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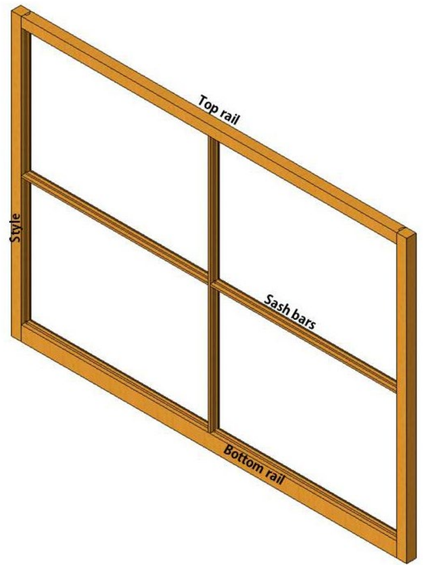
Raised and Fielded Panel Door...35

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Present work draws largely from acknowledged authorities and from workmen of recognized ability to which the authors experience and observation have been added

Windows

Windows Generally *(Pg.201)*



Size and position

The sizes and positions of window openings are influenced by the size of the rooms, and the purposes for which the building is used. For the sake of ventilation, and also to secure good lighting the window should be placed at as great a height as the construction of the room will allow. In dwelling houses the height of the sill is usually about 2'6" above the inside floor level.

Construction

The framework holding the glass of the window may be fixed or movable, so prepared that the glass can be replaced easily when necessary.

Fast Sheets, Casement Sashes and Sash and Frame windows

In warehouses, workshops and similar buildings, the frames holding the glass are often fixed as **Fast Sheets.** As, however, this arrangement affords no means of ventilation, it is more usual to have the glass fixed in lighter frames called sashes.

If the sashes are hung to solid rebated frames , and open as doors do, the windows are called **Casement sashes.**

If they slide vertically and are balanced by weights or by each other , the window is a **Sash and Frame Window.**

Terms used

Styles are the outer uprights.

Rails are the main horizontal cross pieces: top rails, meeting rails and bottom rails being distinguished.

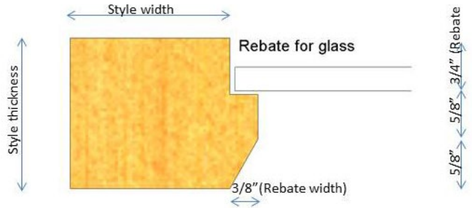
Bars are any intermediate members, whether vertical or horizontal.

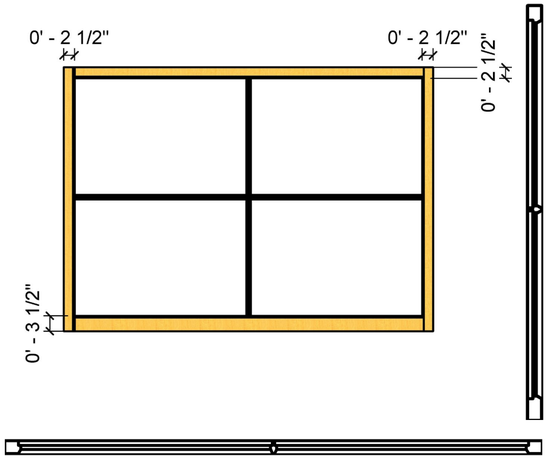
Fast Sheets *(Pg.201-2)*

Sashes are from **1 1/2 to 3 inches thick.** The inner edge of the outer face is rebated to receive the glass.

The inner face is either left square , chamfered or moulded. The size of the rebate varies with the thickness of the sash, its depth being always a little more than one-third this thickness.

The width of the **rebate** varies from a quarter of an inch to half an inch , and the mould is usually sunk the same depth as the rebate. This last fact is of some importance, as it affects the shoulder lines; and with hand work it influences the amount of labor in the making of the sashes.





As little materials as possible is used in the sashes, in order that the light shall not be interfered with.

In general the styles and top rail are square in section before being rebated and moulded. In casement sashes it is advisable to have the outer styles a little wider than thicknesse specially when they are tongued into the frame.

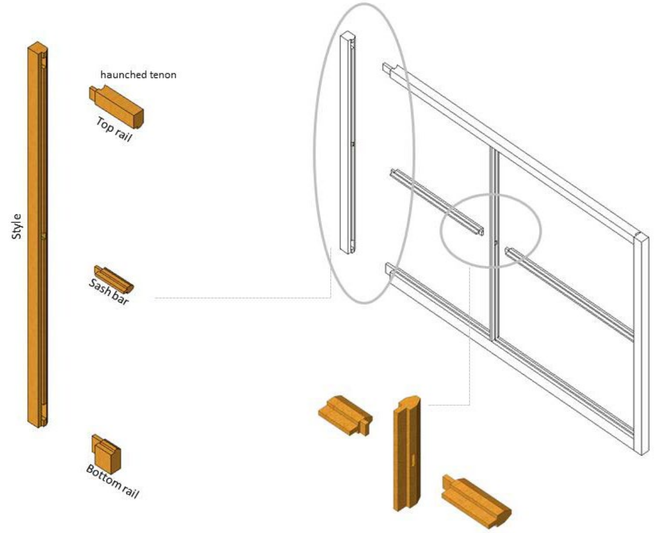
The width of the **bottom rail** is from **1 1/2-2** times the thickness of the sash.

Sash bars, which require rebating and moulding on both sides, should be as narrow as possible in order not to interrupt the light.They are usually from **5/8 of an inch to 1 1/4 inches** wide.

Fast Sheets *(Pg.203-4)*

Joints of sashes

The sashes are framed together by means of the Mortise and Tenon joint. Hardwood cross-tongues are sometimes inserted to strengthen the joints while thick sashes should have double tenons.



Franking the Sash Bars

An alternative to halving in sash bars is to arrange the bar which is subjected to the greater stress –as for example, the vertical bars in sliding and horizontal in hinged should be continuous; this continuous bar is mortised to receive the other, which is scribed i.e. cut to fit the first and on which the short tenons are left. This is called franking the sash bars.

Casement Windows *(Pg.204)*

Case ment windows may be hinged to open inward or outwards and may have one sash or folding sashes.

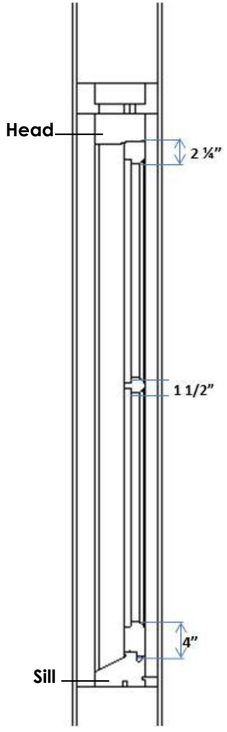
They are hung with butt hinges to solid rebated frames which consist of jambs, head and sill.

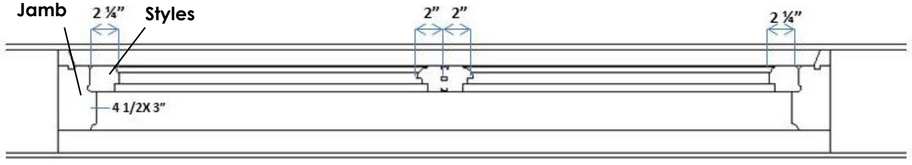
The head and sill run through and are mortised near the ends to receive tenons formed on the ends of the jambs.

