July 1, 1969 J. H. SASSANO 3,452,477

EXTERIOR SLIDING WINDOW SHUTTERS

Filed Oct. 6, 1967 Sheet 1 of 4

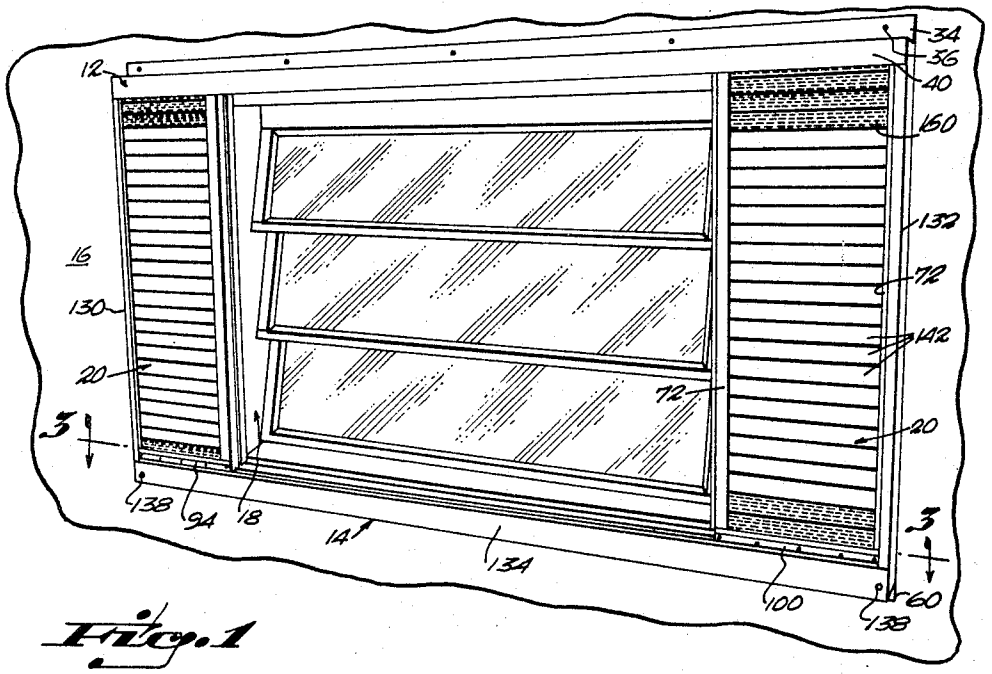


Fig. 1

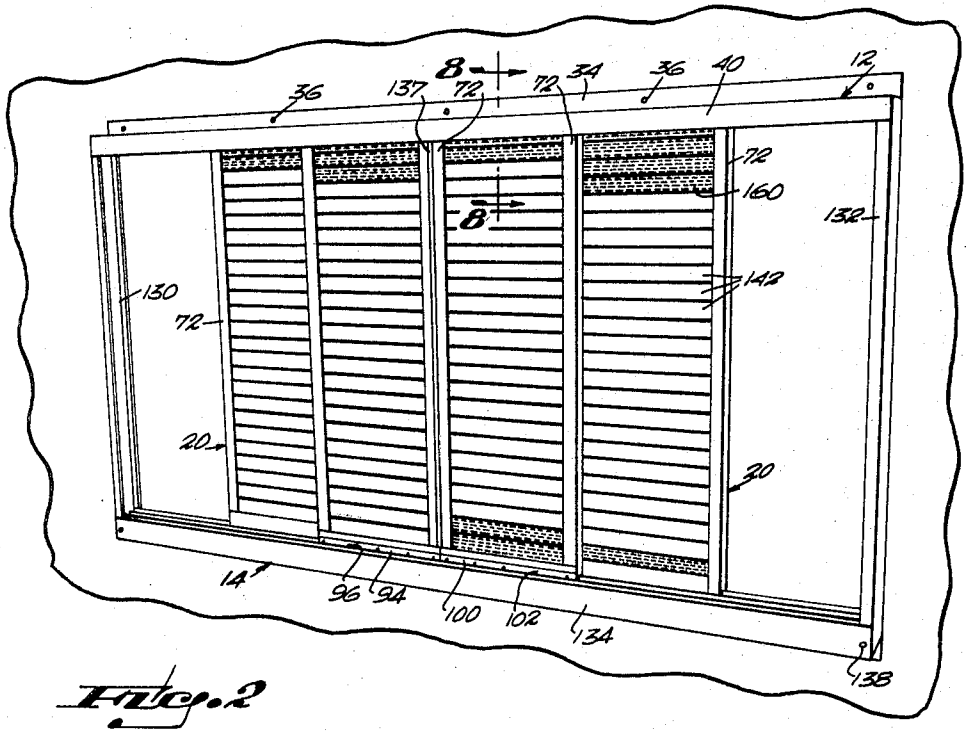


Fig. 2

INVENTOR.
JOHN H. SASSANO
BY
John Cyril Malloy
ATTORNEY.

