

PATENT SPECIFICATION

(11) 1 475 506

- (21) Application No. 41518/74 (22) Filed 24 Sept. 1974
 (44) Complete Specification published 1 June 1977
 (51) INT CL² E06B 3/72
 (52) Index at acceptance E1J 226 231 238 253 610
 (72) Inventors YUKIO YAMAMOTO and AKIO IKEMURA



(54) SHUTTER CONSTRUCTION

(71) We, YOSHIDA KOGYO K.K., a corporation duly organized under the laws of Japan and existing at No. 1, Kanda Izumicho, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a shutter construction. An example of application of the invention is a shutter construction adapted to be installed on the outside of a window to shut out light or sound or to shut off the view from outside or to bar passage through the window.

According to the invention there is provided a shutter construction including a fixed outer frame and at least one horizontally movable panel assembly mounted within said outer frame, wherein said panel assembly comprises, in combination: a supporting frame including a top rail, a bottom rail, and first and second stiles; said first stile having a tongue projecting toward said second stile; said second stile having a pair of clamping jaws projecting toward said first stile, said jaws being so shaped as to be capable of clamping engagement of said tongue; and a series of elementary panels fixedly mounted in a continuous plane within said supporting frame; said elementary panels each having a tongue along one edge thereof which is identical with said tongue of said first stile, and a pair of clamping jaws along an opposite edge thereof which is identical with said jaws of said second stile; whereby said elementary panels are connected to each other and to said first and second stiles solely by the clamping engagement of said tongues by said pairs of jaws, respectively, in such a manner that the outer surfaces of said elementary panels and said first and second stiles are arranged in coplanar relationship to each other; the tongue of said first stile and the jaws of said second stile being formed on flanges integral with said first and second stiles respectively, said

flanges being disposed in coplanar relationship to said elementary panels; each of the tongues of said first stile and said elementary panels being disposed slightly interiorly with respect to the plane of said elementary panels, each of the pairs of jaws of said second stile and said elementary panels consisting of a first jaw disposed in the plane of said elementary panels and a second jaw disposed further interiorly of said tongues; each of the tongues of said first stile and said elementary panels gradually increasing in thickness toward the tip, each of the pairs of jaws of said second stile and said elementary panels having rims formed along the tips of the respective jaws, said rims being disposed to assure positive engagement of said tongues by said jaws to maintained said coplanar relationship of said elementary panels and first and second stiles.

The invention will be described by way of example with reference to the accompanying drawings wherein:—

Figure 1 is an exterior side elevation view of a preferred form of shutter construction embodying the invention;

Figure 2 is a partly broken away horizontal sectional view taken along the plane of line II—II in Figure 1;

Figure 3 is a partly broken away vertical sectional view taken along the plane of line III—III in Figure 1; and

Figure 4 is a horizontal sectional view explanatory of a mode of assemblage of a panel assembly for use in the shutter construction shown in Figure 1.

Figure 1 best represents the general organization of the illustrated shutter construction. As seen in this exterior side elevational view, the shutter construction is broadly composed of a stationary outer frame 10 and one or more in the illustrated embodiment, panel assemblies 11 mounted within the outer frame in one and the same vertical plane for relative horizontal sliding movement.

The outer frame 10 comprises a header 12 and sill 13 at the top and bottom and a jamb

50

55

60

65

70

75

80

85

90

95

14 at one side secured at its ends to the header and sill in any convenient manner.

Mounted at the other side of the outer frame 10 is a shutter box 15 adapted to successively receive the panel assemblies 11 therein when the shutter is opened and to permit manual readjustment, from inside the shutter, of the panel assemblies into side-by-side relationship.

Each of the panel assemblies 11 includes a supporting frame consisting of a top rail 16, a bottom rail 17, and a pair of stiles 18 and 19. Closely fitted in the supporting frame are a series of elementary panels 20 of elongate, rectangular shape that are mounted in a continuous vertical plane with their opposed lateral edges in close interengagement, as later described in more detail. Both supporting frame and elementary panels of each panel assembly can be conveniently molded of aluminum.

The details of each panel assembly 11 are illustrated in Figure 2 and also in Figure 4, the latter view being the horizontal section of the panel assembly in the process of its assemblage or manufacture. As will be seen from these drawings, the stile 18 of the panel assembly includes a flange 21 projecting toward the other stile 19 and arranged in coplanar relationship to the elementary panels 20. The flange 21 terminates in a tongue 22 formed along its edge opposed to one of the edges of the adjacent elementary panel, the tongue 22 also projecting toward the stile 19. It will be observed that the tongue 22 extends in offset relationship to the flange 21 and is arranged slightly interiorly, that is, downwardly as viewed in Figures 2 and 4 and towards the right as viewed in Figure 3, with respect to the plane of the flange 21 and the elementary panels 20. The tongue 22, moreover, gradually increases in thickness toward its tip remote from the stile 18.

