

*Things to Make and How to Make Them*

---

# THE HOME WORKSHOP

*Book 1 of the Series*

WILLIAM W. KLENKE

Instructor of Woodworking, Architectural and Mechanical Drawing, Central Commercial and Manual Training High School, Newark, New Jersey. Registered Architect in the State of New Jersey. Author of *Art and Education in Wood-Turning, Joints and How They are Made, Selected Furniture Drawings, Unique Simple Toys*, and the Syndicated Feature, *Things Easy to Make*.



THE MANUAL ARTS PRESS

Peoria, Illinois

THE PUBLIC LIBRARY  
OF  
PEORIA, ILLINOIS  
FOUNDED BY JOHN W. WATSON  
1857



# THE HOME WORKSHOP



## FOREWORD

**I**N RESPONSE to the evergrowing demand by both the home craftsman and the school shops throughout the country, for working-drawings of interesting projects, simple enough for the average boy of the upper grammar grades or high school, and guided by the requests of boys and men with whom I have come in contact throughout my teaching career, for designs of articles to make that especially appeal to them—projects not usually shown in books already on the market—I have published in syndicate form a series of features called, "Things Easy to Make."

This was the first syndicated series of working-drawings on woodworking projects ever to be run in any newspapers.

Requests have come to me from time to time for copies of back numbers in this series. These requests have resulted in the compilation of the material on hand, besides many new projects of a more difficult nature, and publication in permanent book form. This series of books also contains simple instructions on the use and care of portable motorized woodworking machines, which are so popular today, as well as material on many other subjects helpful to the amateur.

Although special emphasis has been placed

on the types of woodwork of greatest interest to the average American boy, the series includes many projects that will appeal to the growing host of men and women amateur craft workers.

For the most part, these projects were designed with the idea of being simple enough for construction in the home workshop or school shop, using the ordinary hand-tools; however, with the aid of a few good portable machines, amateur workers will find a great deal of joy and surprising ease in making many of these pieces almost entirely by machine operations.

When making up the order for materials for any project from the "List of Lumber," allowance must be made for sawing and planing to size. Except as indicated otherwise, the "List" gives the finished measurements.

A large variety of projects has been chosen to include cabinet-making and simple carpentry work; they take in shop equipment, camping, games, garden projects, and household articles, as well as many commonly used pieces of home furniture.

The projects have been grouped accordingly. Each book in the series is devoted to special articles, classified by the title, paying

COPYRIGHT, 1935  
WILLIAM W. KLENKE

marked attention to the needs of the boy and the home craftsman. By these means spare hours are converted into a healthful, wholesome, and often profitable occupation. At the same time, the boys specially will develop a constructive mind and a sturdy body, and will acquire no little skill in handling the various tools and machinery, all of which should make of him a better man.

I hereby express my gratitude to Arthur Wakeling, of *Popular Science Monthly*, for permission to use photographs of machinery, which I prepared for this magazine a short time ago; to N. C. Phillips, of the Russia Cement Company, (makers of Le Page's Glue), for permission to use several of the drawings which I had prepared for that company; to George W. Thurston, of the American Screw Company, for permission to use much information from a screw-chart that I prepared for that company; to the John Has-

sall Company, Inc., for the information on nails; to E. C. Atkins & Company, for permission to photograph the A. Z. Saw-Set; to the following concerns for splendid cooperation in furnishing me with many photographs of their fine lines of portable, motorized wood-working machines: The Delta Manufacturing Company, of Milwaukee, Wisconsin; The Walker-Turner Company of Plainfield, New Jersey, makers of the "Driver" line; William B. & John E. Boice, of Toledo, Ohio, makers of the Boice Crane line; Montgomery Ward, of Chicago, makers of the Powr-Kraft line; Sears, Roebuck & Company of Chicago, makers of the Craftsman line; to the boys who have so willingly and generously helped me by making possible photographs of both finished projects and methods of handling equipment; and to my wife, Edith Elizabeth, for her untiring assistance in helping me to compile this text.

