the rod). The mortices for the rail tenons are then set out on the face edge of the stile. This and the second stile, together with the muntins, are placed as shown at E, and, aided by the try square, the shoulders (see J) are squared down. The muntins are removed and squared all round for the shoulders which are to fit against the edges of the rails. The mortice lines are set out on the face edge of the second stile as shown at F, and as indicated, some joiners emphasize the mortices by drawing blue pencil lines between the mortice lines. The mortice lines are squared over to the back edge of each stile (see broken lines at F) and the positions of the $\frac{3}{8}$-in. thick wedges are marked on the back edge (see G). Note that the length of the stiles exceeds slightly that shown on the rod.

The setting out of the rails from the width rod (see A) is similar to that described for stiles. The setting out for muntins, shoulders and haunches (or haunchings) on the top rail is shown at K, and the middle rail is shown set out at L—the latter indicating the names applied to the various lines.

(2) *Forming Mortices and Tenons.*—The stiles are now morticed. If a mortising machine is not available, the mortices are made with a mortise chisel (see p. 128) and mallet (see 23, Fig. 67). A mortise gauge (9, Fig. 67) is used to scribe or mark the mortices on each edge of the stile, the points of the gauge being set to the width of the chisel which should equal one-third the thickness of the stuff. These mortices are always gauged from the face side of each stile. Each mortice is cut half-way through, commencing at the centre of the back edge and removing the core by small cuts, and then the mortice is completed from the face edge in a similar manner. A core-driver (a piece of hardwood the size of the mortice) is punched through from the face edge to the back edge to " clean " each mortice and a paring chisel (35, Fig. 67) is used to finish off. The 2-in. deep stub mortices are formed on the rails to receive the tenons at the ends of the muntins.

The ends of the rails are gauged from the face side as shown at B, Fig. 55. The " mortice lines " are rip sawn down to the " haunch lines," the " waste " is removed, and the " gauge lines " are sawn down to the " shoulder lines " (see C). Both ends of each rail are treated in this manner. The panel groove is then formed by means of a plough (31, Fig. 67) on the face edge from end to end of each stile, the top or face edge of the bottom rail, both edges of the middle rail, the bottom or face edge of the top rail and both edges of each muntin ; the plough iron must be of the proper size, be set at the correct depth ($\frac{1}{2}$-in. in this case), and the plough must always be worked from the face side of each member. The tenon cheeks (outer portions) are now removed by using the tenon saw (13, Fig. 67) to carefully cut down the centre of the shoulder lines to complete the end as shown at D, Fig. 55. The tenons on the muntins are formed in a similar manner.

After the corners of the tenons have been chiselled off so that they may readily engage in the mortices, the whole of the members are assembled temporarily to see if the joints fit accurately, and the framing is put aside pending the preparation of the panels.

The panels are then made. The dimensions are taken from the rod or framing, one face and edge are planed with the trying plane, and the face and edge marks are put on these. A panel gauge (see p. 127) is used to mark the required width, the panel is cut along this line, and the ends are squared and cut off to the exact size. The panel is now *mulleted* or gauged ; the mullet—a piece of wood grooved to the required size (see H, Fig. 55)—is slipped along the edges of the panel to indicate any excessively thick places which are eased by planing. The four panels are made in this manner, the sides are smoothed by a smoothing plane (see p. 128), glass paper is rubbed across the grain, and the panels are inserted temporarily in the framing by removing one stile at a time.

(3) *Gluing and Wedging Up.*—Two pieces of scantling are placed on the bench as shown at J, Fig. 55. A cramp is necessary to ensure that the shoulders of the various members fit tightly.

One form of cramp, called a T-cramp, is shown at J. It consists of a steel bar of T-section which is from $1\frac{3}{4}$ to $2\frac{3}{4}$-in. deep, $\frac{3}{4}$ to 1-in. at its flange or widest part, and from 2 to 7 ft. long ; it has a series of $\frac{1}{2}$-in. diameter holes along its length into which a 3-in. by $\frac{1}{2}$-in. round steel taper peg is inserted ; this peg is attached by a chain to a shoe, the jaws of which pass over the flange of the bar to enable the shoe to slide along it ; at the other end of the bar there is a metal head which is threaded to allow the working of a screw which has a rectangular plate at one end having jaws which slide along the bar flange when the metal rod handle is rotated. An extension bar may be fitted to the cramp in order that it may be used for large framings.

A joiner and an apprentice generally work together when gluing up a door. The door is taken to pieces and both sides of the tenons and the insides of the mortices are glued ; it is at once reassembled ; the cramp is then used. Commencing at the middle rail, the cramp is fixed in the position as shown at J ; the shoe is slid along to the required position, the peg is inserted in the appropriate hole, small protecting blocks of wood are placed between the stiles and the shoe and screw cheeks, and the cramp is then screwed up tightly to bring the shoulders right up. The wedges are dipped into the glue-pot and tightly driven in at each end. The cramp is moved to the bottom rail (shown by broken lines at J), tightened up and wedged as before described, the bottom wedge being driven first so as to bring the shoulders of the bottom muntin tight up against the rails. The cramp is finally moved to the third position along the top rail, glued wedges are inserted and driven home, the top wedge at each end being fixed first so as to move the top rail to close the joints between the top muntin and rails. The cramp is removed and the projecting ends of the rails are sawn off.

(4) *Cleaning Off.*—Any superfluous glue is removed by a chisel from the joints, commencing on the face side of the door. The trying plane is applied on the muntins to bring them level with the rails and the latter are levelled to the face of the stiles, any inequalities at the shoulders being removed. A smoothing plane is then used, and if necessary the surfaces are scraped before being glass papered. The other side is treated similarly. The outer edges of the door are not planed, nor are the horns removed, until the door is being hung in position.