

[54] **ESCAPE MECHANISM**

[72] Inventor: **Lorin M. Jones**, 2508 Bellview Avenue,  
Alexandria, Va. 22308

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[51] Int. Cl. .... **A62b 1/20**

[58] Field of Search .... **182/76, 70, 20, 21**

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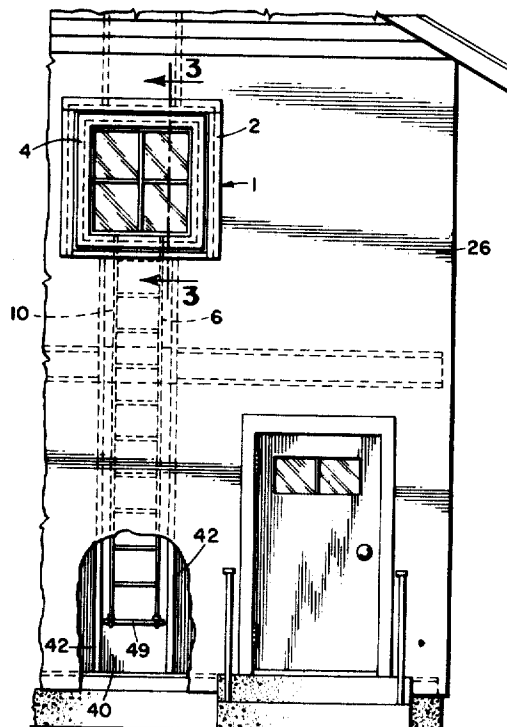
*Primary Examiner*—Reinaldo P. Machado  
*Attorney*—Irons, Stockman, Sears & Santorelli

[57]

**ABSTRACT**

An escape mechanism for use in a building structure whereby an escape device such as a flexible rope ladder can be easily and quickly positioned from an opening in the structure to a position of safety, said ladder being secured to a closure member for said opening and being rapidly positioned by the release of said closure member and the force exerted by the weight of said closure member as it falls from its position on the building structure.

