

WORK IN THIN WOOD

This forms an excellent introduction to ordinary bench work in wood. The wood is supplied planed to thickness and should be straight-grained and free from knots.

Basswood is very suitable. Each pupil should be taught to sharpen his own knife. Knives must be kept in a satisfactory condition if good work is to be done.

The models are intended to be suggestive both in design and in character, and should not be regarded as a prescribed course to be rigidly followed.

Before cutting with a knife the grain of the wood should be carefully examined. Cut with the grain, never against it.

The hand should never be placed in front of the cutting edge. In planning a course of work in this material, the teacher should remember that the instructions here given are to enable him to understand the technique of the tool manipulations and to make the model before his presentation of it to the class. These instructions are not an indication of the way in which he is to develop the lesson. Each lesson should be properly prepared and developed in such a way as to bring in all the correlated facts, and should not be treated merely as an exercise in making a pencil sharpener, a string winder, a plant label, etc.

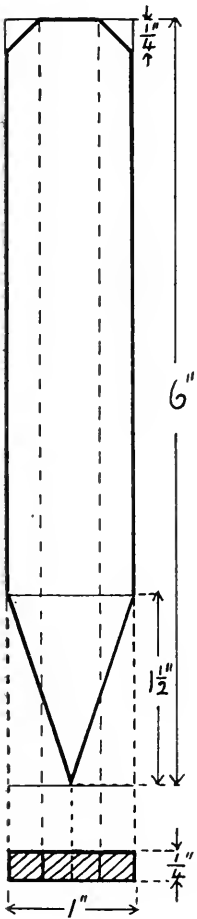
It will be necessary to draw the model carefully before it is made. In the more simple cases, this drawing may be on the wood itself, and the pupils may be allowed to work from a black-board drawing prepared by the teacher or by themselves under his direction. In other cases, a properly lettered and dimensioned working drawing should be made.

Occasionally, the pupils should be allowed to take their own measurements from the prepared model and make their drawings from the measurements thus obtained.

1. *Plant Label:*

This is drawn in a rectangle 1 in. x 6 in. Complete the drawing as shown. Cut to width. Shape the point. Measure the length from the point end. Set out the shape of the top as desired. Finish the cutting.

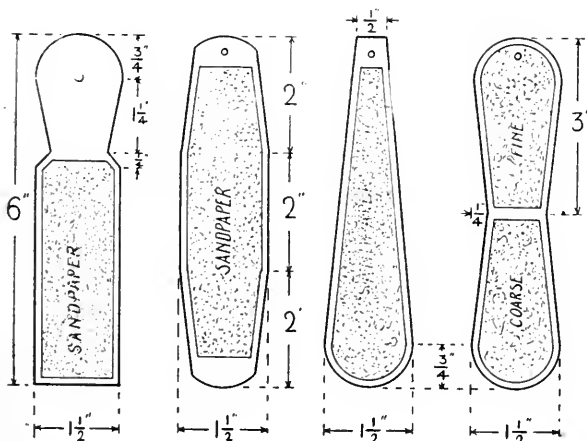
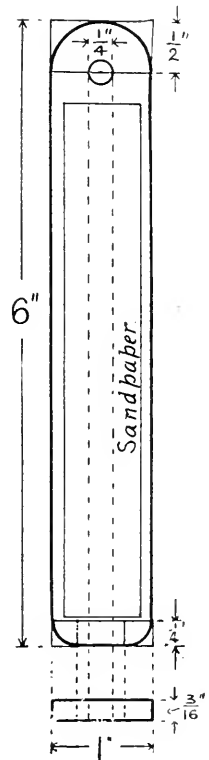
The drawing of these models provides the opportunity for carefully reviewing and extending what has been taught of plan and elevation.

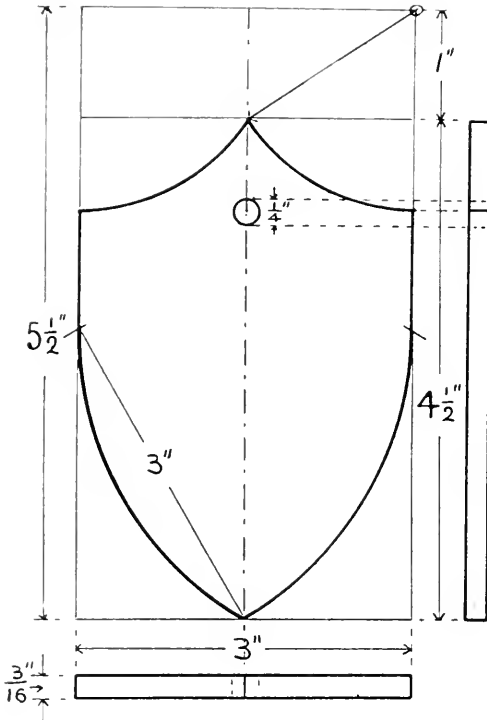


2. *Pencil Sharpener:*

Proceed as in the previous model.

Ends of a different pattern may be designed. The sand-paper should be thinly glued, care being taken not to miss the edges. If sand-paper be glued on both sides of the model, warping will be largely prevented. Four alternative designs are shown.



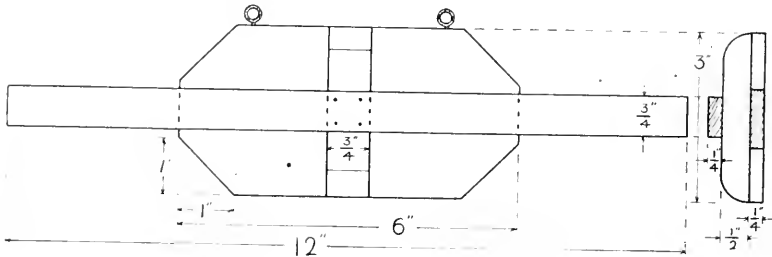


3. Match Scratcher or
Calendar Back:

This must be carefully drawn. Construct a rectangle 3 in. x $3\frac{1}{2}$ in. Bisect the shorter sides and join the points. Describe the arcs with centres as shown. Cut to shape. The length of the model should be in the direction of the grain of the wood. If intended for use as a match scratcher, attach sand-paper.