### 1. Suggestions to the Beginner

THE National Scout Commissioner of the Boy Scouts of America, Daniel Carter Beard, is quoted as having written: "With gumption, a man can make almost anything. It is the primitive, forceful quality of human mind, backed and strengthened by modern education, that produces our Fords and Edisons. The quality of mind is one of the most valuable assets we Americans possess. It means success in business, in the professions, in statesmanship, and in the sciences; and it can be summed up in the good old-fashioned word, *gumption*."

No boy or man can expect to become an expert craftsman, or, as a matter of fact, to make successfully any of the projects shown in this book, if first of all he does not possess "gumption," and a keen desire to overcome the many little obstacles that may come up

from time to time in the making of any object. He must possess a certain ingenuity of his own, and the quality of "stick to it," regardless of occasional slight mistakes and failures.

Dr. Cadman, noted preacher and radio broadcaster, once said, "We learn more by our mistakes than by our successes." This does not mean that we can succeed regardless of how many mistakes we make, but we should profit by each error, and try to do better another time.

Every amateur woodworker is ambitious to be able to make a piece of furniture that will appear to be the work of a master craftsman or artisan. In order to accomplish this, however, there are a few important suggestions he should follow out.

No attempt is made in this book to teach



ork of greatest interest  
an boy, the series in-  
at will appeal to the  
and women amateur

ese projects were de-  
being simple enough  
home workshop or  
ordinary hand-tools;  
f a few good portable  
ers will find a great  
sing ease in making  
almost entirely by

order for materials  
e "List of Lumber,"  
for sawing and plan-  
licated otherwise, the  
measurements.

ects has been chosen  
and simple carpentry  
equipment, camping,  
d household articles,  
used pieces of home

n grouped accord-  
series is devoted to  
by the title, paying

the simple fundamentals of joinery or cabinet-work; the beginner should obtain this help through the numerous good books and magazines now available. However, here are some important rules and bits of advice, dealing with cabinet and carpentry work, that the novice should note.

Although the construction shown on the working-drawings is to be strongly recommended, it is possible for the beginner to do a good job by using wood-screws and nails, with a good glued joint in place of the mortise-and-tenon or dowel type of joining. For this reason, and because many projects are held together with nails and screws, a thorough knowledge of the correct use of these commonly accepted articles should be acquired by studying Sections 3 and 4.

1. Accuracy in laying out the work is of foremost importance. For this reason, use only knife-lines and gage-lines when marking joints. Do *not* use a pencil, except to mark working faces and edges, and in numbering and lettering the various pieces.

2. As you proceed to lay out your work, clearly mark (with a pencil) the different pieces, to indicate front, back, right and left sides, and all companion pieces as they are to be joined together.

3. Always work from a working-face and a working-edge.

4. Multiple pieces should be laid out (where possible) at one time.

5. Joints must be made to fit together snugly, but should not be forced together.

## 2. General Directions

**I**N ORDER that you may be able better to understand the working-drawings, it is advisable to study carefully the drawing showing the completed piece at the same time, as this will often help you to grasp the manner in which the various pieces are

Glue will *not* fill up open spaces in loose, poorly made joints. The lasting strength of your job depends first of all on the construction of good joints, and then on properly using a good glue.

6. Your tools should be kept sharp, in order to do clean, accurate work. Sharp tools make for easy, quick work, and lessen the chance of an accident.

7. All surfaces of all pieces should be hand-dressed (planed), to remove mill-marks made by machinery, and to insure true surfaces and a perfect finish.

8. Before you assemble the project, thoroughly sandpaper all parts (see Finishing). Do *not* skip over or hurry this work, if you want a perfect finish.

9. Think ahead, before you assemble, as to what the next step is to be.

10. Use only the best quality of glue, and plenty of it; since much of the enduring strength of any piece of furniture depends on the glue used. See Section 14, "Information on the Use of Glue." Always make a trial fitting between clamps to make sure that all parts will fit. Be sure to have all companion pieces marked, as 1&1, 2&2.