July 1, 1969 J. H. SASSANO 3,452,477

EXTERIOR SLIDING WINDOW SHUTTERS

Filed Oct. 6, 1967 Sheet 2 of 4

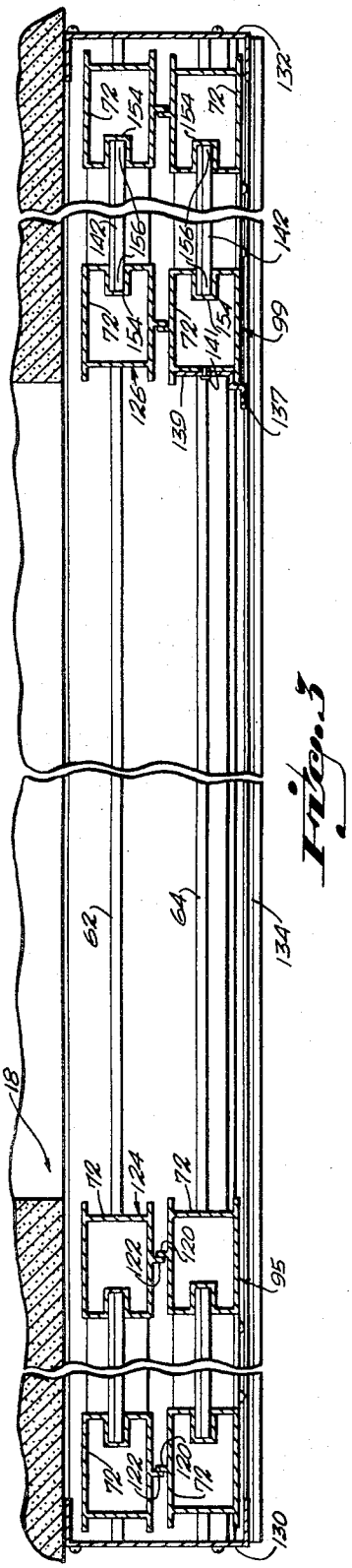


Fig. 3

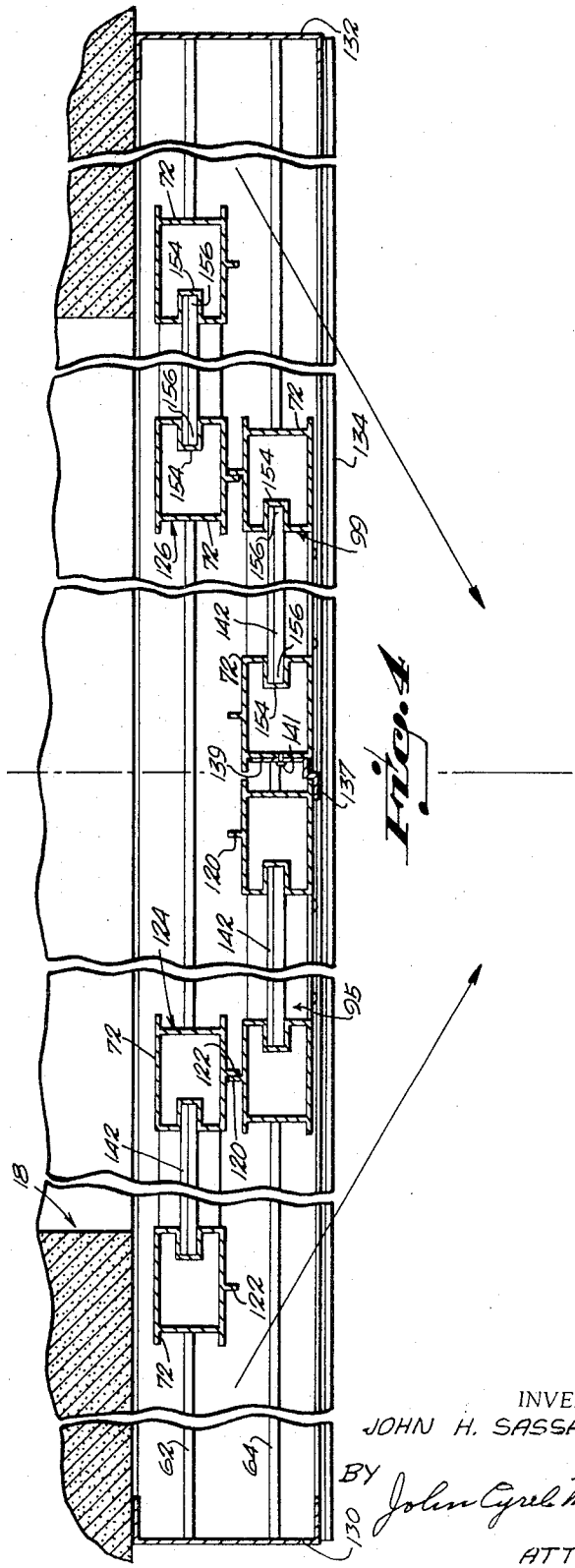


Fig. 4

INVENTOR.
JOHN H. SASSANO
BY John Cyril Malloy
ATTORNEY.