4. Tie Rack:

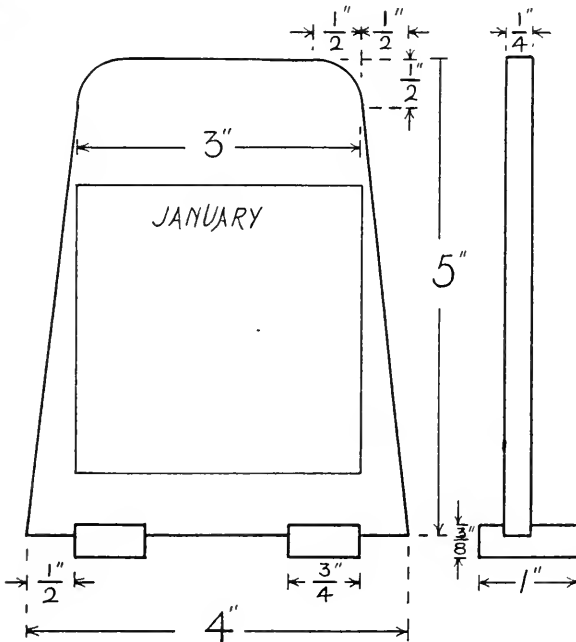
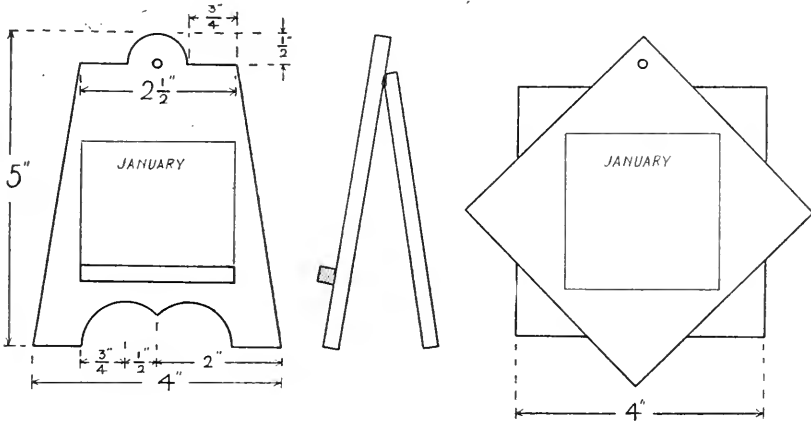
This is a popular model with boys and is easily made. The back should be carefully made, and the two cross strips should be nailed exactly in the centre of it. The rack is hung by the two screw rings, and the ties are placed over the long cross-bar.



5. Calendar Backs:

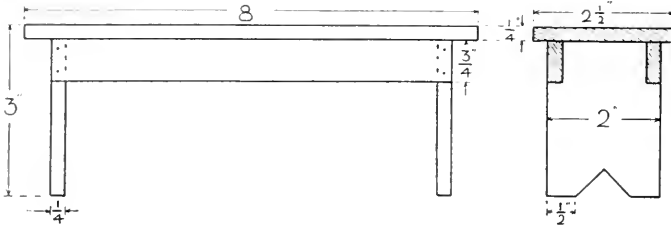
Various forms of these may be made, and calendar pads should be pasted on to them. Three forms are shown. The back of the easel is joined either by a small hinge or by a piece of passe-partout binding. Calendar pads in various sizes may be purchased cheaply.

The square form may be cut from one piece or made from two squares overlapping.

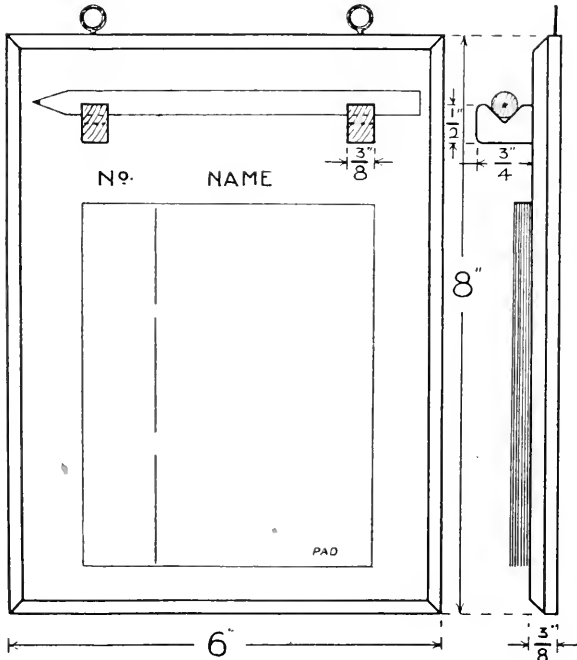


6. *Bench :*

Cut the top piece first, then the side rails, then the legs. Be sure that the legs and the side rails are exactly alike. Cut the slots in the legs for the side pieces to fit and nail the frame together. Nail on the top, being careful that it overlaps equally all round.

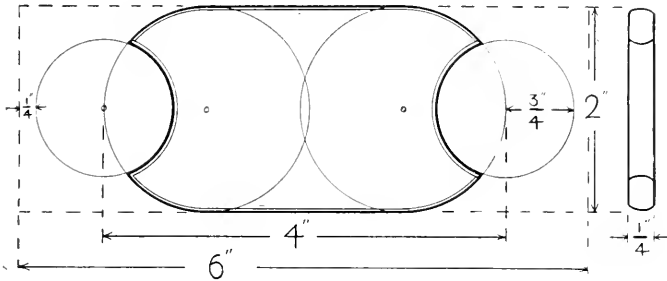
7. *Telephone Call Pad :*

This consists of a piece of thin wood 6 in. x 8 in., with two pieces nailed on as a rest for the pencil. Make the back and cut the bevel all round, finishing with sand-paper. Cut the pieces for the pencil rest and nail them to the back, Glue on the pad. A different design for the top may be chosen if desired.