The upper surface of sill is weathered to throw off rain water

•Casements that reach the floor-sashes require an extra depth of bottom rail and are called French Casements







Casement Windows

Sashes Opening inwards (Pg. 205-7)

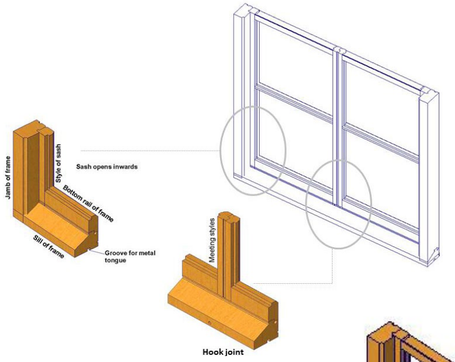
In this class of window the frame is rebated for the sashes on the inner side

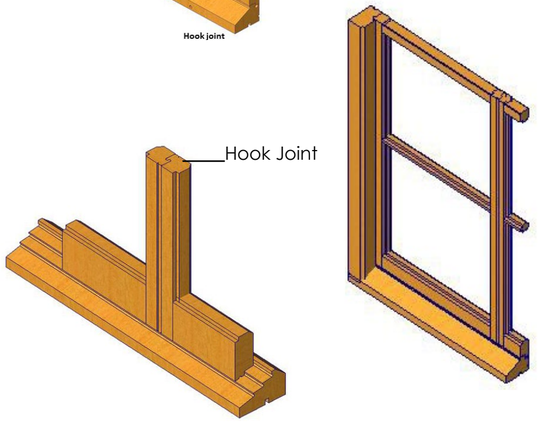
Each sash has on the outer edge of the outer style, a semicircular tongue which fits into a corresponding groove in the jamb of the frame. This tongue renders the vertical joint between sash and frame more likely to be weather proof.

An essential feature of all sashes is a small groove or throating on the under edge of the bottom rail which prevents water from getting through.

The groove in the rebate of the sill is provided to collect any water that may drive through the joint. This water escapes from the hole bored in the center of the sill.

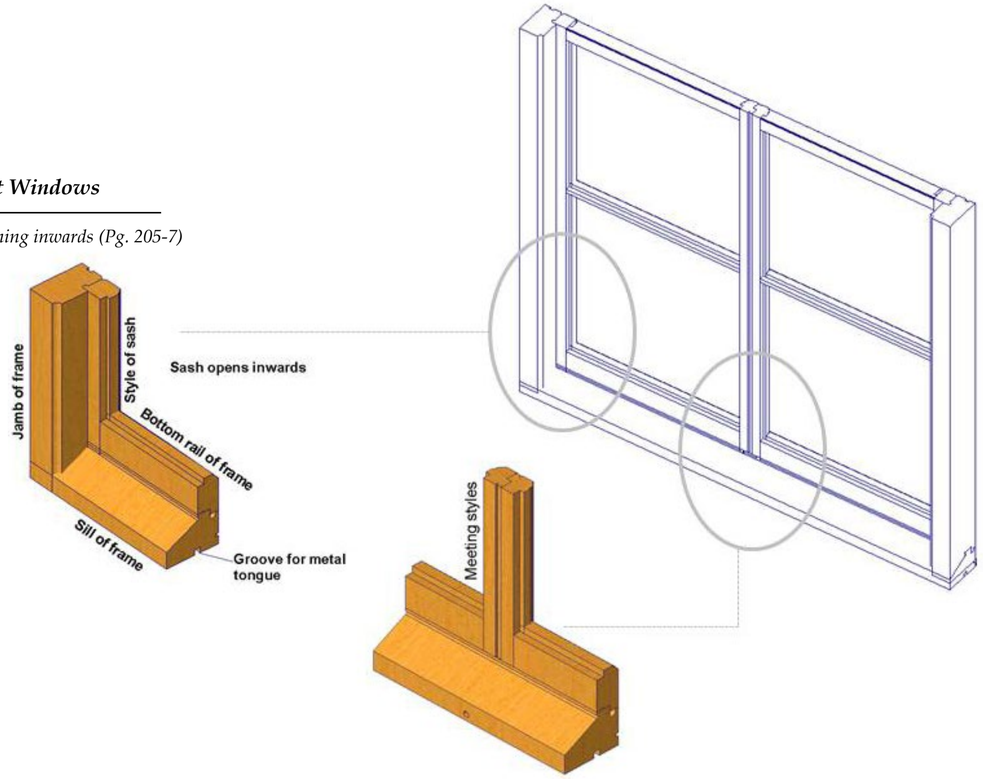
When casement sashes are hung after the manner of folding doors, the vertical joint between the meeting styles is rebated. Hook joint used for this purpose is the better one.





Casement Windows

Sashes Opening inwards (Pg. 205-7)



Casement Windows

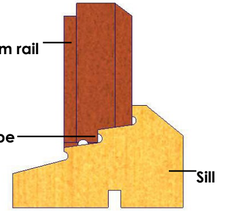
Sashes Opening outwards (Pg.208)

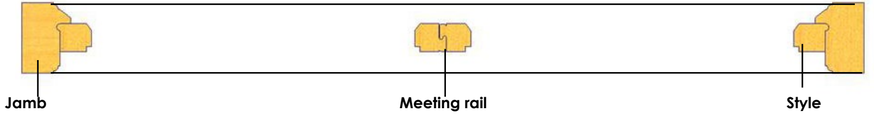
These are more easily made waterproof than inward opening sashes.

The chief objections to their adoption are that they are not easily accessible for cleaning the outside especially in upper rooms and that they are liable, when left open to be damaged by high winds and to let in rain during a storm

The sashes can be hung flushed with one face of the frame or fit in the thickness of the frame. The sill shows to be double sunk i.e. to have the upper surface upon which the bottom rail of the sash fits- rebated with two slopes (weatherings).