July 1, 1969 J. H. SASSANO 3,452,477

EXTERIOR SLIDING WINDOW SHUTTERS

Filed Oct. 6, 1967 Sheet 3 of 4

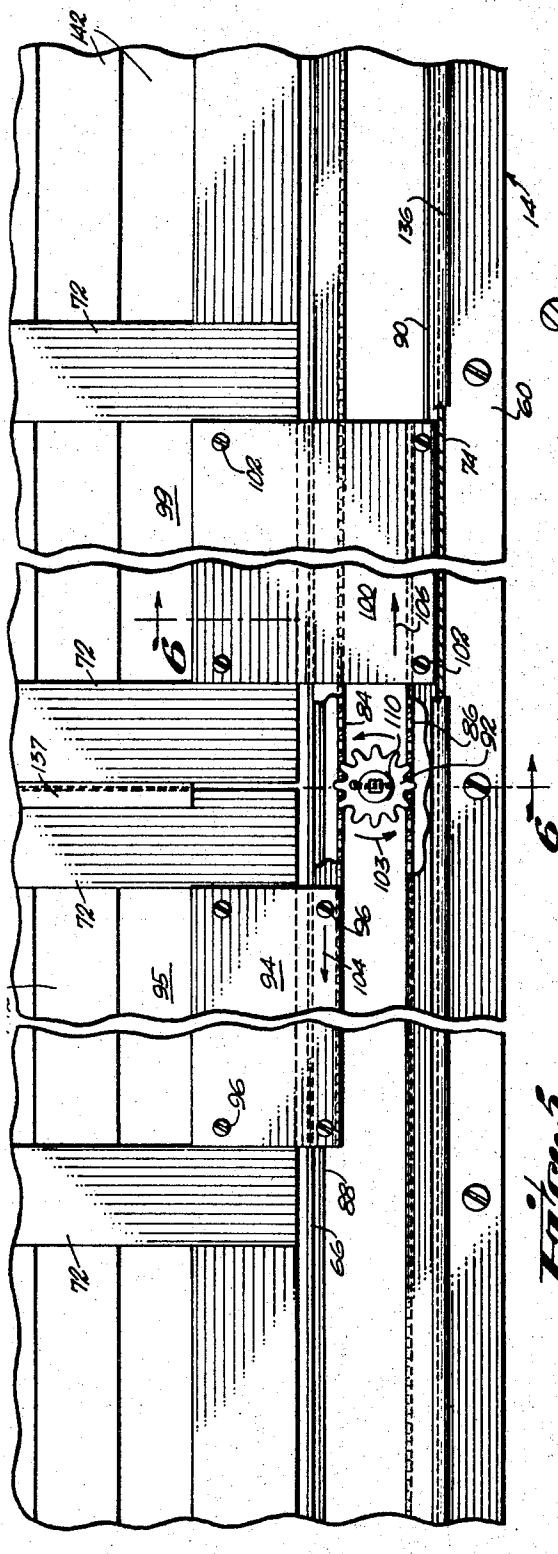


Fig. 5

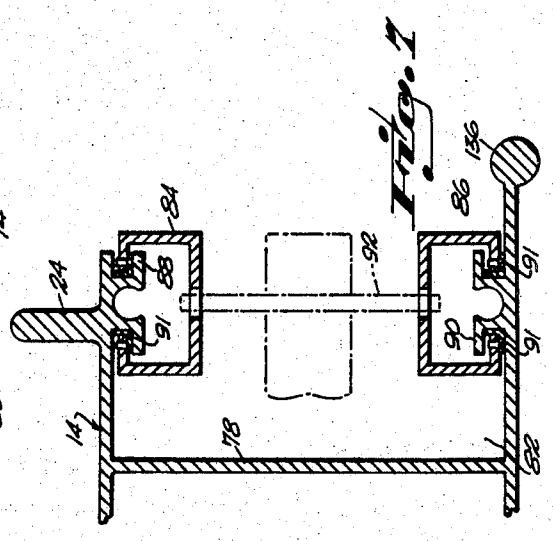


Fig. 4

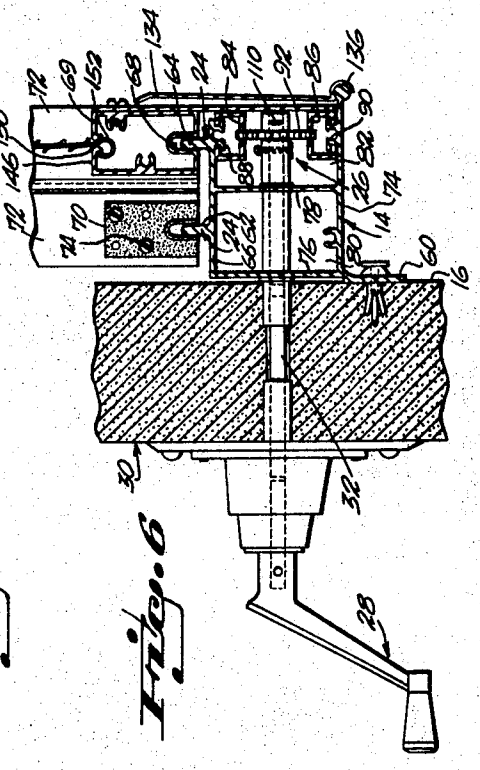


Fig. 6

INVENTOR.
JOHN H. SASSANO
BY
John Cyril Malloy
ATTORNEY.

