Ind. Literature on Saws, Henry Disston & Sons, Inc., Philadelphia, Pa.

Kentucky Extension Circular No. 325

RECORD OF ARTICLES MADE

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STORY OF THIS PROJECT

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

STORY (Continued)

WOODWORKING PROJECT, UNIT I, OF

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| Years in club work | Years in this project |
| Approved | County Agent |
| Date | |