**3 Claims, 8 Drawing Figures**



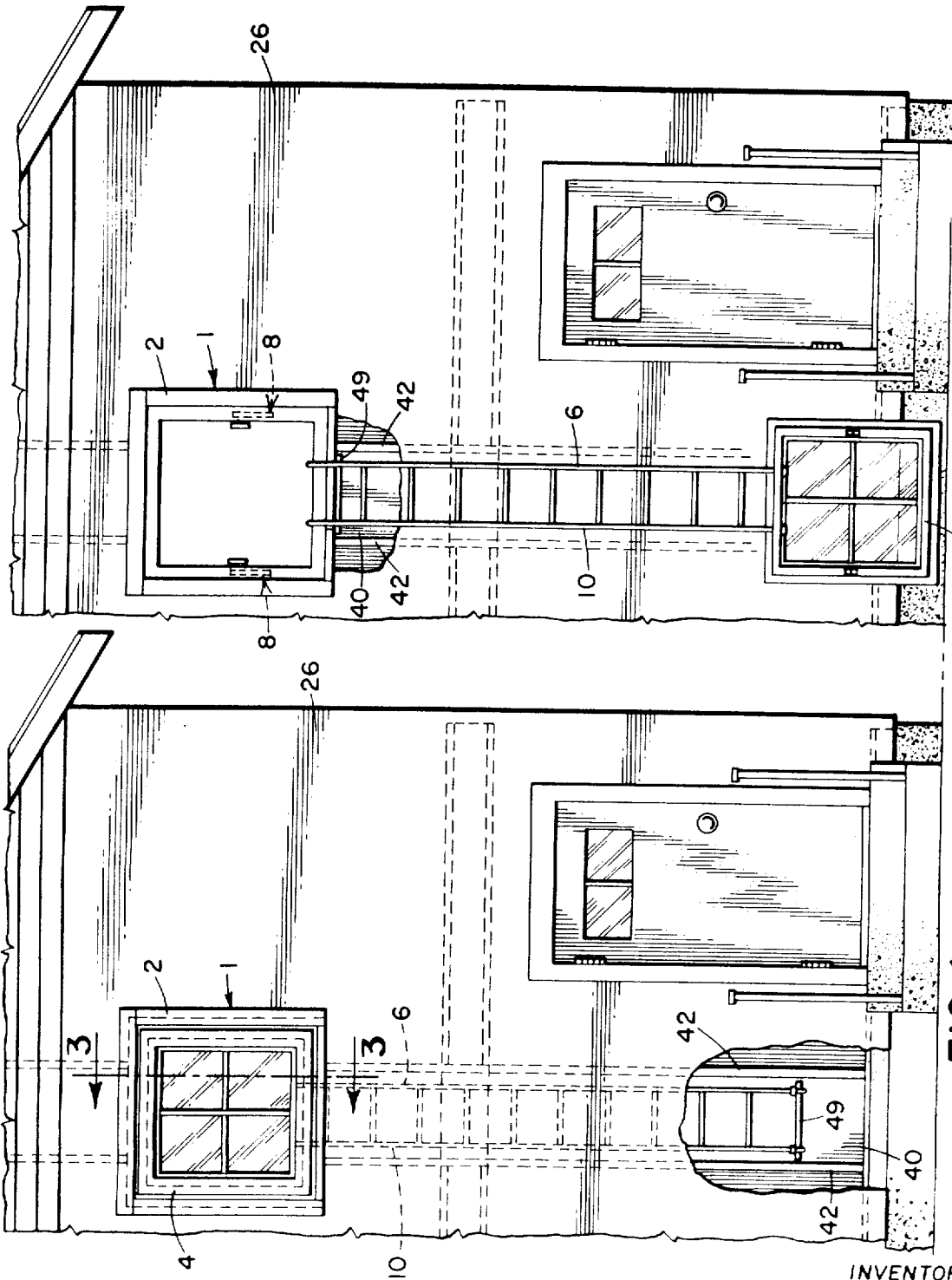


FIG. 2

FIG. 1

INVENTOR

LORIN M. JONES

BY *Chrons, Stockman, Sears & Santorelli*  