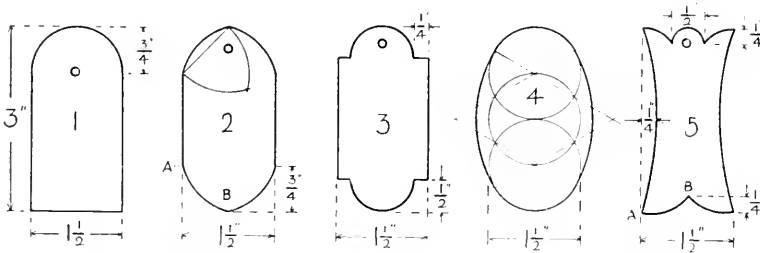
8. *String Winder:*

The drawing shows how to lay out the pattern. A piece of wood 2 in. x 6 in. is required. Draw the circles as shown. To obtain the end curves, bore two holes with the brace and bit and saw off the waste wood.



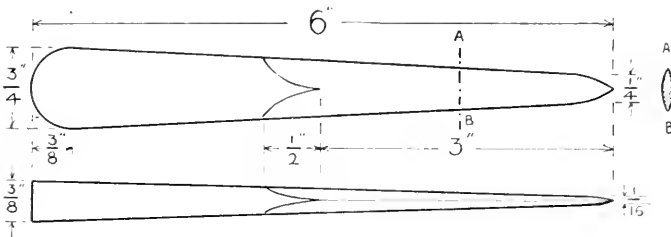
9. *Key Labels:*

These may be made in many different forms. Five patterns are shown. To obtain the curves in Figures 2 and 5, join points A and B, and on AB describe an equilateral triangle. The apex of the triangle is the centre of the curve required. Make the other curves in the same way. The labels are all made from wood 1/4 in. thick, 1 1/2 in. wide, and 3 in. long, except No. 4, which requires material a little wider. The drawing of this shows how to construct an ellipse of given length but of unknown width.



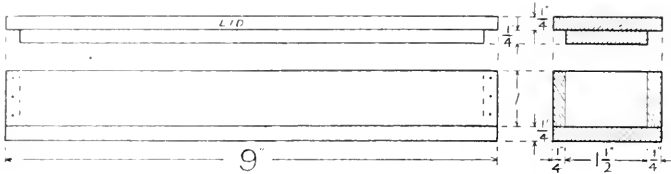
10. *Letter Opener:*

As the drawing shows, the letter, or envelope, opener is tapered both in width and in thickness. The blade is whittled, scraped, and sand-papered to a thin double edge, and the end is pointed. A little decoration for the handle would be an improvement.

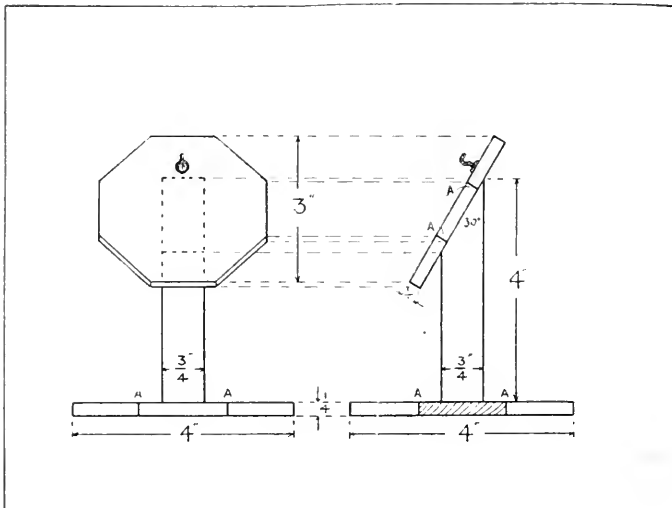


11. *Pencil Box:*

This is an attractive model and is very useful when made. Cut the two sides 9 in. x 1 in., and the two ends $1\frac{1}{2}$ in. x 1 in., and nail the frame together, testing the angles for squareness. The bottom is 2 in. by 9 in., and the top the same size. The under piece of the top is $\frac{1}{4}$ in. less all round than the upper piece. This may be nailed from the under side with $\frac{3}{8}$ in. brads, or the whole lid may be cut from one piece.

12. *Watch Stand:*

The base and the sloping shelf may be octagonal, hexagonal, or circular. In order to obtain the exact position of the lines and points marked A, it will be necessary to make drawings of the two octagons, one with 3-in. sides and one with 4-in. sides. The parts may be nailed or glued together.



STRIP WOOD-WORK

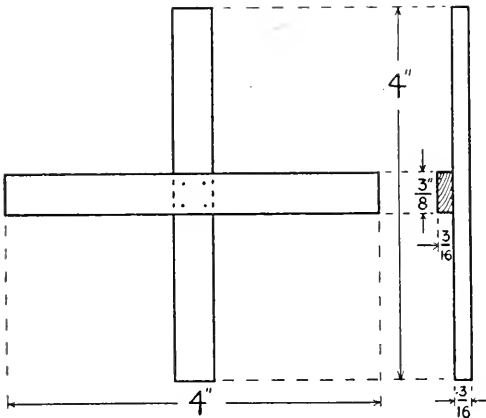
The models suggested below are those used in the Course that has been drawn up by the Supervisor of Manual Training, for the Ottawa Public Schools. It has been worked out successfully, and is recommended for adoption with such modifications as the ingenuity of teacher and pupils may suggest or the requirements of the district in which the school is situated may demand. Many objects

other than those illustrated may be made, particularly if cardboard is used in conjunction with the strips. It should be the aim at all times to stimulate inventiveness and originality. Every fourth lesson is used as a free expression period, in which the small strips sawn off from the longer pieces are used up. All right angles should be judged by the eye before being tested by the square, and all lengths should be judged by the eye before being actually measured by the rule. The success of the work from an educational point of view depends very largely upon the methods adopted in teaching and the degree of accuracy insisted upon. No measurement less than $\frac{1}{8}$ in. is required, and the pupils should be able to measure the distance accurately. The models are frequently taken home to be stained or painted and brought back to the school to be exhibited. Both boys and girls have done this work very successfully.