11. All glued work must be held together, undisturbed, and under pressure between clamps, while the glue sets.

12. Be very careful to square up and line up all work before the glue gets a chance to set.

13. Be orderly, accurate, and neat about your work; and think ahead as you work.

put together. Keep constantly in mind the mental picture of how the finished project is to look.

The selection of the proper wood to use is often of great importance, although many of these pieces can be made successfully out of

discarded  
ware boxe  
some of t  
various p  
wood you  
the skill  
no avail i  
ture if yo  
(wet lum  
apart; top  
will be in

The ma  
work is co  
instances,  
lumber a  
means th  
your roug  
width, an  
the surfr  
that mor  
longer ra

Wheth  
hand, th  
ciples yo  
1, if you

Step 1  
the roug  
various  
If you  
must be  
order to  
the mac

For d  
should l

Step:  
being c  
square,  
joints t

Step  
(see S  
ing Jo  
gether  
with a

Step

discarded packing-cases, soap-boxes, hardware boxes, and the like. I will list elsewhere some of the woods that are best to use on the various projects. No matter what kind of wood you select, it should be dry lumber. All the skill and perseverance in the world are of no avail in making a first-class piece of furniture if you are working with green lumber (wet lumber). Joints are bound to come apart; tops will warp; in short, your efforts will be in vain.

The material used in cabinet and carpentry work is commonly known as "stock." In most instances, the dimensions given in the list of lumber are finished measurements; which means that you must add, when getting out your rough stock, at least  $\frac{1}{8}$ " in thickness and width, and  $\frac{1}{4}$ " in length, to allow for planing the surfaces smooth and true. Remember that mortise-and-tenon construction calls for longer rails than dowel work.

Whether you work by machinery or by hand, there are certain fundamental principles you must follow, as outlined in Section 1, if you want to be successful.

Step 1. *The Stock.* Having gotten out the rough stock, you should now plane the various pieces smooth and true on all sides. If you work by machinery, the final stroke must be done with a hand-plane or scraper, in order to remove mill-marks (marks made by the machines).

For dowel construction, the ends of all rails should be made perfectly square.

Step 2. *Laying Out Joints.* Lay out all joints, being careful to do this with a sharp knife, square, and marking-gage, so as to get the joints to fit tightly and square when finished.

Step 3. *Making Joints.* Cut all joints (see Section 5, "A Brief Discussion on Making Joints"). As you fit the two pieces together for each joint, carefully mark them with a pencil; as 1&1; 2&2, and so on.

Step 4. *Trial Fitting.* Make a trial fit-

ting of all pieces between clamps, so as to make sure that all parts will come together correctly. Check up on the numbers of all companion pieces.

Step 5. *Cleaning Up.* Take the work apart, and thoroughly sandpaper all parts smooth and free from any waves or irregularities. See Section 15, "Wood-Finishing."

Step 6. *Assembly.* Most pieces of furniture must be glued together in two or more operations. A table or a chair, for example, must be glued up in at least two operations. First, two legs and the correct rails are glued together, and the glue allowed to set before attempting the next step; then the entire job is assembled. At this point, think ahead of what the next step is to be so as *not* to neglect any important operation. Once the pieces have been glued together, they cannot be taken apart again; therefore, it will pay to stop for a few minutes, and figure out just how you will put all of the pieces in place. Let me again caution you to square and line up all parts carefully before the glue has set. Often an otherwise promising job is entirely ruined by failing to do this correctly.

Step 7. *Final Cleaning Up.* In Section 14, "Information on the Use of Glue," I mention cleaning off all excess glue before it hardens; this is very important. There always remains a certain amount of glue on your work, that cannot be removed until the clamps have been taken off. This can best be accomplished by cutting across the grain, where possible, with a sharp chisel. Be careful not to cut too deep, and accidentally lift the wood with the glue. This part of furniture making is not a pleasant task, but must be thoroughly done, if you are to obtain a good finish. Now vigorously sandpaper all parts with No. 00 and No. 000 sandpaper, held in the palm of your hands, always rubbing with the grain. The sharp corners should be rounded slightly.