ATTORNEYS

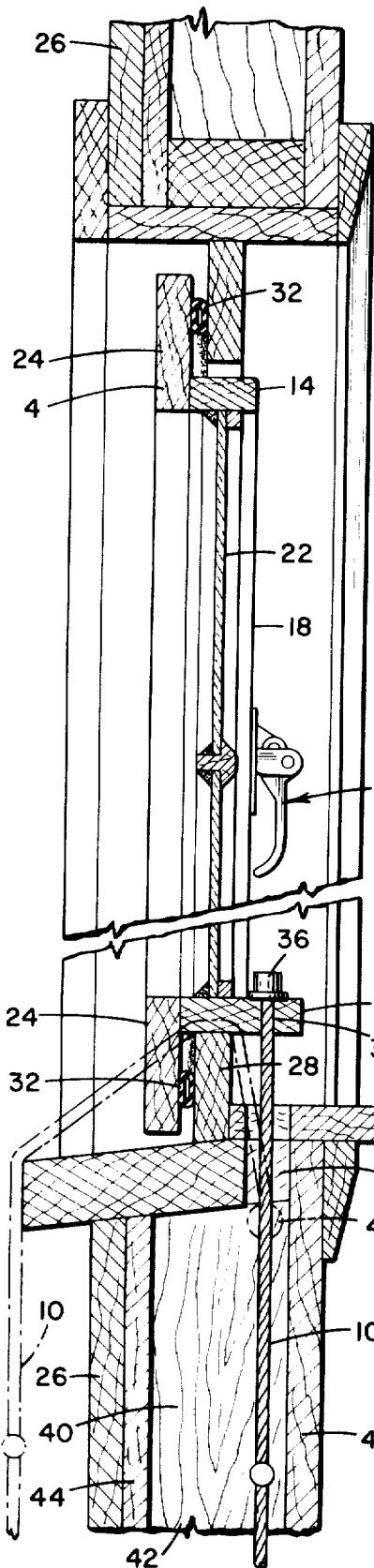


FIG. 3

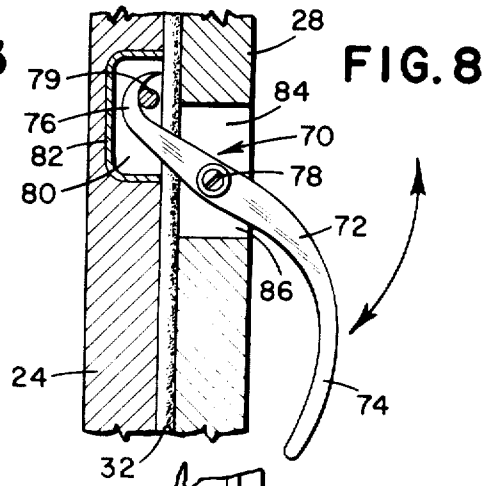


FIG. 8

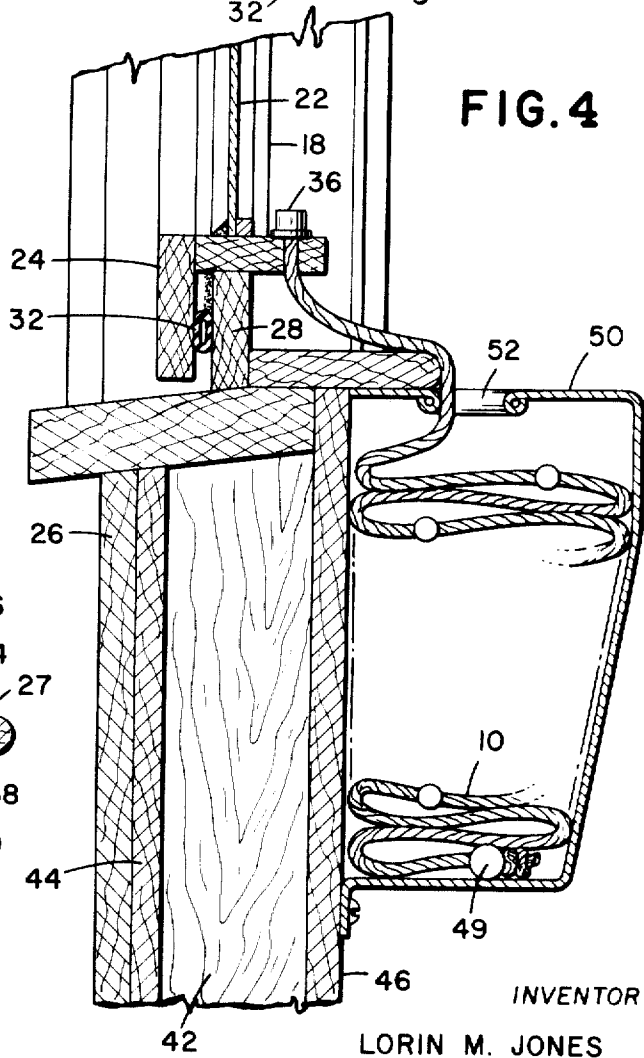


FIG. 4

INVENTOR

