To all whom it may concern:

Be it known that I, Joseph Clement, a subject of the King of Belgium, residing at Tournai, Belgium, have invented certain new and useful Improved Construction of Windows, of which the following is a specification.

This invention relates to the construction of buildings and has for its object to replace the wooden window frame and sash frames of sash windows by a reinforced concrete window frame in which slide two sash frames, also of reinforced concrete, so that construction of the window frame and of the sash frames is limited to the making of three concrete frames, each frame being made in one piece.

Either concrete, or reinforced concrete as commonly known, may be used in my invention, but in the drawings for convenience the concrete is not shown as reinforced; and to avoid multiplicity of claims the term concrete therein should be interpreted as covering reinforced concrete as well.

The invention provides also a method of guiding sash frames by means of wooden guides or bars secured to the reinforced concrete frame of the window, which at the same time ensures easy manipulation of the sash frames, close fitting thereof in the window frames, with non-penetration of wind, and solidity of construction.

The accompanying drawings show by way of example two methods of carrying out this invention.

Figures 1 and 2 are respectively a vertical section and a horizontal cross-section through a window frame with sash frames of reinforced concrete.

Figure 3 is a section similar to that of Figure 2 showing a modified method of guiding the sash frames.

With reference to the drawings, and more particularly to Figures 1 and 2, 1 is the window frame, the sill of which is moulded as for wooden frames, the styles and the upper rail being without moulding or groove; 2 and 3 are the sash frames, also made in one piece, the uprights of which have throughout the whole of their height a groove as shown intended to engage wooden bars or ledges 4, 4, 4, 4 secured to the styles of the window frame 1. Two other wooden bars or spacing ribs 4 and 4 also secured to the styles of the window frame, complete the guiding of the two sash frames relatively to each other and to the window frame.

For fixing the wooden bars 4', 4', 4', 4' to the window frame 1, it is preferable to provide in the styles of the latter, holes into which are introduced, after removal from the mould, wooden plugs 5 to which the said bars are screwed (see Figure 3).

In order to prevent too sudden a contact of cement with cement, one or more cushions 6 of rubber, cork or other suitable material are embedded in the portions exposed to the said contact.

The window frame 1 is provided with a sill having an outwardly slanting portion 10 and an adjacent upwardly extending portion 11, the portion 11 having a shoulder 12 and an adjacent groove 13 extending lengthwise thereof. The inner sash frame 3 is widened transversely at its lower end, as at 14, and is provided on its bottom face with a recess 15 and an adjacent rounded shoulder 16, the recess 15 and shoulder 16 extending lengthwise of the bottom face of the inner sash frame, the shoulder 12 of the sill being engageable in the recess 15 of the sash frame, and the shoulder 16 of the sash frame being engageable in the recess 13 of the sill when the inner sash frame is in lowered or closed position for affording stop-weather connection between the sill and sash frame.

A strip of cushioning material, such as 6, may be secured in a recess on the shoulder 12 for cushioning the contact between the concrete bottom face and the concrete upper face of the portion 11 of the sill and preventing passage of moisture.

It is preferable to give to the two sash frames 2, 3 different heights, in order to make it possible to obtain at will complete closing of the window bay, opening at the top or at the bottom only, or opening at the top and bottom simultaneously, for the purpose of ventilating the place.

The two sash frames can be connected together by cords with balance weights, but the two frames will be preferably of practically equal weight, in which case they will be connected together by a cord 8 passing over pulleys arranged on a support 7 carried by the rail of the window frame 1.

The arrangement just described is a special characteristic of the window of the present invention, and consists in the fact that...
the two sliding frames are of different height so that as a result of their relative positions there may be presented, for the passage of air; an opening at the top or at the bottom or at both the top and bottom of the window simultaneously. For example, the two frames may have the same weight and respective heights of $\frac{1}{2}$ meters and 1 meter, and when the window is closed the larger frame 3 (1 1/2 meters) may be at the bottom of the frame of the window, and the smaller frame 2 (1 meter) is at the top. This may be obtained by giving to the smaller frame a heavier weight than to the larger one, or by well weighting the smaller frame 2 by means of heavier masses therein, or by relying upon counterweights. The two frames being thus balanced are connected by cables in such manner (as in Fig. 1) that when the one goes up the other comes down, and vice versa.

Suppose then that the large frame 3 be raised by a half meter, the smaller frame will descend about a half meter and there will be presented both at the top or at the bottom of the window an opening a half meter high. This double opening permits then ventilation at the top and bottom simultaneously. If one continues to lift up the large frame until it reaches the top (its maximum path is 1 meter), the smaller frame will therefore travel 1 meter and it will leave at the bottom of the window an opening one half meter.