SUGGESTED MODELS

1. *String Winder:*

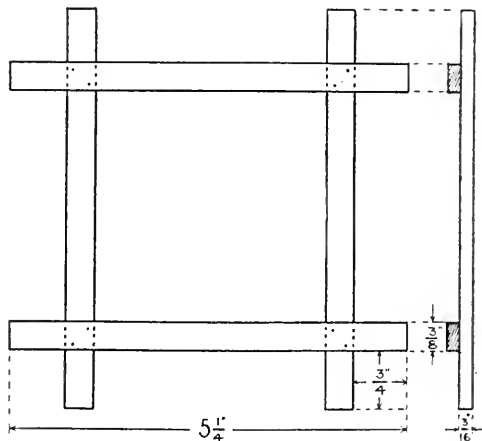
One end is first squared. The lengths are then sawn and the ends smoothed. The position of the first nail is marked by a dot, and a nail is driven just through one piece. The point is placed in position on the second piece, driven through, and the nail clinched. A large boot protector driven into the cutting board may be used to clinch the nails on. The angles are then examined and tested, and, when correct, the remaining nails are driven through and clinched.



2. *Picture Frame:*

One nail should be driven into each joint, and the angles tested before the other nails are driven.

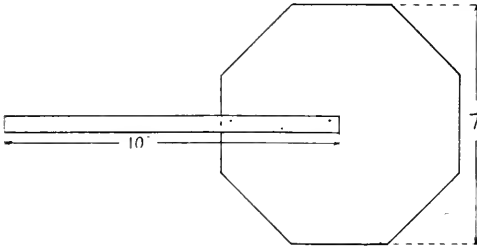
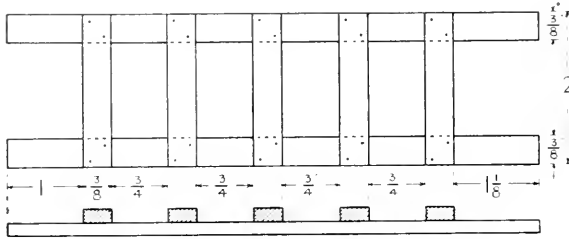
A definite size is given, but in practice it is best to frame a post-card or other picture brought by the pupil.



3. *Ladder:*

Follow the practice in each model of having the pupil calculate the total length of wood required, for example:

Two pieces 7 in. long equals 14 in.
 Five pieces 2 in. long equals 10 in.
 Total, 24 in. equals 2 ft.

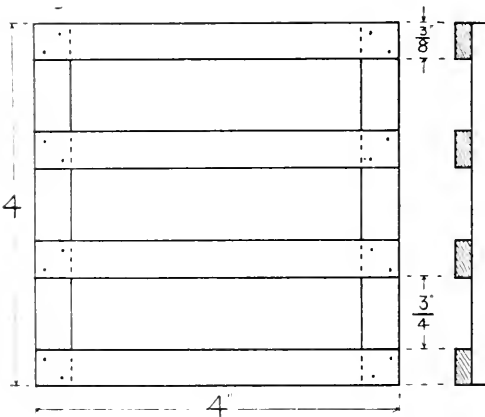
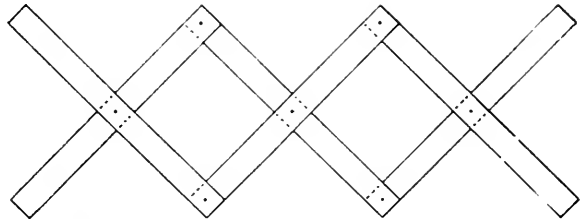


4. *Fan:*

The handle is of 2 pieces 8 in. long, and the fan is nailed between. This may be of thin cardboard. Any shape may be used. An octagon in a 7-in. square is shown.

5. *Movable Trellis:*

Each piece is 4 in. long. If one nail is placed at each joint, the trellis may be moved in and out. Feathers or cut out cardboard figures may be tacked on the ends.



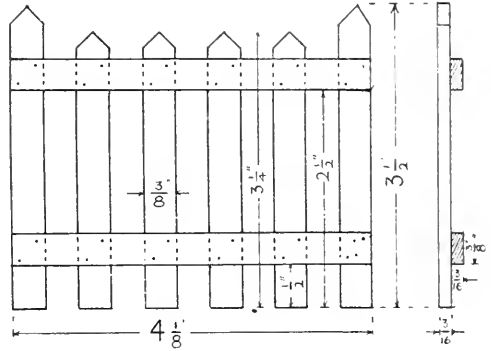
6. *Flower-pot Stand:*

This is used to prevent a flower-pot from coming into contact with the window-sill. It will be seen that the figure formed is a square. An opportunity is thus afforded to review the definitions, etc., of a square and of a right angle. Nail each corner with one nail and test for squareness before driving the remaining nails.