Step 8. *Miscellaneous.* Hinges and other

hardware should be fitted in place before attempting any finishing. After all work of this nature has been completed, however, the hardware should be removed so as to keep these parts free from stain, shellac, or lacquer. Table tops, seats of chairs, and other parts, should be fastened in place, but taken apart again when applying the finish. Screw-holes, and any other necessary patching should also be attended to at this time.

### 3. Nails and How to Use Them Correctly

THE average boy of today takes many things for granted, and is but slightly concerned about how some of the commonly used articles were developed and are now made. This lack of knowledge often leads to great waste, because things like nails and screws seem so plentiful and easy to procure. Let us, for a minute, think back to the boys and men of olden days, when, for example, in England certain villages had as their sole occupation the making of nails. In Birmingham, 60,000 persons were so employed, and they consumed 200 tons of iron in a week, hammering out each nail by hand.

Thomas Jefferson made nails for sale on his estate at Monticello, and hand-made nails

As a final check, go over the entire piece, to make certain that you have performed all operations as they should be done. It is best to put casters in place after all finishing has been completed, to avoid getting stain or lacquer on the rollers.

Step 9. *Finishing.* Read and follow the directions in Section 15, Wood-Finishing. After the final rubbing, all hardware should be replaced, tops screwed down, and the like.

went into the construction of his own home, which is standing today.

Ten years after the Declaration of Independence was signed, a man from Massachusetts, named Ezekiel Reed, invented a machine for manufacturing nails. Today a single machine can turn out from 120 to 450 nails per minute, depending upon the size of the nail.

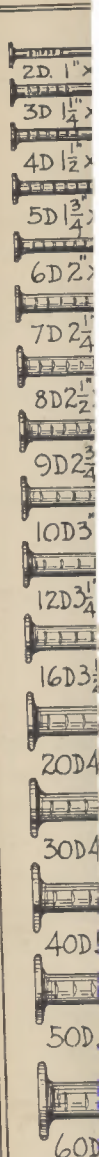
Generally speaking, the woodworker is most concerned about two kinds of steel nails. Flat-head common wire nails, and wire brads or finishing nails. See Plate 1. (The main difference between brads and finishing-nails is in the size of the wire, as indicated on the wire-gage.)

#### Kinds and Sizes of Nails

Nails are also made out of copper and zinc, for special purposes where rust-resisting qualities are essential. Lathers' nails are sold sterilized and blued; shingle-nails are galvanized. Nails made of aluminum and aluminum alloy are used for securing sheet aluminum, or where acid conditions and fumes make steel or copper unsuitable.

The sizes of common wire nails are designated by the *penny*, and known as sixpenny (abbreviated 6d), eightpenny (8d), and so on. Penny is said to be derived from *pound*; the explanation being that 1,000 sixpenny nails originally weighed six pounds; 1,000 tenpenny nails weighed ten pounds; and so on.

A few words of advice on driving nails will not be out of place, and may help you in your carpentry work. For all general use, a bell-face hammer is to be preferred to one with a flat face, as it is less likely to mar the wood as you drive the nail "home." Use a free swinging motion of the wrist and arm, and strike the nail squarely on the head. Keep the face of the head free from grease, to prevent slipping off the head of the nail as you drive it. Use a nailset (of proper size) to countersink all brads about 1/16" below the surface of the wood. As shown in Plate 1, use a scrap block of wood when drawing a nail, to prevent marring the surface of the



TO P  
HANI

ver the entire piece.  
 have performed all  
 l be done. It is best  
 after all finishing has  
 id getting stain or  
  
 ead and follow the  
 5, Wood-Finishing.  
 all hardware should  
 down, and the like.  
  
 n of his own home,  
  
 eclaration of Inde-  
 man from Massa-  
 Reed, invented a  
 ing nails. Today a  
 ut from 120 to 450  
 ng upon the size of  
  
 woodworker is most  
 nds of steel nails.  
 ails, and wire brads  
 late 1. (The main  
 and finishing-nails  
 as indicated on the  
  
 e on driving nails  
 and may help you  
 or all general use.  
 e preferred to one  
 s likely to mar the  
 il "home." Use a  
 he wrist and arm.  
 on the head. Keep  
 e from grease, to  
 ead of the nail as  
 (of proper size)  
 out 1/16" below  
 shown in Plate 1,  
 when drawing a  
 e surface of the

**STANDARD WIRE NAILS**

**WIRE BRADS**

NOTE:  
NOT ALL THE SIZES  
MADE ARE SHOWN.