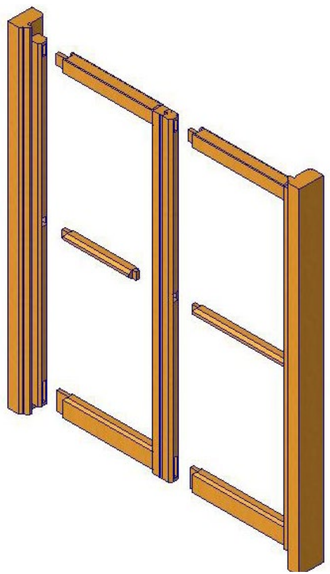


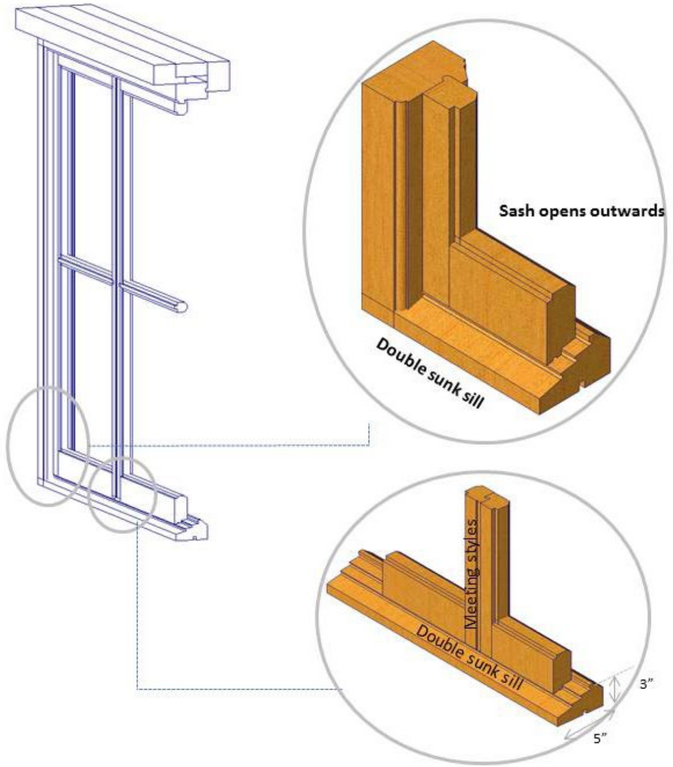




Casement Windows

Sashes Opening outwards (Pg.208)





Sash and frame window

(Pg.209-14)

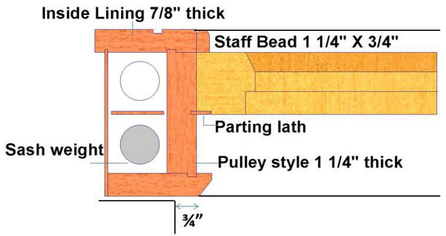
In this class of window, which is by far the most common as it is easily made water proof there are two sashes which slide past each other in vertical grooves and are usually balanced by iron or leaden weights.

The frames form cases /boxes in which the weights are suspended (called **cased frames)** which take the place of the solid rebated jambs of casement windows. **Pulley styles, outside and inside linings and back lining** together form a box subdivided by a vertical **parting slip.**

In superior window frames of this kind the pulley styles and linings are tongued and grooved together .

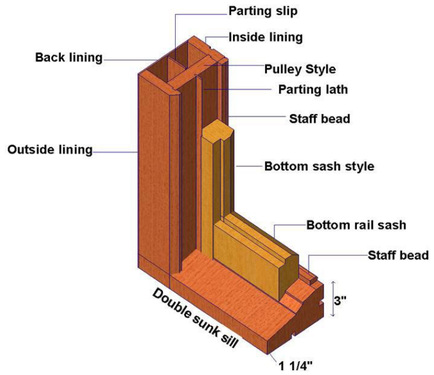
The frame must be so constructed that the sashes can be removed for repair/replacement. To enable this, the edge of the inside lining is either made flush with the face of the pulley style or rebated slightly.





Sash and frame window

(Pg.209-14)



When the weathering has two steppings it is known as double sunk sill. An alternative of having width of sill of the full thickness of the frame is to arrange it so that the outside edge is flush with the outside face of the bottom sash. This ensures less danger of water driving through the joint between the sash and the sill than with a sill the full thickness of the frame.

For waterproofing, a metal tongue often fixed into corresponding grooves cut into the underside of the wooden sill and upper surface of the stone sill. A rebated joint between the two sills serves the same purpose as the metal tongue.

The pulley on which the sash lines run –sash or axle pulleys are fixed in mortoises near the upper ends of the pulley styles

The edge of the outside lining projects for a distance (3/4") beyond face of pulley style to form a rebate along which the outer (upper) sash slides.

The outer sash is kept in position by the parting lath which fits into groove in the pulley style.

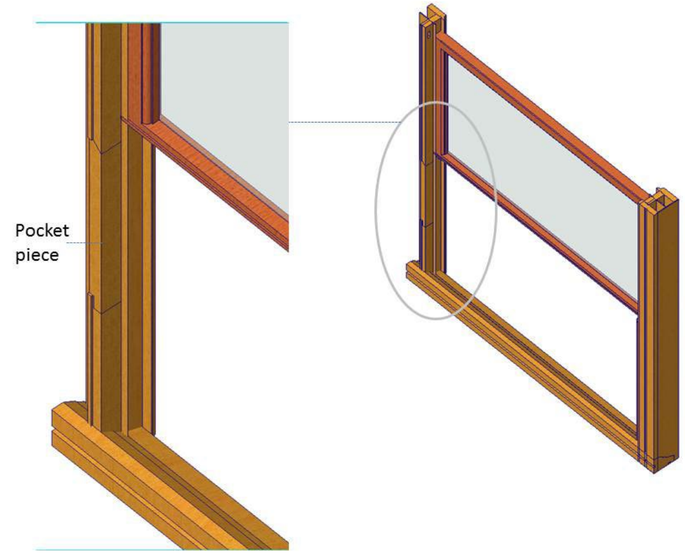
The groove for the inner (lower) sash is formed by the parting lath and a staff bead/stop bead which is secured by screws. The staff bead on the sill is 2-3 inches deep to allow the lower sash to be raised sufficiently for ventilation at the meeting rails without causing a draught at the bottom

A vertical section at the head of the frame is similar to a horizontal section across the pulley style except that the back lining and parting slips are absent.

The Sill of the frame is solid and weathered and should always be of hardwood preferably oak or teak. The sill has a width equal to the full thickness of the frame

Sash and frame window

(Pg.209-14)



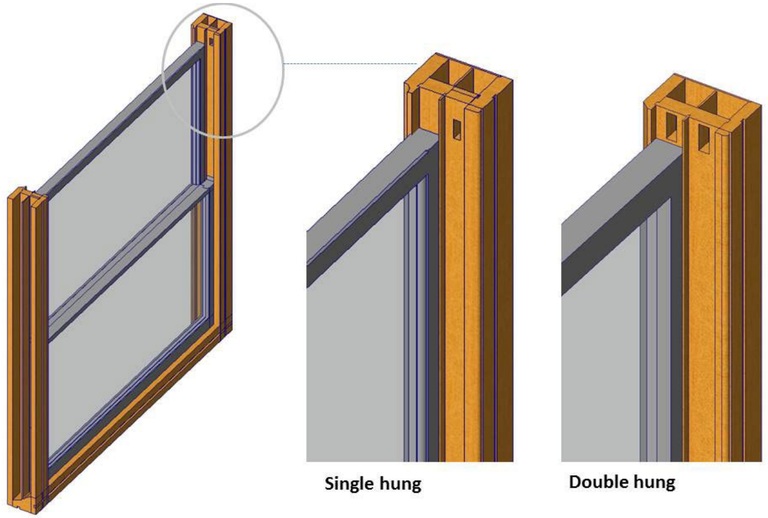
It is also necessary to have a removable piece in the lower part of each pulley style to allow of access to the weights.

This piece is called the **pocket piece**.The pocket piece is behind the lower sash and hidden from view when the window is closed.