July 1, 1969 J. H. SASSANO 3,452,477

EXTERIOR SLIDING WINDOW SHUTTERS

Filed Oct. 6, 1967 Sheet 4 of 4

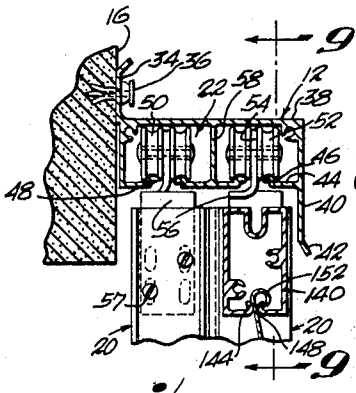


Fig. 8

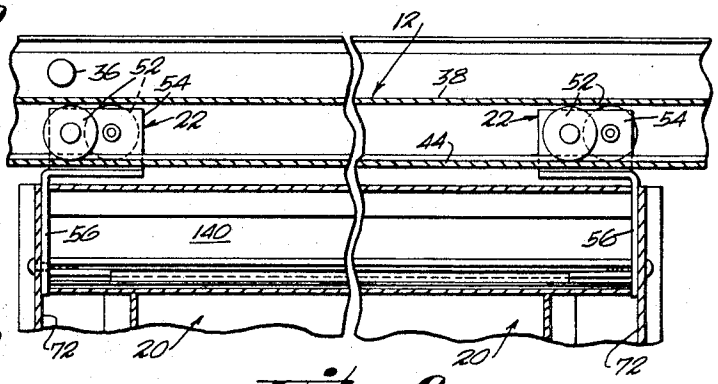


Fig. 9

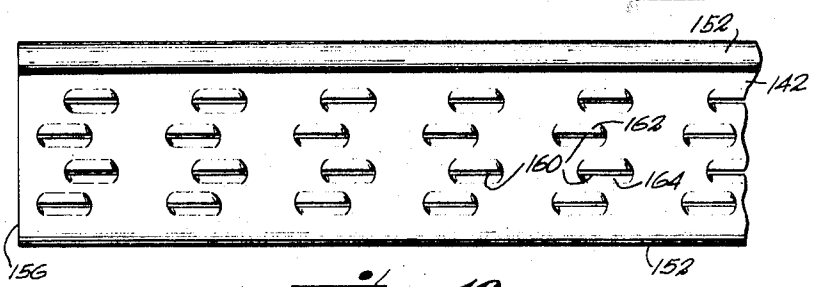


Fig. 10

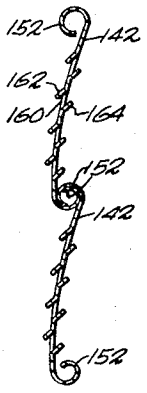


Fig. 11

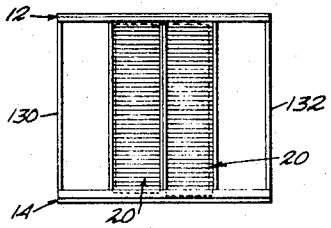


Fig. 12

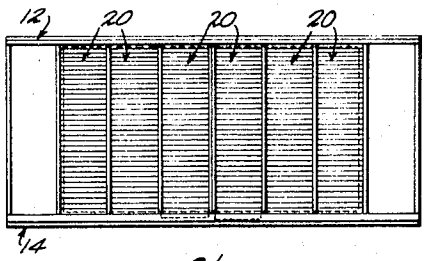


Fig. 13

INVENTOR.
JOHN H. SASSANO
BY
John Cyril Malloy
ATTORNEY.

United States Patent Office 3,452,477
Patented July 1, 1969

3,452,477

EXTERIOR SLIDING WINDOW SHUTTERS

John H. Sassano, 5724 Grant St., Box 6030,
Hollywood, Fla. 33021

Filed Oct. 6, 1967, Ser. No. 673,473
Int. Cl. E05f 17/00
U.S. Cl. 49—116 6 Claims

ABSTRACT OF THE DISCLOSURE

A shutter assembly for use on an exterior wall surface at a window opening or the like comprising a plurality of horizontally reciprocable pairs of apertured shutters restrained in reciprocable movement by guide rails, and moveable in relatively smooth relative reciprocation by a pair of opposed gear racks respectively connected to at least one pair of shutters and operated by a transversely disposed shaft including a pinion meshed with the gear racks, and in which the gear racks and pinions are disposed in a hollow chamber generally below the path of travel of the shutters, and in which the chamber opens outwardly and is closed by a displaceable access panel.

This invention pertains to shutters and means to moveably mount them on an exterior wall of a home or building on tracks which extend laterally across the top and bottom of the window opening, and which includes means to open and close the shutters which comprises gear racks on the shutters, to be actuated by a single pinion gear with an operator within the building.

Shutters of this type are generally used as storm protection and to close the window openings for various other reasons such as when the residents are absent for an extended period of time. Many other types of shutters, awnings or the like are provided for this purpose, most of which are operable from the outside only; however, other attempts at providing such closures operable from the inside have not met with complete success due to one or more undesirable features.

One of the principal objects of the invention is, therefore, to provide a window covering shutter structure which is mounted on an outside wall relative to a window opening and wherein the shutters are adapted to be actuated to a completely closed position or a completely unobstructing, open position by means of a single crank on the inside of the wall.

A further object of the instant invention is to provide such a shutter structure which is equally as adaptable for use on structures such as one or two story homes or on high rise apartment bildings, multi-story hotels or the like.

Yet another object of the invention is to provide shutters which will permit the windows to be opened at least partially when said shutters are completely closed and to incorporate ventilation means therein to permit free passage of air therethrough yet providing complete protection from weather elements such as rain, snow, high winds, etc.