7. Gate:

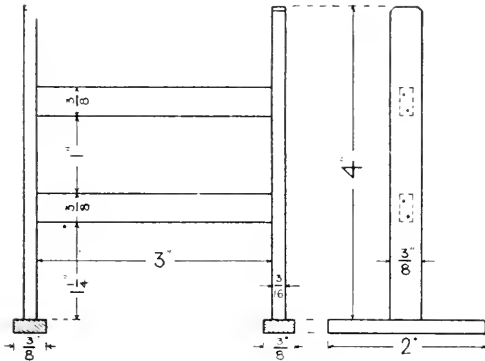
Two pieces $3\frac{1}{2}$ in. long equals 7 in.
 Two pieces $4\frac{1}{8}$ in. long equals $8\frac{1}{4}$ in.
 Four pieces $3\frac{1}{4}$ in. long equals 13 in.
 Total, $28\frac{1}{4}$ in. equals 2 ft. $4\frac{1}{4}$ in.

Show the pupils how to saw the ends of the uprights at angles of 45 degrees on the cutting board.



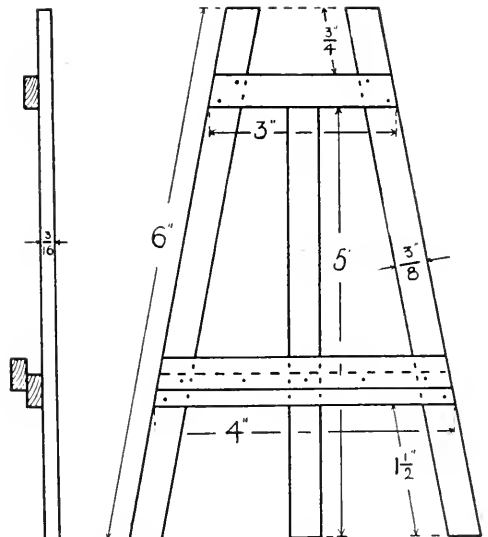
8. Towel-horse:

The two horizontal pieces fit in between the two uprights and are nailed through as shown. Where pieces fit in between other pieces, as in Nos. 6, 9, 11, 14, and 19, the ends should not be sand-papered, but should be left from the saw.

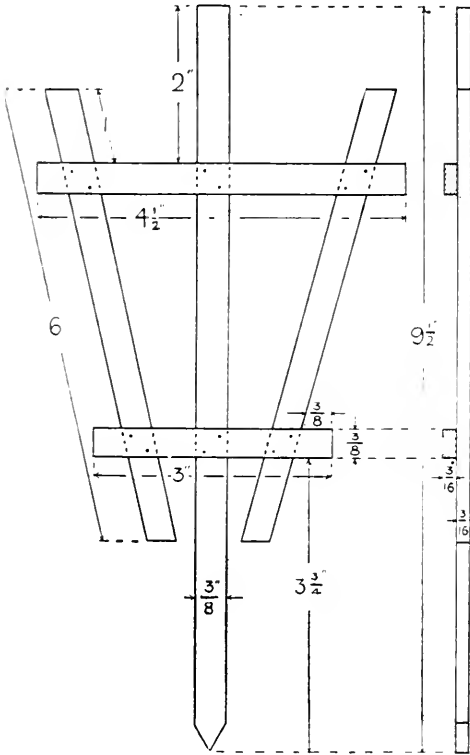


9. Easel:

The back leg is 5 in. long and is attached by a hinge of stout paper or passe-partout binding. The rabbet on which the picture rests is made from two strips nailed together.



BACK LEG 5" LONG . PASSE PARTOUT HINGE



10. Plant Support:

One piece $9\frac{1}{2}$ in. long equals $9\frac{1}{2}$ in.

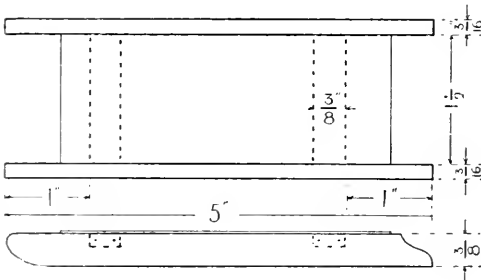
Two pieces 6 in. long equals 12 in.

One piece $4\frac{1}{2}$ in. long equals $4\frac{1}{2}$ in.

One piece 3 in. long equals 3 in.

Total, 29 in. equals 2 ft. 5 in.

The point is sawn at angles of 45 degrees.



USE HEAVY CARDBOARD FOR TOP BOARD

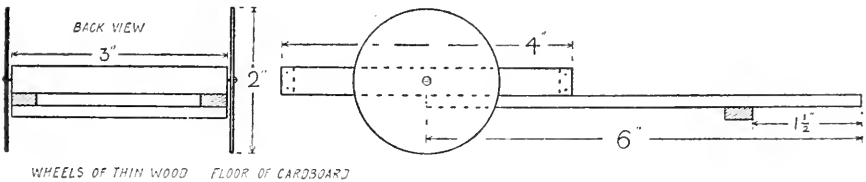
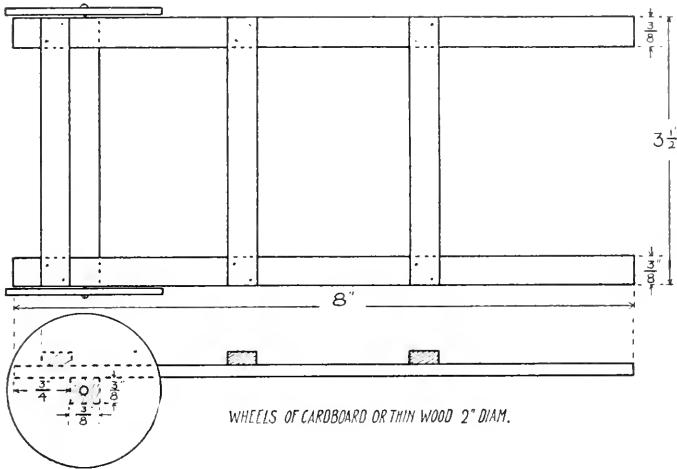
11. Sleigh:

The cross-pieces fit in between the 5-in. strips and are nailed through. The ends of the runners are rounded off with sand-paper. Use heavy cardboard (known as wood-board to the bookbinder) for the top. This may be cut by the pupils with a knife; but as a rule it is better, in the earlier stages, that it should be provided by the teacher, cut to the correct size.