Or the pocket piece may be in the middle of the pulley styles the vertical joints between the pocket piece and the pulley styles are then V shaped to prevent damage to the the paint in case of removal

Sash and frame window

(Pg.209-14)



The only difference between the joints of sliding sashes and those of casement sashes already described is in the construction of the meeting rails

Each of the meeting rails is made thicker than the sash to the extent of the thickness of the parting lath. Otherwise there will be a space between them equal to the thickness of the parting lath.

Joint between them may be rebated or splayed
The angle joint between the ends of the sash styles and the meeting rails are often dovetailed
They are however stronger if the styles are made a little longer the projecting part being moulded and mortise and Tenon joint used

When both sashes slide and are balanced by weights the window is known as a **double hung sash and frame window**
If one sash only slides and the other is fixed in the frame the window is **single hung.**

Sash and frame window

(Pg.215-6)

The Hanging of Vertical sliding sashes

Sashes of sash and frame window are balanced by cast iron or leaden weights. The best cord is employed for hanging sashes of ordi nary size, while for very heavy sashes the sash lines are often of steel and copper.

The staff bead and parting bead having been removed, the cords are passed over the axle pulley(which are best of brass to prevent corrosion) and are tied to the upper ends of the weights . The weights are passed through the pocket holes and suspended in the boxes.

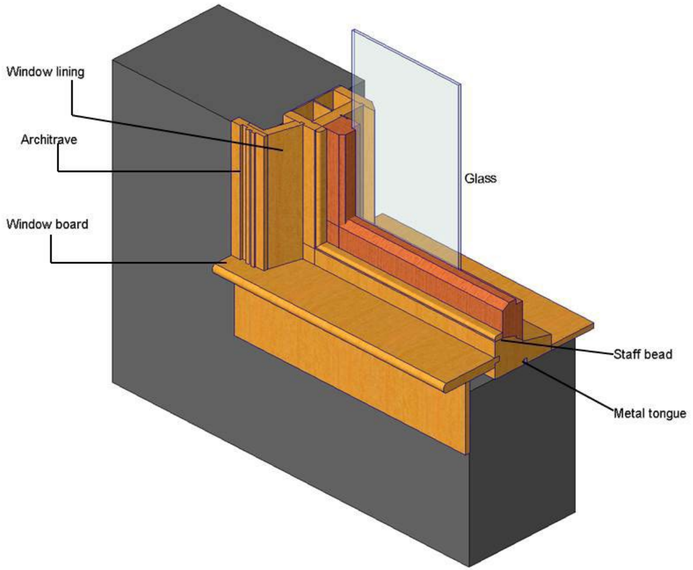
The pocket pieces having been replaced the upper sash which slides in the outer groove is hung first the free ends of the chords being either nailed into grooves in the out-er edges of the sash or screwed by knotting the ends after passing them through holes bored into the styles of the sash.

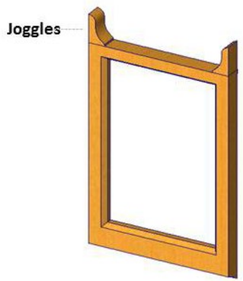
The upper sash being hung the parting laths are fixed into the grooves in the pulley styles and the lower (inner) sash is hung in a similar manner, after which the staff beads are screwed in position.

If the cords for the upper sash are too long the weights will touch the bottom of the frame and cease to balance the weight of the sash before the latter is closed.

If the cords for the lowersash are too short the weights will come in contact with the axle pulleys and thus prevent it from closing.

Sash and frame window





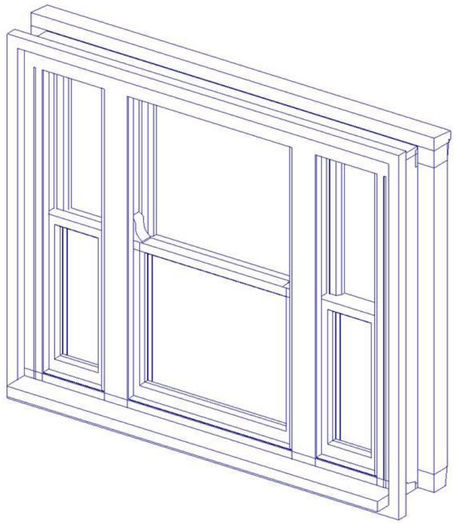
The projecting ends of the styles are called joggles they assist in enabling the sashes especially in wide windows to slide more freely

When three pairs of sashes are used, the middle pair wider than the others it is called a Venetian Window The vertical divisions between the adjacent pairs of sashes are called mullions.

Venetian Window

(Pg.215-6)



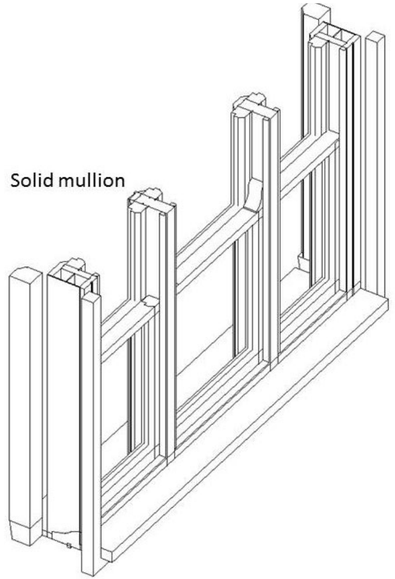


Venetian Window

Pg.215-6

Different Mullion types

1.If the middle pair of sashes is only required to slide the mullions may be solid from 1 ¼ " to 2" thick , The sash-cord conducted by means of additional pulleys to the boxes which are at the outer edges of the frame

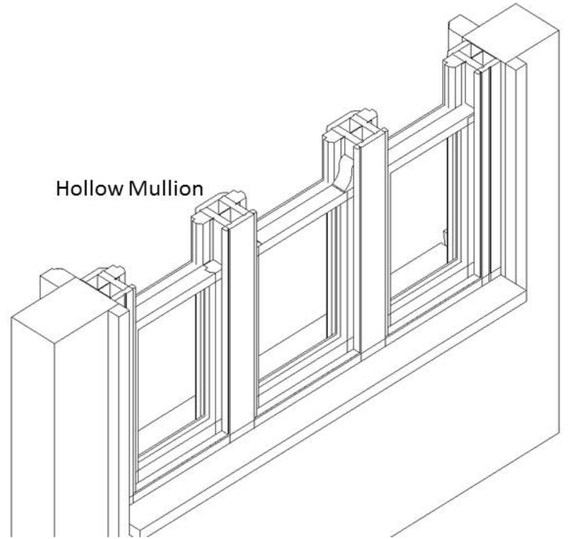


Venetian Window

(Pg.215-6)

2. If it is desirable to have all the sashes to slide the mullions must be hollow to provide room for the weights.

With the arrangement of a mullion with provision made for one weight to balance the two sashes adjacent to it, the sash cord passes around a pulley fixed into the upper end of the weight.