LORIN M. JONES

BY

*Shum, Stockman, Sears & Santorelli*  
ATTORNEYS

FIG. 5

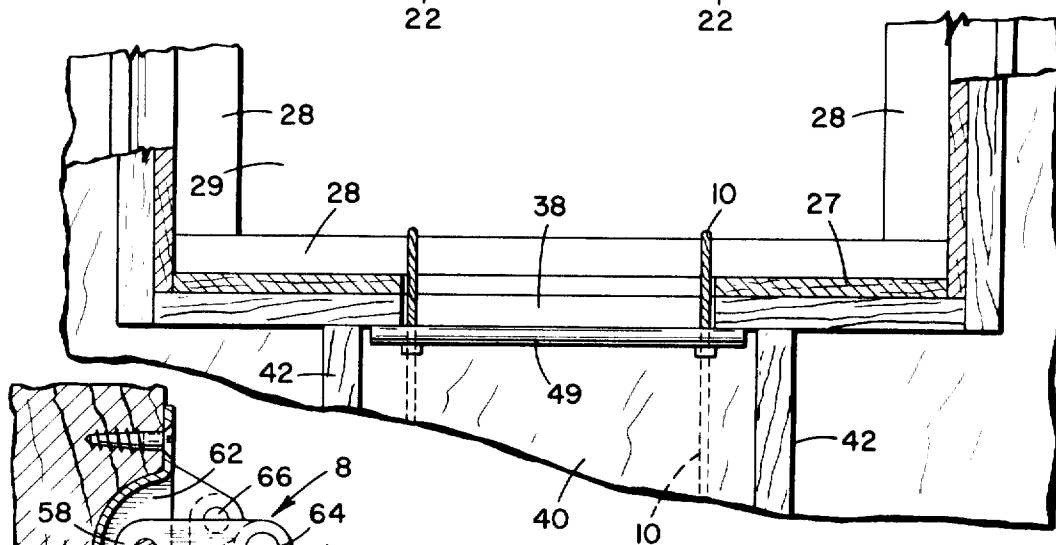
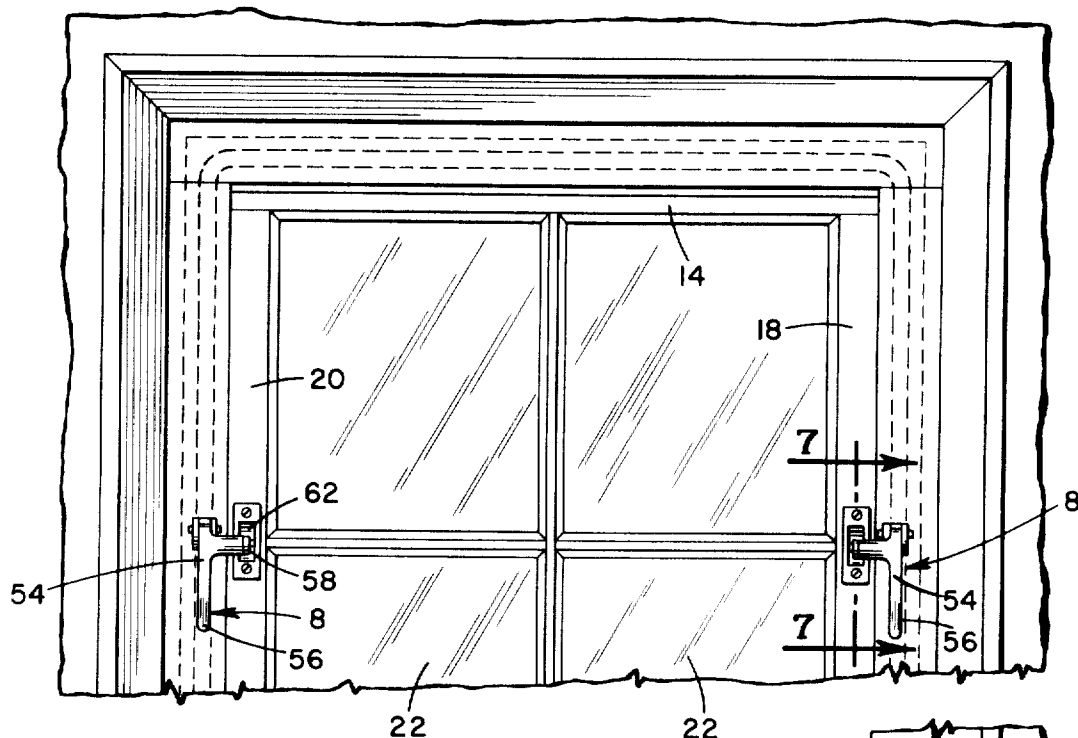


