equal to the width (see T, Fig. 60). A reasonable size is 11-in. high by $7\frac{3}{4}$ to 8-in. wide and has been adopted in the elevations A and B, Fig. 56. The vertical bars may be omitted to emphasize the effect of horizontality. The windows at A and B are not built into recesses such as are shown at E, Fig. 8. This is a *weakness* for, unless great care is taken in the bedding and pointing of the frame, water may gain entrance between it and the wall. The reason why the frame is shown in a square jamb is on account of the improved appearance which results when the maximum amount of the frame is exposed. Sounder construction is shown in Fig. 57 and also by broken lines at F, Fig. 8. The frame is checked to receive the plaster (see F, Fig. 56, and C, Fig. 57) or a cover mould, such as is shown at H, Fig. 56, may be provided to hide any unsightly crack which appears when the frame shrinks.

Notice particularly the small grooves which are shown in the rebate of the frame and in the rails and stiles. These are capable of arresting water which would otherwise proceed by capillarity between the sash and the frame to the inside ; these grooves are also effective in reducing draughts.

The frame shown at D and F, Fig. 58, is wider than those shown in Fig. 56, and this makes it possible for the sash to be set farther back and the underside of the head to be throated ; excepting in heavy storms, this throat is effective in causing the rain to drop clear of the top rail.

The alternative details shown at E and G, Fig. 58, have been proved to result in an excellent weather resisting window. One of the disadvantages of casement windows is the expansion of the wood which may take place to cause the sashes to " jam " or " bind." When this occurs, the sashes are " eased " (the edges being planed to remove the excess timber) and there is a likelihood of rain and wind entering the enlarged clearance when the timber shrinks subsequently. Details E and G obviate these defects ; the cover fillet which is screwed to the sash overlaps the frame $\frac{1}{2}$-in. and enables a $\frac{1}{4}$-in. clearance to be provided which is an adequate allowance for any expansion of the timber that may occur ; in addition, the fillets are effective in excluding rain and wind. The throated *hood* or *drip fillet*, tongued to the head, affords an additional protection. The sashes may be made thicker and shaped to include the fillet, and the head of the frame may be made larger so that the hood may be formed out of the solid.

The details shown in Fig. 57 are also recommended for adoption in buildings which are exposed to severe weather conditions. Those at A and B show a rebated jamb which gives a $1\frac{1}{2}$-in. cover to the frame and the *hanging* stile of the sash is rebated and tongued, the tongue being splayed as shown to enable it to clear the frame when the sash is opened. If it is desired to show the full frame and retain the rebated jamb, the latter may be reversed as shown at C.

Some of the window boards are shown finished with bed moulds which are returned at the ends. These moulds are usually nailed to plugs and to the window boards after the latter have been secured. Large moulds are fixed to splayed grounds which are plugged to the wall (see R, Fig. 60). The internal soffits and jambs of the openings are shown plastered. These are called *plastered linings*, and as lime plaster is easily damaged at the edges a satisfactory finish is provided when a comparatively hard material, such as Keene's cement, is used to form the arrises. A Keene's cement arris is at least 2-in. wide in each direction, and narrow linings may be entirely covered with this cement instead of lime (see C, D and K, Fig. 56). Wood *angle beads* (see L and M, Fig. 64) are often used instead of cement arrises.

The brick lintel is shown at B and N, Fig. 56 supported on a mild steel angle. This is not often used for a single or double light window, where the span is relatively small and the brick head is usually built directly on the head of the frame, but such support (or the alternative forms shown in Fig. 12) complies with the principles of sound construction and must always be applied to wide windows.

The height of windows above floor level should be given consideration. That shown in section C, Fig. 56, is satisfactory for a house. Upper-floor windows of the cottage type should be as near to the eaves as possible, and a satisfactory treatment at the head is shown at G and H, Fig. 69.

HARDWARE.—This for casements consists of hinges, fasteners and stays. Fig. 59 shows the application of these.

Hinges.—Ordinary butt hinges (a pair to each sash) are used, but these are not entirely satisfactory as they are apt to be wrenched off and, when fixed to upper floor windows, difficulty is experienced in cleaning the external face of the glass from the inside. A big improvement upon the butt hinge for hanging casements is the *extension* or *cleaning hinge* which is illustrated in Fig. 59 ; the upper fitting is shown at A and the lower hinge is shown at B ; the latter is also shown at C, Fig. 57. As shown in the plan, the sash can be opened to give a clearance of from 4 to 5-in. between it and the frame, which is sufficient to enable the outside of the window to be cleaned from the inside (see also isometric sketch). The vertical edge of the free stile and the adjacent rebate on the jamb should be slightly splayed to permit of the opening of the casement. These hinges are made of steel or wrought iron which is *sherardized*, a process of rendering the metal rust proof by the application of powdered zinc.

Casement Fastener (see C and sketch).—The plate to which the pivoted handle is attached is screwed to the inside face of the free stile and the projecting point of the handle (when the sash is closed) engages in a slotted plate which is screwed to the frame near to the rebate. This type is also known as a *cockspur fastener* and is obtained in sherardized iron and bronze.

Casement Stay (see D, plan and sketch).—This form is called a *peg stay* and consists of a bar, holed at about 2-in. centres, which is pivoted to a small plate that is screwed to the inside face of the bottom rail ; there is in addition a *peg* or *pin plate* which is screwed to the top of the wood sill. As is implied, the object of the stay is to maintain the sash when in the open position, and this it does when the peg is engaged in one of the holes. This fitting is made of sherardized iron, bronze, gunmetal, etc.