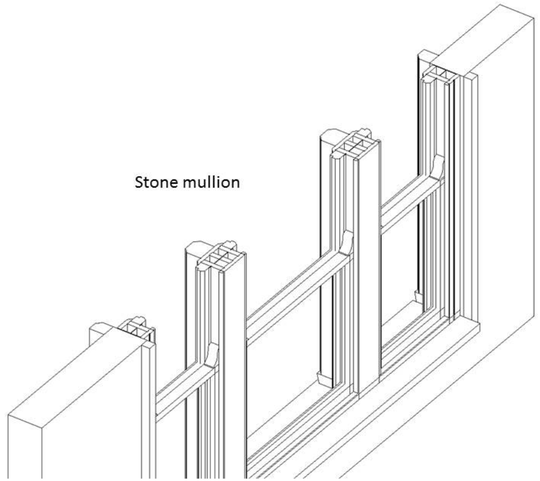




Venetian Window

(Pg.215-6)

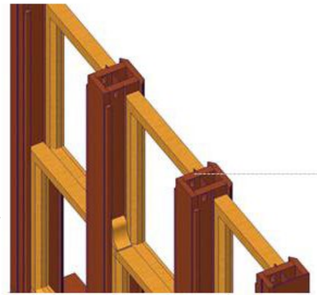
3.If stone mullions are used in the window openings separate boxing may be made so that each pair of sashes is hung independently and the window becomes two or three separate window frames with the sill and head each in one length for the sake of strength.



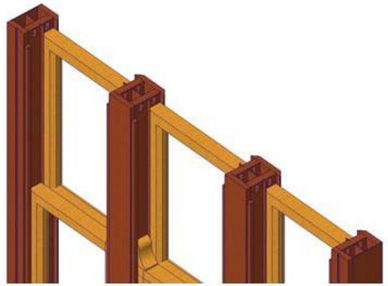


Venetian Window

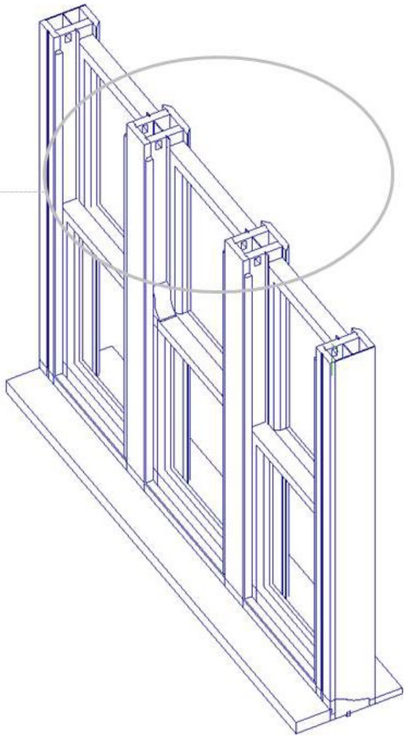
(Pg.215-6)



Middle sash single hung

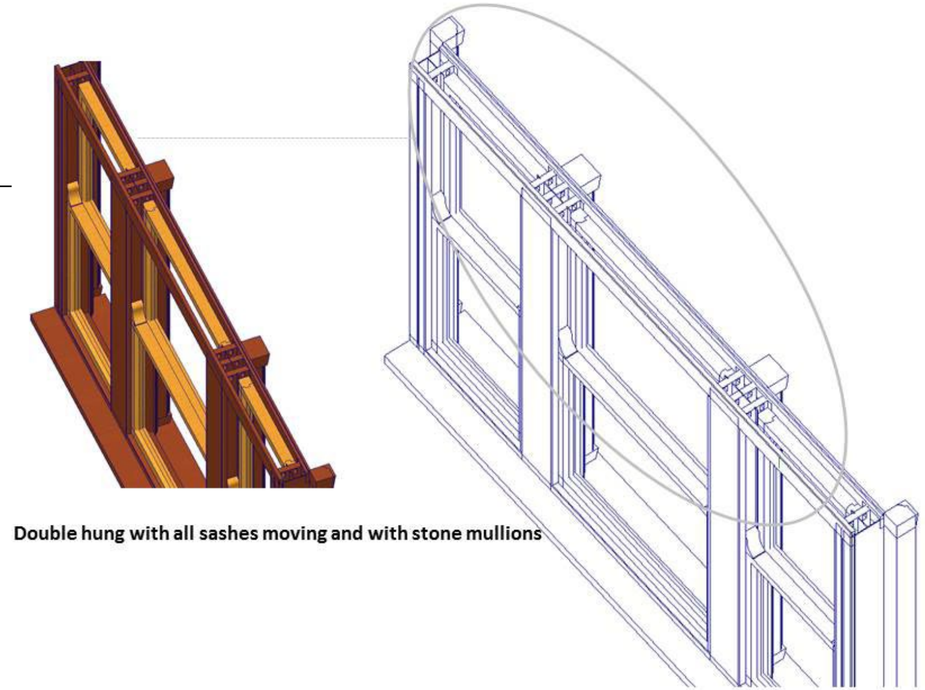


Middle sash double hung



Venetian Window

(Pg.215-6)



Double hung with all sashes moving and with stone mullions

Doors

Doors Generally

(Pg.263-4)

Pg. 263-4
The following may be taken as an indication of the more usual dimensions given to ordinary good class dwelling house doors
Entrance door, from 7ft. to 8 ft. 6 in. high by from 3 ft. to 4ft. 6 in. wide, 2 to 2 ½ in. thick.
Reception rooms, 7 ft. by 3ft. 3 in. by 2 in.
Bedrooms, 6 ft. 8 in. by 1 ½ in.
Details of interior doors
Stiles and top rails, in common work, out of 4 ½ in.,
Muntings and frieze rails 4 in.
Middle and bottom rails 9 in.

Superior doors vary much, but generally stiles and rails are somewhat wider than the above, muntings and frieze rails narrower.

Height of lock rail usually 2ft. 8 in. to its centre. This is a convenient height for the handle which is generally placed in the middle of depth of rail. When an entrance door is approached from a step the middle rail is kept about 6 in. lower, to bring the height of the handle convenient.

Common Doors, both internal and external are made of "yellow pine" or Georgia pine throughout. A better class of interior doors have yellow pine frames and white pine panels. The latter wood should not be used for external work, as it is far too soft and will not stand wet.

Superior internal doors are made throughout of Honduras mahogany, black walnut and oak; also of pine and baywood, veneered with Spanish mahogany. External doors of oak, teak, walnut and pitch pine.

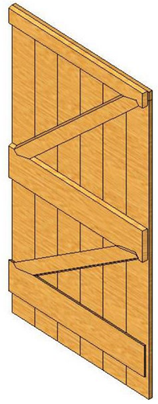
In constructing doors of any of the abovementioned figure woods, great attention must be paid to the arrangement of the members, so as to balance the figure, and this may also well be studied in the conversion of the plank. For instance, two stiles each having a pronounced figure on one end and the other end plain should have the figured ends placed at the bottom.This gives the effect of solidity, whilst the reverse would make the door look top heavy.

Similarly, the upper rails should be plain ,the lower figured. It must be understood that the above only applies when the wood is a mixed lot.