FIG. 6

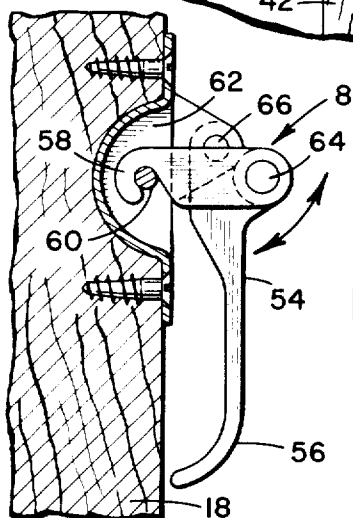


FIG. 7

INVENTOR

LORIN M. JONES

BY *Chrons, Stockman, Sears & Santoroli*  
ATTORNEYS

## ESCAPE MECHANISM

## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

This invention relates generally to safety devices and more particularly to an escape mechanism capable of being retained in a ready and concealed position within a building structure and rapidly and simply placed in an escape position to facilitate the withdrawal of occupants from the building structure during a time of emergency.

## 2. Description of the Prior Art

Heretofore various mechanisms have been employed to provide an exit from a building structure during times of emergency. While most commercial structures have attached thereto some rigid form of escape mechanism as the typical fire escape, the residential structure is usually lacking in any type of escape device. Some households own and store rope ladders and the like for effecting escape through upper story windows. Such ladders and the like however which are typically stored in closets and the like, must be first located, properly mounted to an object in the room and then positioned outside the window to provide an escape avenue. At times of panic, however, it is often difficult, if not impossible, for the occupants to exercise the degree of thought necessary to locate the escape device, properly mount and position it from a window or door. It is critical during such periods of panic that the escape mechanism be readily available and easily positioned so that a rapid exit can be effected from the building structure without reliance on the mental state of the occupants seeking to escape the structure.

Other devices have appeared, at least in the patent art, which provide a concealed escape device at the window which, in one manner or another, is positionable downwardly from the window unit. None of these devices, however, permit the disposition of the escape device in such a rapid fashion as that of the present invention wherein the escape device is attached to a quickly releaseable window unit or other closure member and the weight of that window unit, as it falls, positions the escape device on the exterior of the building structure.

## SUMMARY OF THE INVENTION

This invention is comprised of a new and improved escape mechanism for mounting on a building structure, for instance a two-story residence, wherein the means for escape from the second story is easily and rapidly positioned on the exterior of the building structure by the weight of a falling closure member.

The escape mechanism is comprised of a frame defining an opening in the building structure, a closure member mounted in said opening with a flexible escape means secured to the closure member, such flexible escape means being employed by the occupants for climbing from the opening to a position of safety below said frame. The flexible escape means is positioned downwardly from the opening by the weight of the closure member when the member is released and displaced from the frame and thence falls to a position of safety. In addition, the invention includes a cooperative latch means on the frame and the closure member for selectively drawing the closure member into tightly fitting relation to the frame and to provide for a quick release of the closure member from the frame so that the closure member is permitted to fall from the frame to position the flexible escape means on the exterior of the building structure to a position of safety. Cooperative means are also provided at the frame and on the end of the flexible escape means opposite the end secured to the closure member to retain that opposite end of the flexible escape means at the opening when the falling closure member positions the flexible escape means on the exterior of the building structure. When the flexible escape means is being retained in a stored and ready position it is concealed, for instance, between the studs and wall coverings of an exterior building wall of the nature of that conventional in most residential structures.

A principal object of this invention is to provide a new and improved escape mechanism which allows a rapid and safe exit from elevated positions on a building structure.

It is a further object of this invention to provide such a mechanism which is retained in a ready position directly at an exit opening from the building structure so that it may be quickly positioned without the exercise of any degree of mental effort by those who may well be in a panic state.

It is also an object of this invention to provide such an escape mechanism wherein the escape device is maintained at such a ready condition in a concealed position while not detracting from the interior decor and not being easily tampered with such that the escape mechanism will be operable when needed.

Another object of this invention is to provide such a new and improved escape mechanism positionable downwardly from an elevated exit by the weight of a falling closure member whereby the only action which must be taken by one seeking to escape from the building structure is to unlatch the closure member, the member thereby falling from the frame and positioning the escape device.