Another object of the invention is to provide a shutter structure which is adaptable to window openings of various widths by varying the width of the shutters and the number of shutters in an assembly. However, in the most practical application, a single standard width shutter is used for most standard sized window openings and the number of shutters is varied to accommodate the various widths; for instance, various narrow width openings within certain limits will require two shutters while intermediate and wide window openings within certain limits will require the use of four and six shutter assemblies respectively.

Still another object of the instant invention is to provide a shutter structure which is durable and decorative in both the open and closed positions.

Other shutter assemblies have been developed in the past and in particular that disclosed in U.S. Letters Patent No. 2,808,626; and it is an object of this invention to provide an improved shutter assembly which includes shutters moveable in a plane of closure that is closely adjacent the outside surface of a wall on which the assembly is installed, for use in high apartment building type installations where increased wind velocities are encountered and more forcibly driven rain and sleet are impacted upon the building.

It is also an object of this invention to provide structure such that the mechanism is arranged to be protectively housed in a chamber which is arranged beneath the plane of closure and not between the closure plane and the outer surface of the building, so that the shutters may closely overlay the surface of the building.

It is also an object to provide a shutter assembly which includes a plurality of shutters which are adaptive to be stacked on the side of an opening when not in use, and, when in the closed condition, the center-most pair or furthest out from the wall surface and on either side of the center shutters as is indicated by the arrowed lines in FIGURE 4, so that there will be a shielding and relatively weather-proof structure provided.

Another object of the invention is to make the actuating mechanism readily accessible for repairs or replacement if necessary without dismounting the bottom rail structure from the wall.

In accordance with these and numerous other objects and advantages which will become more fully apparent hereinafter, the instant invention will now be described with reference to the accompanying drawings.

FIGURE 1 is a perspective view of a window shutter assembly mounted in accordance with the instant invention and illustrating the shutters in an open position;

FIGURE 2 is a perspective view similar to FIGURE 1 but illustrating the shutters in a closed position;

FIGURE 3 is a cross sectional view taken along the line 3—3 on FIGURE 1 looking in the direction of the arrows and illustrating the shutters open;

FIGURE 4 is a cross sectional view similar to FIGURE 3 with the shutters closed;

FIGURE 5 is a fragmentary elevational view of the bottom rail and bottom portions of the shutters with certain parts broken away to better illustrate the operating mechanism;

FIGURE 6 is a fragmentary vertical sectional view taken along the line 6—6 of FIGURE 5 and looking in the direction of the arrows;

FIGURE 7 is an enlarged fragmentary sectional view taken from FIGURE 6 to better illustrate the slidable mounting of the gear racks within the bottom rail;

FIGURE 8 is a vertical sectional vew taken along the line 8—8 of FIGURE 2 and looking in the direction of the arrows;

FIGURE 9 is a vertical sectional view taken along the line 9—9 of FIGURE 8 and looking in the direction of the arrows;

FIGURE 10 is an enlarged fragmentary elevation of a typical shutter slat;

FIGURE 11 is a vertical sectional view illustrating the interlocking of two shutters slats and the ventilation apertures therein;

FIGURE 12 is an elevational view of a typical two shutter installation of the instant invention for narrow window openings; and

FIGURE 13 is an elevational view of a typical six shutter installation for wide window openings.

In the drawings in which like reference numerals designate like or similar parts throughout the various views, the shutter assembly **10** of the instant invention consists generally of upper and lower rails **12** and **14** fixed to the outer surface **16** of a wall outwardly from and parallel to the upper and lower horizontal edges of a conventional window opening **18**. The rails **12** and **14** extend laterally outwardly from the side vertical edges of the window opening a distance at least as far as the width of one shutter **20**. Included within the upper rail **12** is a suspension trolley means **22** for the shutters **20**, and guide tracks and actuating means **24** and **26** respectively are included within the lower rail **14**. An operator crank **28**, projecting inwardly from the inside surface **30** of the wall, connects to a shank portion **32** extending through said wall centrally of the shutter assembly in operable connection with the shutter actuating means **26**. Thus, by manipulation of the operator crank on the inside of the wall the shutters may be slid from the open position illustrated in FIGURE 1 to the fully closed position of FIGURE 2 or vice versa, as set forth hereinafter.