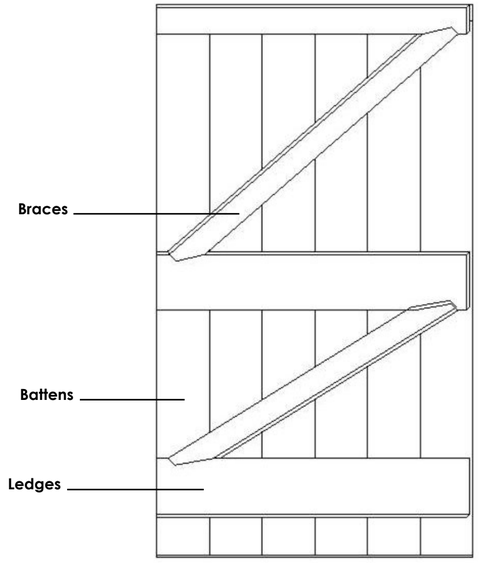
When the wood is handsomely figured throughout , the point of most importance is the effect of its position upon the figure, and this is so great that in some of the light colored woods, wainscot and baywood for instance, a piece that in one position will appear richly figured while in another show quite plain and dull.

Plain Battened Door

(Pg.252-3)



The plain Battened door is composed of **battens,** from 3/4 to 1 1/4 in. thick, ploughed and tongued in the joints with straight tongues which should be painted before insertion nailed to three **ledges** 1 to 1 1/4 in. thick, usually with wrought nails long enough to come through and be clenched on the back side.



Plain Battened Door

(Pg.252-3)

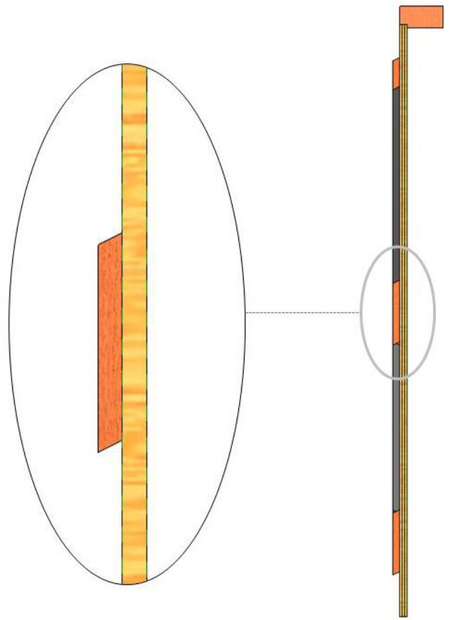
Their ends should be notched into the ledges about 1 in. deep and 1 1/2 in. from the ends, with the abutment square to the pitch of the brace .

Narrow doors are sometimes made without braces, but they seldom keep 'square'.

These doors are hung with wought iron strap hinges called cross garnets, which should be fixed on or opposite the battens, whether placed on the face or back of the door.

The ends of the ledges are better fixed with screws and their top edges as well as those of the braces should be bevelled to throw off the water.

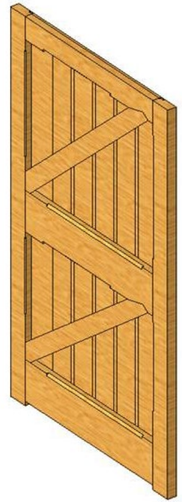
The lower edges may be throated or bevelled under. The braces shoud be placed so that their lower ends are at the hanging side for if in the opposite direction, they will be useless to prevent the door racking.





Framed Battened and Braced Door

(Pg.253-4)

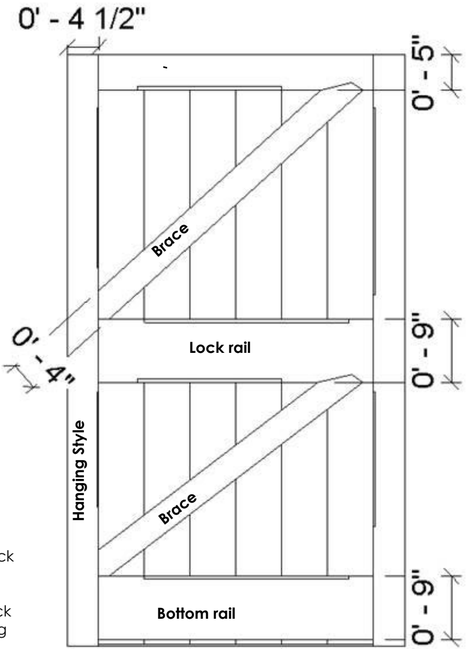


The battens and ledges are enclosed on three sides by a frame of a thickness equal to the combined thickness of the battens and ledges so that it is flush on both sides with them.

The boards are tongued into the frame at the top and the sides, and the ledges are framed into the stiles with barefaced tenons.

The bracces should not be taken into the angle formed by the stile and rail, but be kept back from the shoulder about 1 in.

These doors, as in fact all framed work exposed to damp, should be put together with a quick drying paint instead of glue in a joints, because ordinary softens in damp conditions releasing its hold leading to dry rot in timber



Framed Battened and Braced Door

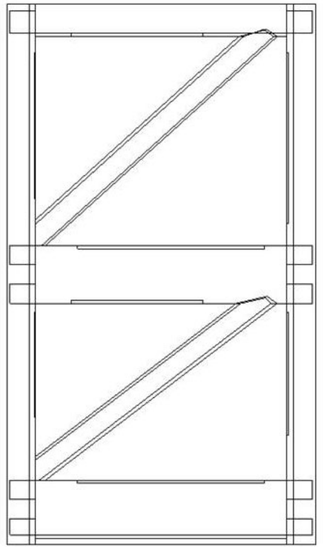
(Pg.253-4)

The battens in these doors should be made 1/16 in. slack for each foot of width to allow for subsequent expansion, or otherwise the shoulder will be forced off

Method of construction

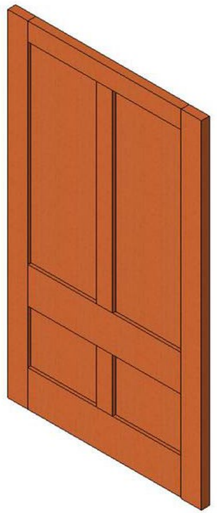
The framework of these doors is first made and wedges up, then the battens folded in and driven up into the top rail and nailed to the ledges.

Braces are cut tightly in and nailed to the battens in turn and the whole cleaned off together. In larger gates it is usual to stub tenon the braces into the rails, in which case they must be inserted first and wedges up with the framing.



Framed or Panelled Doors

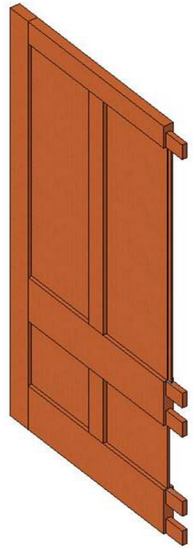
(Pg.254-60)

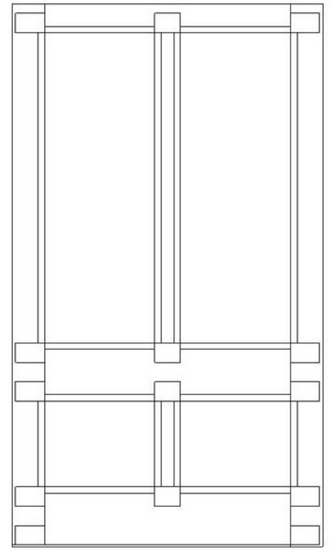


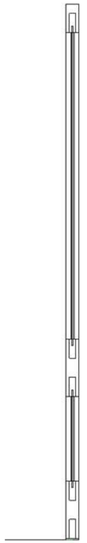
Framed or Panelled doors are of several kinds, distinguished by the number or treatment of their panels, or by arrangement of the mouldings as follows:

1.Square and Sunk

When a thin panel is used without moulding.





