rebated to receive the square edge of the stile and the outer edge of the latter is butt jointed and nailed to the outer lining. The upper ends of the pulley stiles are rebated and continued above the springing line to receive the lower ends of the head. The members are glued, well screwed from the back and blocked. Attention is drawn to the projection of the end of the curved head beyond the face of the pulley stile (see E). The purpose of this $\frac{1}{2}$-in. stop is to restrict the upward run of the bottom sash and thus prevent it being jammed in the head ; it also prevents damage to the glass in the upper sash which may otherwise occur if the latter was forced tightly against the crown of the frame. The joints between the segments of the inner and outer linings are either tongued and grooved or cross tongued and grooved ; G shows a t. and g. springing joint in an inner lining ; the ends of the wider outer linings are similarly shaped, although the tongues are usually stopped short of the outer edge. The parting slip is suspended from the block shown at E.

An alternative curved soffit lining consists of a *veneer* (a thin sheet of wood, $\frac{1}{8}$ to $\frac{1}{4}$-in. thick and a little wider than the finished soffit, planed on the face and prepared on the back with a toothing plane to surface it for glue), shaped over a *cylinder* and backed with *staves* (narrow pieces of wood slightly longer than the width of the soffit, 1 to $1\frac{1}{2}$-in. wide and of equal thickness). The cylinder resembles a centre consisting of two built-up ribs, cut to the semicircular curve and closely lagged ; the back of the laggings is planed to a true curve of the required radius of the soffit. The veneer, face downwards, is secured at one end of the cylinder by a stave placed across it and screwed at both ends to the cylinder. The veneer is gradually bent over the cylinder, temporary staves being screwed across it to the cylinder at required intervals and at the opposite end. The whole of the back is now staved. Commencing at one end, the staves are glued to the veneer and to each other, and the ends, having been previously holed, are screwed temporarily to the cylinder. After the glue has thoroughly dried the veneered soffit is removed by unscrewing the ends of the staves, sawn to the required width and then screwed to the pulley stile as explained above. Before bending, hardwood veneers must be softened by steaming or by soaking in hot water ; softwood veneers can usually be bent dry.

Details of the top sash are shown at J and K. The sash, indicated by thick lines, has a semicircular head in one thickness which comprises two segments jointed at the crown and either at the springing O or, preferably, above it (especially if the pulleys are fixed just below the springing line) as indicated by the broken radial line at P. These butt joints are formed with *handrail bolts*, so called because they are invariably used to ensure tight fitting joints between portions of handrails ; they are also applied more widely. A handrail bolt is illustrated at Q, and consists of a square nut, a round slotted nut (as it has five or six shallow slots cut in its outer edge) and a washer, in addition to the bolt which has screwed ends. Details showing the application of this bolt at the crown joint in the sash are shown at L and M. A hole, slightly larger than the diameter of the shank, is bored centrally in each of the adjacent ends of the segments for the bolt. Two holes are also made from the top, one just sufficiently large to receive the square nut and the other for the washer and slotted nut. The joint is formed in the following manner : The square nut is placed in its hole and the bolt is inserted and screwed on to the nut until half of its length only projects. After gluing the ends, the washer and slotted nut are put into the hole in the other segment and the free end of the bolt is slipped into the drilled hole. The bolt is next tightened by means of a *handrail punch* (a chisel with its edged end slightly curved) or similar tool, which is engaged in the notches of the slotted nut in turn as it is caused to rotate, and this is continued until the ends of the segments are brought together and a tight joint ensues. The joint is strengthened by means of a *cross tongue*[1] which is grooved into the ends at the rebate side ; this prevents the pieces of timber from twisting. Two or three small ($\frac{5}{16}$-in. diameter) hardwood dowels serve the same purpose. A sketch of the springing joint with projecting bolt and tongue is shown at H.

Enlarged details at the head, jamb and sill are shown at R, S and T. These are self-explanatory, especially if those in Figs. 60 and 61, Vol. I, have been studied. It will be observed that : (1) Thick pulley stiles are employed (which take most of the weight of the large sashes), (2) the pulley stiles and soffit lining are slightly rebated to receive the inner beads (this ensures the correct re-fixing of the beads and a free run for the bottom sash on being replaced after cord replacements), (3) the outside of the groove for the water bar at T is in line with the inside of the outer lining (and thus water passing along a defective bedding joint will only affect a small portion of the wood sill), (4) a deeper draught bead than the inner beads is employed to enable the lower sash to be raised slightly to permit of ventilation at the meeting rails (if the width of the draught bead is still further increased, the bottom rail of the sash should be correspondingly deeper to ensure, as shown, the margin between the top of the sash and the bead being equal to those shown at R and S) and (5) this draught bead and the bottom rail are bevelled to prevent vibration of the sash by ensuring a tight fit between it and the parting bead (the slight clearance shown between the sashes, outer lining and beads is to allow for three coats of paint).

Segmental-headed Windows.—The heads of the frame and sash of a window curved to the form of a segment having a relatively large rise may be constructed as described above, the number of joints depending upon the span and the amount of the rise. If, however, the rise is small, it is usual to provide the window with a square head, as indicated by broken lines at B, Fig. 27. The construction of the head, with its inner, outer and soffit linings, is as shown in Figs. 60 and 61, Vol. I, except that the *outer* lining of the head is of wider stuff and swept to the curve of the segment. Thus, whereas the external appearance of the head is segmental (parallel to the intrados of the arch), that internally is the same as a square head above which a lintel and not an arch is provided to support the wall over the opening. The head of the sash is as shown at E, Fig. 27, the lower edge of the top rail being shaped to the sweep of the outer lining. This rail is tenoned and wedged to the stile of the sash as indicated.

[1] Cross tongues are about $\frac{1}{8}$-in thick and so called because they are cut across the grain of the squared end of the board from which they are made. Cross tongues are stronger than *feather tongues* (used for similar purposes), as the latter are cut diagonally across the grain.