In more detail the upper rail **12** as best seen in FIGURE 8 includes an inner upwardly extending flange **34** for attachment to the outer surface **16** of a wall by any appropriate means **36**. A horizontally disposed outwardly extending roof portion **38** connects the flange **34** to a downwardly extending flange **40** to enclose the top edges of the shutters **20**. Flange **40** is provided with an outwardly angulated drip lip **42** along its lower edge. Preferably, this upper rail is constructed of extruded aluminum and includes a floor **44** providing tracks **46** and **48** for trolley rollers sets **50** and **52** rotatably fixed to upwardly extending flanges **54** of angle brackets **56** fixed to both top corners of each shutter **20** by screws **57**. A septum **58** extending downwardly from the roof **38** supports the central portion of the floor **44**.

It should be noted at this point that the upper rail as described is for use with a four shutter assembly for intermediate width window openings as detailed in the drawings. However, when used with a two shutter assembly as in FIGURE 12, the upper rail includes but one trolley track **46** and when used with a six shutter assembly, FIGURE 13, the upper rail is extended outwardly to include a third trolley track.

The lower rail **14**, also preferably constructed of extruded aluminum, includes a downwardly extending inner flange **60** fixed to the outer surface **16** of a wall in the same manner as the upper rail. A pair of upstanding tracks **62** and **64** are provided longitudinally across the top surface of the roof portion **66** of the lower rail **14**, to be slidably traversed by grooves **68** formed in the bottom rail **69** of each shutter. Nylon bearing plates **70** are fixed to the lower ends of each shutter side rail **72**—**72** by screws **74**, FIGURE 6, with appropriate U-shaped cutouts for bearing engagement with the tracks **62** and **64**.

The lower rail **14** also includes a floor **74** connected to the roof **66** by a rear upstanding wall **76** and a septum **78** forming two longitudinal chambers **80** and **82** therein. A pair of gear racks **84** and **86** are slidably carried in the outer chamber **82** on a pair of tracks **88** and **90** formed integral with the roof and floor **66** and **74** respectively, said racks including L-shaped nylon bearings **91** pinned thereto in engagement with the tracks. Gear racks **84** and **86** are disposed in a parallel opposed relation to be simultaneously engaged and actuated by a pinion **92**. Referring to FIGURE 5, the upper gear rack **84** is fixed in driving relation to the outer shutter **95** on the left side by means of a connecting plate **84** and screws **96** and extends longitudinally to the right a distance sufficent to allow the shutters on the left to be opened clear of the window opening. The lower gear rack **86** is fixed to the outside shutter **99** on the right side by means of a connecting plate **100** and screws **102** and extends an equal distance to the left. When the pinion is turned counterclockwisely as indicated by arrows **103**, the shutter **95** and top gear rack is slid to the left as indicated by arrow **104** and the shutter **99** and lower gear rack **86** is slid to the right as indicated by arrow **106**. Thus, the shutters are opened, and by turning the pinion clockwisely the shutters are moved from an opened to a closed position.

The pinion **92** is fixed as at **110** to the outer end of the shank portion **32** of the operator means which as previously stated extends through the wall to carry a crank handle **28** which projects inwardly from the inside surface **30** of the wall. The crank operator mechanism is preferably of a conventional type that automatically locks the shutters in any desired position by slidably removing the crank handle **28**.

As described in relation to the top rail, the bottom rail varies for a two, four or six shutter assembly only in the number of tracks provided, the gear racks and pinion drive being common to each.

For four and six shutter assemblies the vertical side rails **72** of each shutter is provided with abutting pick up fins. As seen in FIGURES 3 and 4, the outer shutters **95** and **99** are provided with inwardly projecting fins **120** which are adapted to contact confronting fins **122** on the inner shutters **124** and **126** to move said inner shutters to the completely opened position illustrated in FIGURES 1 and 3 or to the closed position of FIGURES 2 and 4.

A pair of vertical channel members **130** and **132** extend between the outer distal ends of the top and bottom rails and are fixed thereto to nest the outer vertical side rails of the shutters when they are in an open position. To provide for easy accessibility of the operating mechanism for repairs or the like, a cover plate **134** extends longitudinally across the front of the lower rail **14** and is hinged thereto as at **136**. The cover plate is held in its normally closed position by screws **138** adjacent its outer distal ends. An overlap flange, FIGURE 4, **137** of vertical rail **139**, fixed as by screws or rivets **141** along the center abutting edge of one of the outer shutters, provides a weather right relationship between the abutting shutters when closed.