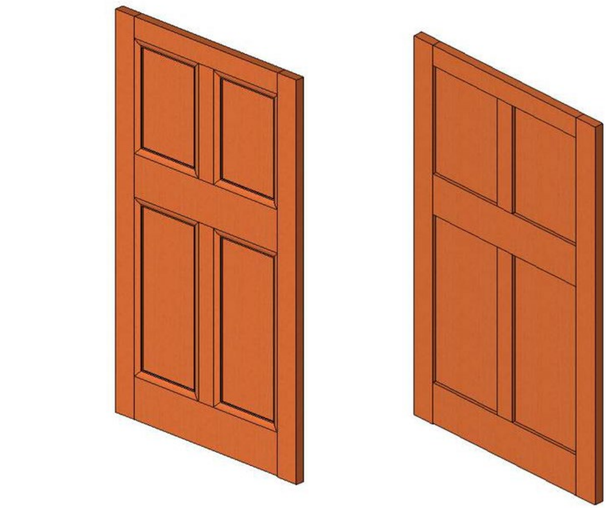


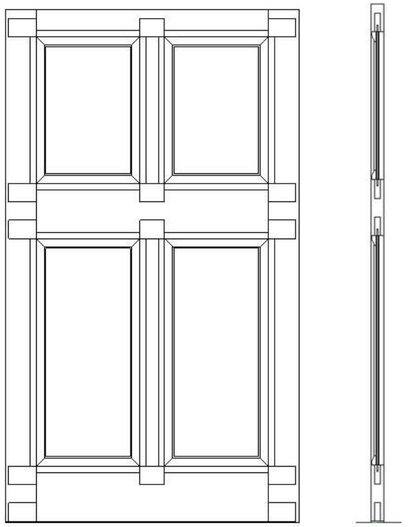
Framed or Panelled Doors

(Pg.254-60)

2. Moulded and Square

When one side of the panel is moulded and the other one is plain.



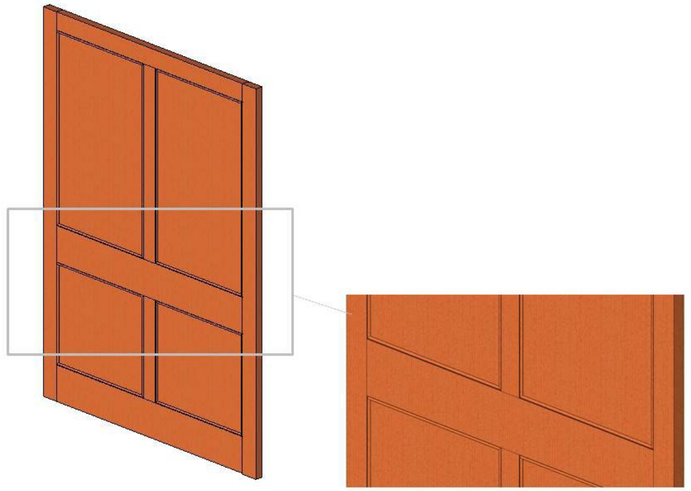


Framed or Panelled Doors

(Pg.254-60)

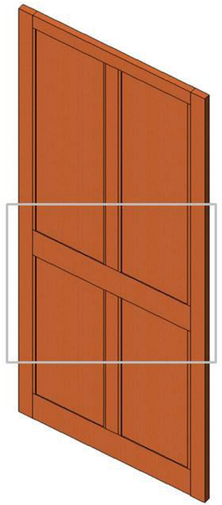
3. Bead Flush

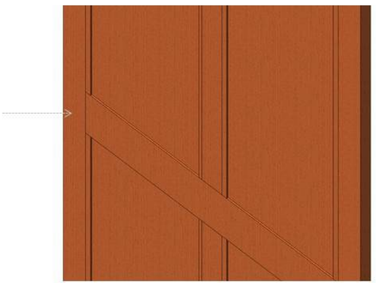
When one side of the panel is flush or nearly so, with the frame, and with a bead worked round the edges to break the joints.



Framed or Panelled Doors

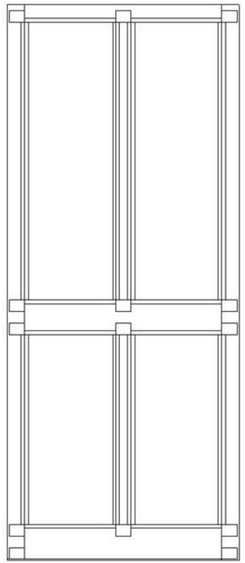
(Pg.254-60)





4. Bead Butt Panels

When the bead is worked only on the two sides of the panel.



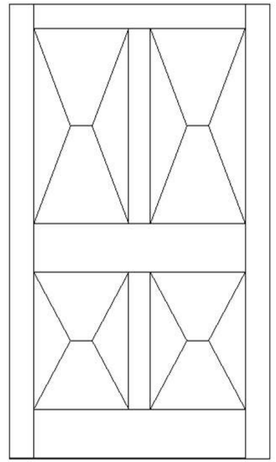
Raised Panel Door

(Pg.256-7)

When the centre part of the panel is thicker than the margin. There are four varieties of raised panel

1. Chamfered Raised Panel Door

In this the panel is chamfered down equally all around, from the center to the edgewhen square, or from a central ridge if rectangular.



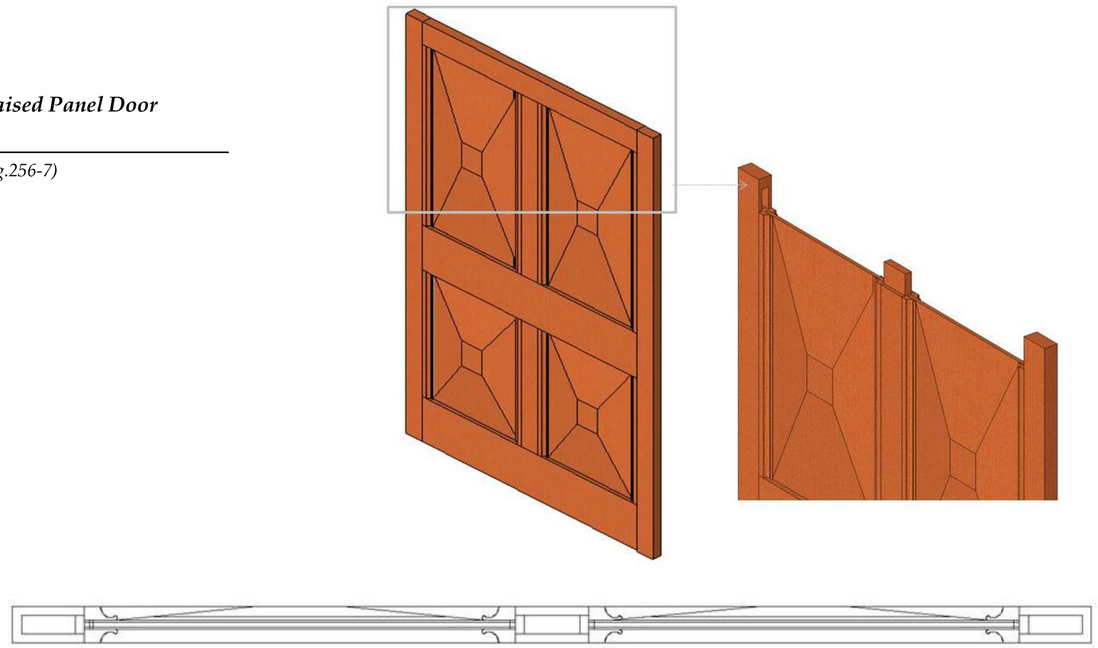


Raised Panel Door

(Pg.256-7)

2. Raised and Flat or Raised and Fielded

When a chamfer is worked all around the edge, leaving a flat in the center.