12. *Cart:*

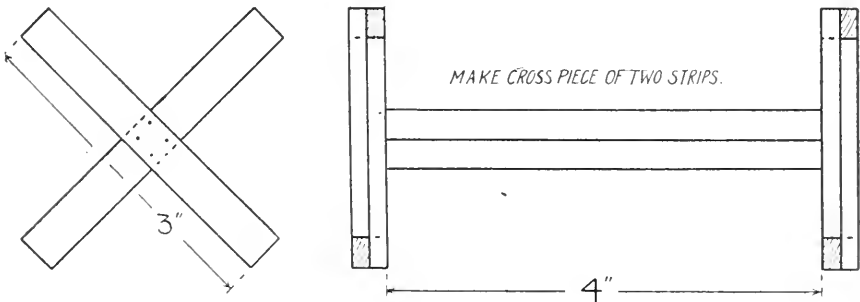
The shafts are 8 in. long. The cross-pieces are $3\frac{1}{2}$ in. long. The axle is made of two pieces nailed together. The wheels are 2 in. in diameter and are made from cardboard or thin wood.

Another form of cart is shown, the body of which is 4 in. long and 3 in. wide. The shaft is 6 in. long. The wheels are of thin wood 2 in. in diameter, and the floor is made of cardboard.



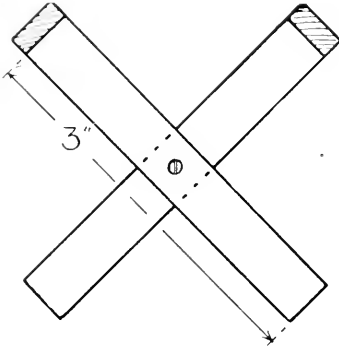
13. *Saw-horse:*

This requires great care in making. The cross-piece is made by nailing two pieces together. (4 in. long)

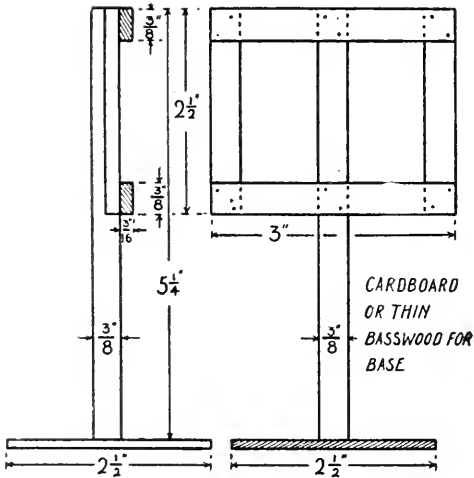
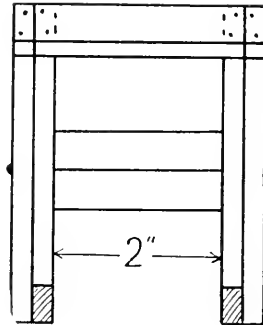


14. *Camp Stool:*

A modification of the previous model. Two cross-pieces are nailed on the top, and a piece of cloth or woven material (raffia, etc.) is tacked on to represent the seat. Instead of nails, screws may be used to join the side pieces which form the ends.



SEAT MADE OF WOVEN RAFFIA

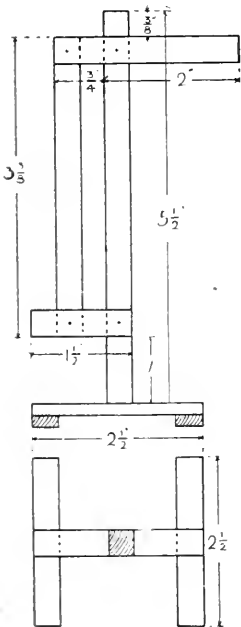
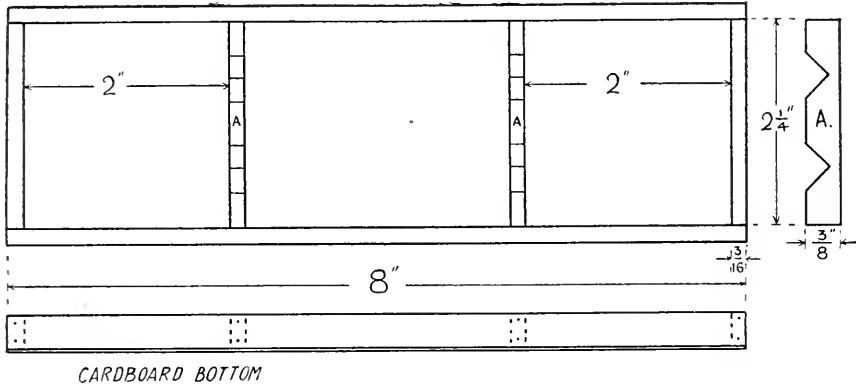


15. *Calendar Stand or Notice Board:*

The upright consists of two strips nailed together and is 5 1/4 in. long. The base is stiff cardboard or thin basswood, 2 1/2 in. square, and is glued and nailed to the upright. The back may be covered with a piece of cardboard.

16. *Pen Tray:*

The base of this is of stiff cardboard cut to size and glued and nailed on. The centre pieces are slightly notched, as shown in the drawing, in order to hold the pens.