Each shutter is composed generally of a rectangular frame composed of vertical side rails **72**, top and bottom rails **140** and **69** respectively, and a plurality of interlocking laterally disposed slats **142**. The bottom and top walls **144** and **146** of the top and bottom rails respectively include slots **148** and **150** to captivate the curled lateral edge **152** of the upper and lower slats as illustrated in FIGURES 6 and 8. The vertical side rails **72** include vertical channels **154** to receive the vertical edge portions **156** of the plurality of interlocked slats **142**. As best illustrated in FIGURE 11, the top and bottom lateral edges of each slat are curled as at **152** to provide for a weather tight interlocking relationship therebetween.

Additionally, each slat is provided with a multiplicity of relatively short lateral slits **160**, with the material above each slit being angulated outwardly and downwardly as at **162** and inwardly and upwardly as at **164** along the bottom thereof to provide for ventilation therethrough.

It will be noted that the outer chamber **82** of the lower rail **14** or track means opens or faces away from the wall and that the chamber is directly beneath the plane of closure of the center-most or drive shutter panels, so that the distance between the plane of closure and the wall surface is minimized or not increased by reason of the gear type drive means which are employed and located by reason of this structure wholly beneath the outer abutting drive shutters. This shutter assembly when closed therefore is adapted to be installed in close adjacent relation to the wall surface having the openings to be protectively covered. Additionally, the follower or driven outer shutters are arranged for movement in planes closer to the wall than the aforesaid plane of closure of the drive panels or shutters. There results a multi-shutter assembly, when the shutters are in the closed position and as viewed in plan, which projects in a generally V-shaped projection from the building to an apex or vertical center

line of abutment, as illustrated in FIGURE 4 to resist entrance of wind driven elements. It will further be noted that by reason of this structure, the drive means effective to translate the shutter assembly are disposed for ready access for repair or maintenance simply by removing the cover plate which is apparent in FIGURE 6.

While the instant invention has been shown and described herein in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention.

What is claimed is:

1. A shutter assembly for use on the outer surface of a wall at a window opening or the like, comprising:

upper and lower guide rails disposed in mutually parallel relation;

at least a pair of opposed shutters reciprocably supported between said rails for movement toward and away from each other relative to said opening; the improvement therein:

said lower guide rail including an outwardly-opening hollow chamber generally underlying the path of movement of said shutters,

said chamber including opposed tracks on upper and lower portions thereof and extending along the path of movement of the shutters,

opposed gear racks reciprocably supported on a respective one of said tracks and being operatively connected to a respective one of said shutters for movement therewith,

an operating shaft having an integral pinion meshed with said gear rack and extending between the racks in said hollow chamber whereby rotation of said shaft causes relative reciprocation of said shutters; and

a closure panel overlying said outwardly-opening chamber and closing the outer side thereof and including means displaceably mounting said panel on said rail over said chamber for permitting displacement of the panel and ready access to the interior of the chamber and the mechanism housed therein.

2. The structure as claimed in claim 1 in which said last mentioned means comprises a hinge connected between said closure panel and said lower guide rail, and fastener elements between said panel and lower rail.

3. The structure as claimed in claim 1 in which said shutters include a sealing strip secured to and extending the length of one of said shutters,

said strip including a lateral flange extending toward said other shutter and engageable over the other shutter inner edge when said shutters are in abutting relation at their inner edges.

4. The structure as claimed in claim 1 in which said guide track in said chamber include anti-friction means engaging said gear racks.

5. The structure as claimed in claim 1 in which said shutters comprises a plurality of apertured slats having reversely bent portions adjacent interengaged upper and lower edge portions.

6. The structure as claimed in claim 5 in which said apertured slats include a plurality of horizontal slits bordered by angularly disposed lips integral with said slats.

References Cited

UNITED STATES PATENTS

525,745	9/1894	Saltmarsh	49—158 X
2,716,785	9/1955	Schoen	49—176
2,808,626	10/1957	Sassano	49—116
2,957,211	10/1960	Howard	49—116 X
3,237,250	3/1966	Scoville	49—362 X
3,241,283	3/1966	Ahlgren	49—362 X
3,348,603	10/1967	Ford	160—202 X

FOREIGN PATENTS

951,918	4/1949	France.

DENNIS L. TAYLOR, *Primary Examiner.*

U.S. Cl. X.R.

49—362