FOR ADDED  
STRENGTH  
CLINCH NAILS  
ON THE BACK.

TOE NAILING

TO PREVENT BREAKING HAMMER  
HANDLE

TO DRAW A NAIL  
PLACE SCRAP BLOCK  
UNDER HAMMER  
INCREASE LEVERAGE

STAGGER NAILS  
TO PREVENT  
SPLITTING WOOD  
& TO ADD  
STRENGTH

USING A NAIL SET TO  
COUNTERSINK HEAD OF BRADS

BY WILLIAM W. KLENKE

PLATE 1. NAILS AND HOW TO USE THEM CORRECTLY.

wood, to prevent splitting the handle of the hammer, and to make it easier to pull the nail or spike.

If you have many finishing-nails to drive in hard wood, it is a good plan to bore a small hole in the handle of your hammer, and plug soap in this hole; then, as you use a nail, simply soap it a little to make driving the nail easier, and to prevent splitting. In very hard wood, bore small holes first.

When nailing lattice work or battens in place, use a nail of sufficient length to go all the way through both pieces and to project far enough so that you can clinch over the nail on the back side of your job.

Brads can be made into simple hand-routers and reeding-tools by shaping one end and driving the brad in a piece of wood to hold the proper depth.

#### 4. Information About Wood-Screws

**T**HERE are no reliable data on when wood-screws were first made and used. The early method of making them was by forging the blanks, forming the heads by pinching between dies while hot, and then making the threads by filing. Machinery was first used to make screws in France, by a man named Besson, who contrived a screw-cutting device to be used in a lathe. The first recorded patent in connection with the making of screws, was granted in England, 1760, to Job and William Wyatt; and, about 1766, William and Benjamin Wyatt began operating a screw-making factory at Burton-on-Trent, England, in a building formerly used as a grist-mill. By the year 1798, they had reached an output of about 100 gross daily.

The first American to be granted a patent in connection with screw-making machinery was David Wilkinson, of Rhode Island, in 1790. The first enterprise relating to the making of screws in America was in 1810, and was started by Aborn and Jackson, at

Added strength is given to your job by driving the nails in at an angle, triangular shape or towards each other, rather than driving them all in a vertical position.

#### Tacks

In a number of projects in this series, tacks are used for fastening cretonne and the like to the wood; for that reason, you should know something about the sizes in which tacks are made.

The sizes are indicated by the word "ounce," which means the number of ounces of iron required to make 1,000 tacks.

As manufactured today, 1-oz. tacks are 3/16" long, and the common sizes are:

1-oz., 3/16"	3-oz., 3/8"	8-oz., 1/8"
2-oz., 1/4"	4-oz., 1/2"	10-oz., 5/8"
	6-oz., 1/2"	

Bellefonte, Rhode Island. The first machine, however, to manufacture pointed screws in a practical manner, was devised by Cullen Whipple, of Providence, Rhode Island, in 1849. The first and largest American screw-making enterprise that is still in existence, consists of two companies, founded in 1838 and 1840 by two independent competitors, which combined in 1860, and were incorporated as the American Screw Company, in Providence, Rhode Island. New England, therefore, may justly claim the distinction of being the cradle of the screw industry in America.

The method for making wood-screws throughout the world, is in general very much the same, and about the only improvements brought out on the screw-making machines were such as would increase and speed up production. Common wood-screws were formerly made of wrought iron, but are now made of low-carbon (Bessemer or basic) steel, which comes to the manufacturer in long wire