The other stile 19 includes a flange 23 projecting toward the stile 18 and arranged in coplanar relationship to the elementary panels 20. This flange 23 terminates in a pair of clamping jaws 24 and 25 formed along its edge opposed to one of the edges of the adjacent elementary panel 20, the jaws 24 and 25 also projecting toward the stile 18. The exterior jaw 24 is formed as an extension of the flange 23 and is therefore disposed in the plane of the elementary panels 20 and flange 23. The interior jaws 25 branches off, so to say, from the flange 23 and is slightly longer in its horizontal or transverse dimension than the exterior jaw 24 and is disposed further interiorly (i.e. lower down in Figure 2) of the aforesaid tongue 22 (and a tongue 32 referred to hereinafter). Both exterior and interior jaws 24 and 25 have ribs 26 and 27, respectively, which are formed along their tips remote

from the stile 19 and which are directed substantially toward each other.

The several elementary panels 20 fixedly mounted within the supporting frame of each panel assembly 11 are exactly identical in construction, so that the description of one elementary panel applies to all.

With reference to Figures 2 and 4, therefore, one representative elementary panel seen in its entirety therein has a pair of clamping jaws 28 and 29 formed along one of its edges opposed to the tongue 22 of the stile 18. These jaws, complete with rims 30 and 31, are exactly identical with the jaws 24 and 25 of the stile 19. Formed along the opposite edge of the representative elementary panel is a tongue 32 which also is exactly identical with the tongue 22 of the stile 18.

As may now be apparent, the stile 18 is connected to the adjacent elementary panel 20 by the clamping engagement of the tongue 22 of the former by the jaws 28 and 29 of the latter. The elementary panels 20 are connected to each other by the clamping engagement of the tongue 32 of each by the jaws 28 and 29 of the adjacent elementary panel. The stile 19 is connected to the adjacent elementary panel 20 by the clamping engagement of the tongue 32 of the latter by the jaws 24 and 25 of the former.

As shown in Figure 2, the outer surfaces (that is, the upper surfaces in Figure 2) of the elementary panels 20 and of the stiles 18 and 19 are arranged in coplanar relationship when connected thus together.

One or more, two in the illustrated embodiment vertical mounting fins 33 project inwardly from each elementary panel 20, and the tips of these mounting fins are each bent at a right angle, for purposes hereinafter made apparent.

As best illustrated in Figure 3, the top and bottom rails 16 and 17, each of H-shaped cross section, are fitted over the top and bottom, respectively, of the stiles 18 and 19 and the elementary panels 20 that are connected to each other in the above described manner. The top and bottom rails 16 and 17 have rims at 34 and 35, respectively, that abut against the mounting fins 33 to restrain the elementary panels 20 from lateral displacement relative to the supporting frame of each panel assembly 11. The top and bottom rails 16 and 17 are further fixedly provided with slides 36 and 37, respectively, that are slidably received in respective tracks formed in the header 12 and sill 13 of the stationary outer frame 10.

In the assemblage of each panel assembly 11 constructed as hereinbefore described, it will be noted from Figure 4 that the interior jaw 25 of the stile 19 and the interior jaw 29 of each elementary panel 20 are initially set

5 apart from the exterior jaws 24 and 28 respectively. The tongue 22 of the stile 18 and the tongue 32 of each elementary panel 20 are inserted between the pairs of jaws 24 and 25, and 28 and 29, as in the drawing. By then pressing the interior jaws 25 and 29 towards the respective exterior jaws 24 and 28, the tongues 22 and 32 can be tightly clamped therebetween. The rims 26 and 27 on the jaws 24 and 25 of the stile 19, and the rims 30 and 31 on the jaws 28 and 29 of each elementary panel 20, are effective to assure the positive clamping of the respective tongues 22 and 32 by the jaws. With the stiles 18 and 19 and the elementary panels 20 thus connected together without use of any separate fastening element, the panel assembly is completed by securing the top and bottom rails 16 and 17 and the slides 36 and 37 thereto as in the drawings.