This arrangement is very advantageous for at will locating the point of the ventilating opening. If the structure is reversed, i. e., if when the opening of the window is completely closed, the smaller frame will be at the bottom, and one is able by the relative displacement of the two frames to obtain the ventilating opening at the top only or at the top and bottom simultaneously.

With reference more particularly to Figure 3, the uprights of the sash frames 2, 3 are not recessed laterally, but the upright of the inner frame 3 has a groove engaging a tenon on the bar 4, while the upright of the outer frame 2 has projecting a metal strip partly embedded in the cement and sliding in a groove provided for the purpose in the corresponding style of the window frame 1; in the case of the said Figure 3, two of the guide rods are done away with, the construction of the sash frames and of the window frame is more complicated, but the conditions for close fitting and for non-penetration of the wind are better fulfilled than in the construction Figure 2.

It will be readily understood from the above description and the accompanying drawings that the construction and the erecting of the three constituent elements of the sash window according to this invention are very easy, do not require skilled labor and show a considerable saving on the wooden frames. Reinforced concrete frames occupy less space, they are lighter in appearance, are not liable to deformation or loosening of the constituent elements, and are moreover incombustible. They can be made of any desired color, last indefinitely, do not require any attention, painting, or repairs.

Any desired mouldings or ornamentation can be obviously added to them. The metal skeleton forming the reinforcement may be in accordance with well known rules, or as desired.

What I claim as my invention and desire to secure by Letters Patent is:

1. A sash window construction comprising a window frame of reinforced concrete and having a groove; two sash frames of reinforced concrete and adapted to slide in the window frame, guide strips secured to the uprights of the window frames and engaging grooves in the uprights of the inner sash frames, and metal guide strips projecting from the uprights of the outer sash frame and engaging the concrete of the grooves in the window frame.

2. A sash window construction comprising a window frame of reinforced concrete; two sash frames of reinforced concrete and adapted to slide in the window frame; guide strips secured to the uprights of the window frame and engaging grooves in the uprights of the inner sash frames; and metal guide strips projecting from the outer face of the uprights of the outer sash frame and engaging grooves in the window frame.

3. A sash window construction comprising a window frame of reinforced concrete; two sash frames of reinforced concrete and adapted to slide in the window frames, the three frames being made each in a single piece, guide strips secured to the uprights of the window frames and engaging grooves in the uprights of the sash frames, and cushion elements interposed between the sash frames and the window frame.

4. A sash window construction comprising a window frame of reinforced concrete; two sash frames of reinforced concrete and adapted to slide in the window frame, the three frames being made each in a single piece, guide strips secured to the uprights of the window frames and engaging grooves in the uprights of the inner sash frames, metal guide strips projecting from the uprights of the outer sash frames and engaging grooves in the window frame, and cushion elements interposed between the sash frames and the window frame.

5. In combination, a window frame of concrete having a sill of concrete provided with an outer flat-faced longitudinal shoulder and an inner flat-faced longitudinal shoulder separated therefrom by a circular
longitudinal groove; outer and inner sash frames of concrete slidably movable in the window frame to open and closed positions; the inner sash frame being extended outwardly near its bottom and having an outer curved longitudinal bottom face and an inner circular longitudinal bottom face separated therefrom by a flat-faced longitudinal recess, said curved bottom face when the inner sash is in closing position overlapping outwardly the outer shoulder of the sill and the outer shoulder of the sill being received in the flat-faced recess of the inner sash and the circular bottom face of the inner sash engaging in the circular groove of the sill.

6. In combination, a window frame of concrete having a sill of concrete provided with an outer flat-faced longitudinal shoulder and an inner flat-faced longitudinal shoulder separated therefrom by a circular longitudinal groove; outer and inner sash frames of concrete slidably movable in the window frame to open and closed positions; the inner sash frame being extended outwardly near its bottom and having an outer curved longitudinal bottom face and an inner circular longitudinal bottom face separated therefrom by a flat-faced longitudinal recess, said curved bottom face when the inner sash is in closing position overlapping outwardly the outer shoulder of the sill and the outer shoulder of the sill being received in the flat-faced recess of the inner sash and the circular bottom face of the inner sash engaging in the circular groove of the sill, said flat-faced recess having secured therein a downwardly extending rubber strip engaging in a recess formed in the forward shoulder of the sill.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH CLEMENT.

Witnesses:

FELIX DE COSMAIR,

JOSEPH DUTERS.