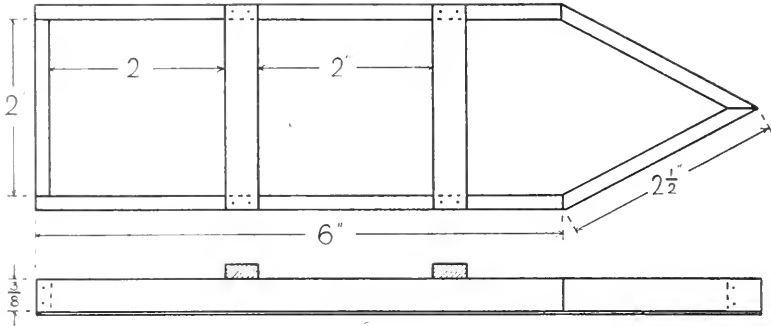


17. *Signal Post:*

The main upright ($5\frac{1}{2}$ in. long) consists of two strips nailed together and glued to the wooden base, which is $2\frac{1}{2}$ in. square. One nail is placed at each joint, in order to allow freedom of movement. The signal arm may be coloured with red ink.

18. Boat:

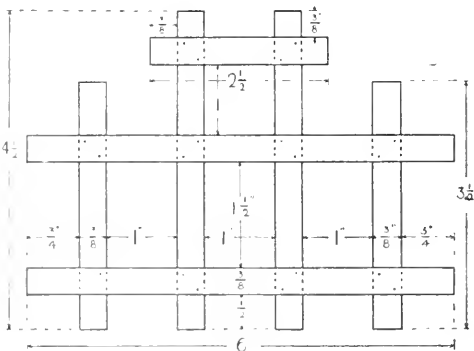
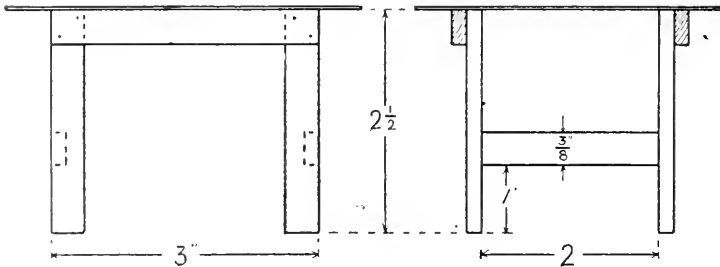
The bottom is of heavy cardboard. What are the angles required? Saw them carefully and glue them together.



HEAVY CARDBOARD FOR BOTTOM

19. Table:

The top is of wood-board 4 in. x 3 1/2 in. See that it is tacked on so as to lap over evenly on all sides.

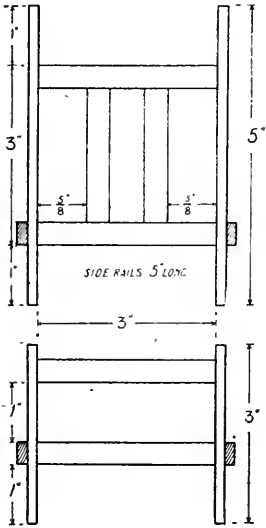


20. Key Rack:

- Calculate length of strips required.
- 2 at 6 in. long equals 12 in.
- 2 at 3 1/2 in. long equals 7 in.
- 2 at 4 1/2 in. long equals 9 in.
- 1 at 2 1/2 in. long equals 2 1/2 in.
- Total, 30 1/2 in. equals 2 ft. 6 1/2 in.

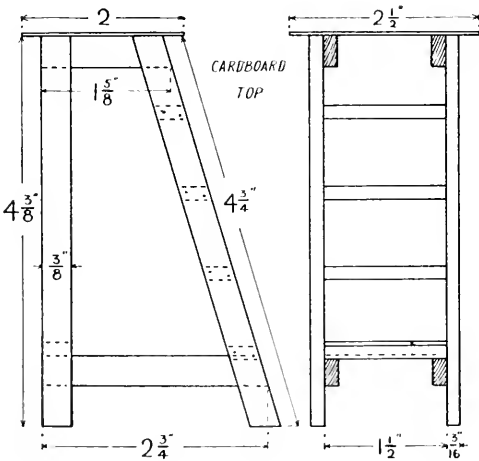
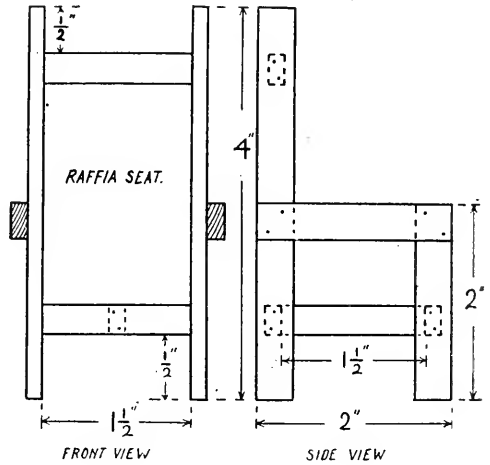
21. *Bed:*

Make each end separately and join by side rails 5 in. long.



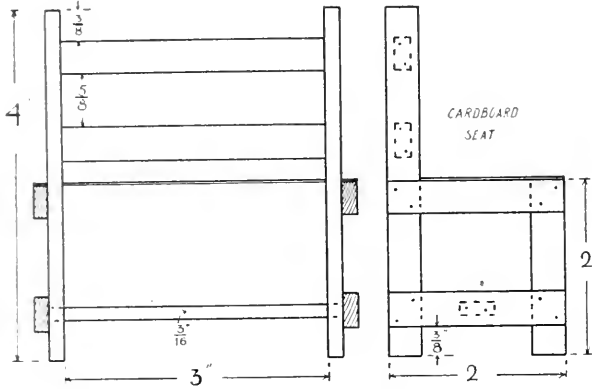
22. *Chair:*

The seat may be made of raffia or any other woven material.