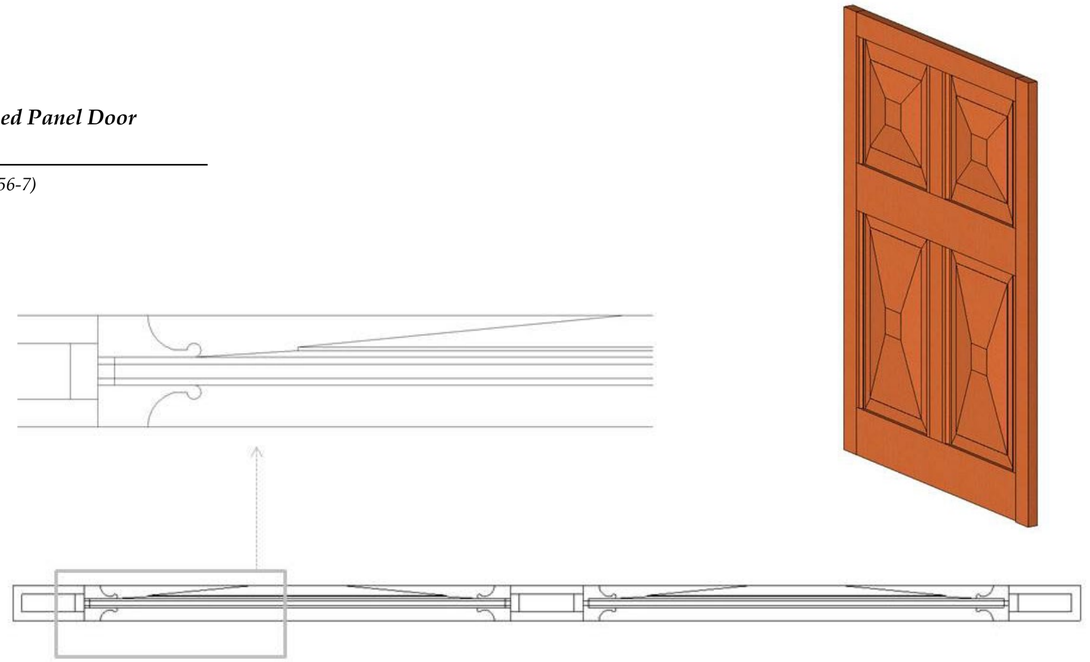


Raised Panel Door

(Pg.256-7)

3. Raised, Sunk and Fielded

When a chamfer starts from a marginal sinking below the face.



Double Margined Entrance Door

(Pg.267-74)

Double Margined Doors

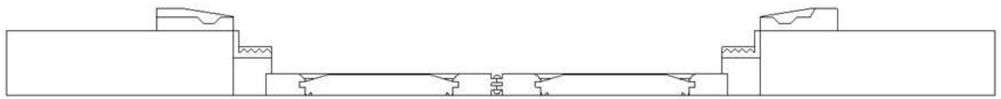
Typical of the style in vogue in the **latter part of the 18th and early part of the 19th centuries** are wide entrance doors framed to appear as pairs of doors.

They are used in openings too wide proportionately for a single door but where half the opening would be rather small for convenient passage.

These doors are made in two ways.

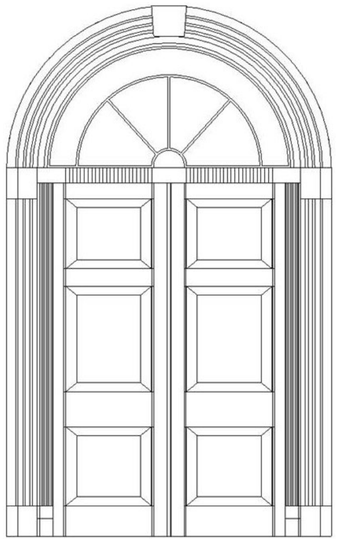
In the earlier method the central imitation stile which in this case is really a munting is made in one piece and forked over the top and bottom rails, which are continuous. The intermediate rails are stubtenoned to the central , and through tenoned and wedged to the outside stiles but unless the stub tenons are fox –wedged, the shoulders are very liable to start for which reason the method of construction now to be described is generally preferred.

The door is composed of two separate pieces of framing each complete with two stiles and a set of rails that are tenoned through and wedged up. The two portions are then united by a ploughed and tongued and glued joint, which is hidden by a sunk bead in the center and the parts keyed together with three pairs of hard wood folding wedges. The door is sometimes further strengthened by having flat iron bars sunk and screwed into the top and bottom edges.



Double Margined Entrance Door

(Pg.267-74)



The actual process of putting the door together is as follows:

After the various rails and panels have been duly fitted and marked each leaf is taken separately and the stiles knocked on. The one intended for the meeting stile having been glued is cramped up and wedged. Then the meeting stiles are made to a width , grooved , jointed and rebated for the beads.

The end of tenon and wedges should be cut back 1/8 in. to prevent them breaking the joint when the stile shrinks. The mortises for the keys will have been made when the mortises for the rails were done , and cross tongues are next glued in, the joint rubbed in , the two stiles pinched together with handscrews, and the oak k eys, well glued, driven in.

At this stage the frames are stood aside to dry, after which the projecting ends of the keys are cut off, the panels inserted and the two outside stiles glued and wedged in the usual manner. After the door is cleaned off, the grooves to receive the beads are brought to their exact size with side rabbit and router planes.

Should iron bars be used , they are inserted in grooves made after the door has been shot to size. The bars should be about ½ in. shorter than the width of the door, so that the ends are not visible.

Double Margined Entrance Door

(Pg.267-74)

Diminished stiles are sometimes cut out in pairs from a board or plank. When this is done, the back or outside edge is shot straight and the setting out made thereon, the two portions being gauged to width also from the back, but the method more suitable for machine working.

Here the stile may be cut parallel to the full width, the face edgeshot in the usual way and the setting out made upon that , the diminish being gauged from inside.

In this method the mortises are made before the diminished part is cut out, to render that operation easier for the machinist. He should not, however, mortise right up to the sight lines on the diminished part, because if the chisel is at all out of upright when the waste is cut away, the mortise will be found beyond the sight line, which will be a serious defect.