WHAT WE CLAIM IS:—

25 1. A shutter construction including a fixed outer frame and at least one horizontally movable panel assembly mounted within said outer frame, wherein said panel assembly comprises, in combination: a supporting frame including a top rail, a bottom rail, and first and second stiles; said first stile having a tongue projecting toward said second stile; said second stile having a pair of clamping jaws projecting toward said first stile, said jaws being so shaped as to be capable of clamping engagement of said tongue; and a series of elementary panels fixedly mounted in a continuous plane within said supporting frame; said elementary panels each having a tongue along one edge thereof which is identical with said tongue of said first stile, and a pair of clamping jaws along an opposite edge thereof which is identical with said jaws of said second stile; whereby said elementary

panels are connected to each other and to said first and second stiles solely by the clamping engagement of said tongues by said pairs of jaws, respectively, in such a manner that the outer surfaces of said elementary panels and said first and second stiles are arranged in coplanar relationship to each other; the tongue of said first stile and the jaws of said second stile being formed on flanges integral with said first and second stiles respectively, said flanges being disposed in coplanar relationship to said elementary panels; each of the tongues of said first stile and said elementary panels being disposed slightly interiorly with respect to the plane of said elementary panels, each of the pairs of jaws of said second stile and said elementary panels consisting of a first jaw disposed in the plane of said elementary panels and a second jaw disposed further interiorly of said tongues; each of the tongues of said first stile and said elementary panels gradually increasing in thickness toward the tip, each of the pairs of jaws of said second stile and said elementary panels having rims formed along the tips of the respective jaws, said rims being disposed to assure positive engagement of said tongues by said jaws to maintain said coplanar relationship of said elementary panels and first and second stiles.

75 2. A shutter construction as claimed in claim 1, wherein each of said elementary panels has at least one mounting fin adapted to restrain the elementary panel from lateral displacement relative to said supporting frame.

80 3. A shutter construction substantially as herein described with reference to and as illustrated in the accompanying drawings.

MARKS & CLERK,
Chartered Patent Agents,
Agents for the Applicants.

5 apart from the exterior jaws 24 and 28 respectively. The tongue 22 of the stile 18 and the tongue 32 of each elementary panel 20 are inserted between the pairs of jaws 24 and 25, and 28 and 29, as in the drawing. By then pressing the interior jaws 25 and 29 towards the respective exterior jaws 24 and 28, the tongues 22 and 32 can be tightly clamped therebetween. The rims 26 and 27 on the jaws 24 and 25 of the stile 19, and the rims 30 and 31 on the jaws 28 and 29 of each elementary panel 20, are effective to assure the positive clamping of the respective tongues 22 and 32 by the jaws. With the stiles 18 and 19 and the elementary panels 20 thus connected together without use of any separate fastening element, the panel assembly is completed by securing the top and bottom rails 16 and 17 and the slides 36 and 37 thereto as in the drawings.

WHAT WE CLAIM IS:—

25 1. A shutter construction including a fixed outer frame and at least one horizontally movable panel assembly mounted within said outer frame, wherein said panel assembly comprises, in combination: a supporting frame including a top rail, a bottom rail, and first and second stiles; said first stile having a tongue projecting toward said second stile; said second stile having a pair of clamping jaws projecting toward said first stile, said jaws being so shaped as to be capable of clamping engagement of said tongue; and a series of elementary panels 35 fixedly mounted in a continuous plane within said supporting frame; said elementary panels each having a tongue along one edge thereof which is identical with said tongue of said first stile, and a pair of clamping jaws along an opposite edge thereof which is identical with said jaws of said second stile; whereby said elementary

panels are connected to each other and to said first and second stiles solely by the clamping engagement of said tongues by said pairs of jaws, respectively, in such a manner that the outer surfaces of said elementary panels and said first and second stiles are arranged in coplanar relationship to each other; the tongue of said first stile and the jaws of said second stile being formed on flanges integral with said first and second stiles respectively, said flanges being disposed in coplanar relationship to said elementary panels; each of the tongues of said first stile and said elementary panels being disposed slightly interiorly with respect to the plane of said elementary panels, each of the pairs of jaws of said second stile and said elementary panels consisting of a first jaw disposed in the plane of said elementary panels and a second jaw disposed further interiorly of said tongues; each of the tongues of said first stile and said elementary panels gradually increasing in thickness toward the tip, each of the pairs of jaws of said second stile and said elementary panels having rims formed along the tips of the respective jaws, said rims being disposed to assure positive engagement of said tongues by said jaws to maintain said coplanar relationship of said elementary panels and first and second stiles.

75 2. A shutter construction as claimed in claim 1, wherein each of said elementary panels has at least one mounting fin adapted to restrain the elementary panel from lateral displacement relative to said supporting frame.

80 3. A shutter construction substantially as herein described with reference to and as illustrated in the accompanying drawings.

MARKS & CLERK,
Chartered Patent Agents,
Agents for the Applicants.