23. *Step-ladder:*

The sides must be made in pairs right and left. The top is a piece of wood-board 2 1/2 in. x 2 in.

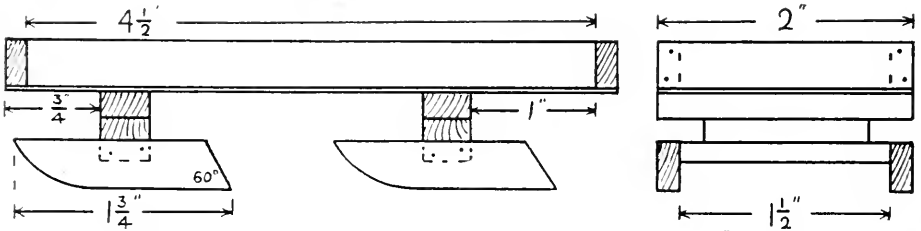


24. *Settle:*

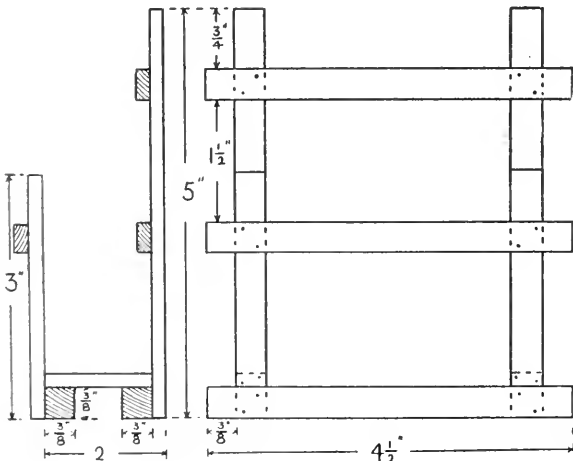
The seat is of wood-board.

25. *Bob-sleigh:*

The front pair are left loose, using only one nail. The top of the sleigh is of wood-board.

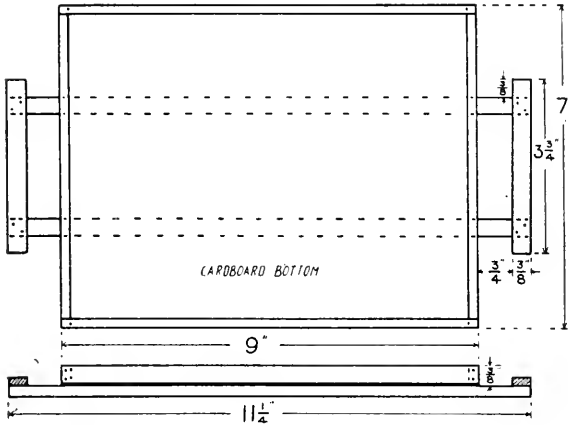


FRONT PAIR LOOSE, USE ONLY ONE NAIL. CARDBOARD FOR BOX BOTTOM.



26. *Letter-rack:*

Calculate the number of pieces and the lengths required. Nail the back first, then the front. Join together.



27. *Tea-tray:*

The bottom is made of heavy cardboard, cut to size and nailed on.

Many of the above objects are shown on page 143. They may also be made from natural twigs which have been gathered and dried by the pupils. For this work the willow, the elder, the hazel, the pine, and various fruit trees yield suitable material. The twigs cut from trees and shrubs in the late autumn should be gathered and left to dry for this purpose.

STRIP WOOD-WORK

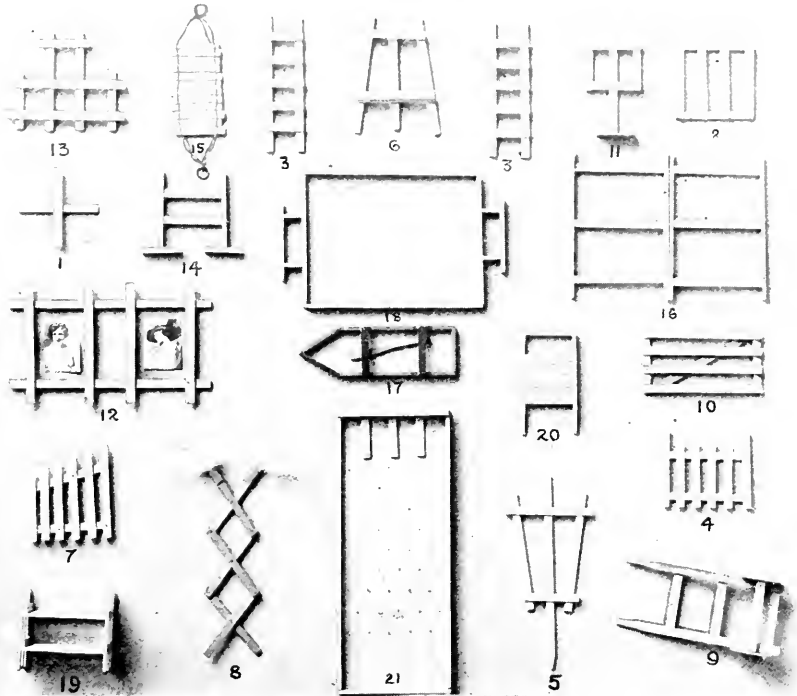


Plate 30.—Strip wood-work

- | | | |
|------------------|----------------------|-------------------|
| 1. String Winder | 8. Toy or Trellis | 15. Hammock |
| 2. Plant Stand | 9. Hand-cart | 16. Clothes-horse |
| 3. Ladder | 10. Gate | 17. Row-boat |
| 4. Gate | 11. Calendar Stand | 18. Tea-tray |
| 5. Plant Support | 12. Photograph Frame | 19. Book-stand |
| 6. Easel | 13. Key Rack | 20. Wash-board |
| 7. Gate | 14. Towel-horse | 21. Marble Board |