Other objects and advantages of the invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration examples of certain embodiments of the invention.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partial elevational view of the exterior of a building structure showing a window unit in a window frame and an escape device, a rope ladder, located between spaced studs in the exterior wall in a ready position, said ladder, studs and floor-ceiling joist combination being shown by dashed lines except at that portion of the exterior wall which is broken away.

FIG. 2 is a partial elevational view of the exterior of a building structure with the escape device located in its escape position on the exterior of the building structure, the studs as well as the floor-ceiling joist combination are shown in dashed lines.

FIG. 3 is a vertical sectional view taken on line 3—3 of FIG. 1 through the window unit and frame showing the escape device in its stored position in solid lines and in its escape position in broken lines.

FIG. 4 is a partial sectional view taken along a line like that of 3—3 in FIG. 1 showing a modification of this invention wherein the flexible escape device is stored in a special compartment mounted on the interior wall covering of the exterior wall just beneath the window frame.

FIG. 5 is a partial elevational view of the interior side of the exterior wall of FIG. 1 showing the position of the cooperative latch means on the window unit and window frame.

FIG. 6 is a partial sectional view showing the escape mechanism illustrated in FIGS. 1, 2 and 3 in its escape position with cooperative means on the end of said escape device opposite the end secured to the window unit and on the window frame for retaining that end of the escape device at the window frame when the escape device is placed in its escape position.

FIG. 7 is a vertical sectional view taken on lines 7—7 of FIG. 5 illustrating the cooperative latch means on the window unit and window frame.

FIG. 8 is a vertical sectional view showing a modified form of a cooperative latch means.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, an embodiment of an escape mechanism comprising the features of this invention is illustrated and designated by the reference numeral 1. The escape mechanism 1 is comprised of a window frame 2 defining an opening in the building structure, a closure member or window unit 4 operatively mounted in the frame, an escape device

6 and cooperative latch means 8 on the window frame 2 and window unit 4 for selectively drawing the window unit 4 into tightly fitting relation to said frame 2 and to quickly release said window unit 4 from the frame 2 so that the window unit 4 will fall from the frame 2 and thereby position the escape device 6 downwardly on the exterior of the building structure as shown in FIG. 2.

The escape device 6 is illustrated herein as a rope ladder 10, however various types of escape devices may be employed. It is however important that the escape device be of a flexible nature so that it can be withdrawn from a stored position at the window and quickly moved to an escape position on the exterior of the building structure by the weight of the falling window unit 4. The flexible escape device 6 therefor can be of various types and comprised of various materials so long as it is properly positionable from its stored location to a position on the exterior of the building structure.

Referring to FIG. 3, the window unit 4 is shown as a window sash 12 comprised of opposed spaced upper and lower rails 14 and 16 and spaced vertical posts 18 and 20 with a plurality of window panes 22 conventionally mounted between rails 14 and 16 and posts 18 and 20. Each of the rails 14 and 16 as well as the posts 18 and 20 have a weather member 24 mounted thereon on the exterior side of the sash 12. The weather member 24 extending outwardly from the sash 12 in a position normal to the rails 14 and 16 and posts 18 and 20.

The frame 2, as illustrated, is mounted in a conventional fashion on the exterior wall 26 of the building structure and includes a window sill 27. The otherwise conventional window frame includes an inwardly protruding member 28 extending about the periphery of the window frame and defining an opening 29 in which the sash 12 is positioned, the rails 14 and 16 and posts 18 and 20 fitting between the peripherally disposed member 28 and within the space defined thereby. The space defined by the member 28 has a vertical dimension slightly greater than that of the sash 12 as best indicated in FIG. 3 by the opening between the member 28 and the upper rail 14 designated by the reference numeral 30. The opening 30 permits the window unit 4 to fall from the window frame 2 upon disengagement of the cooperative latch assembly 8. There is located between the weather member 24 and the frame member 28 a weather stripping 32 which extends about the periphery of the window frame to provide an appropriate seal between the window unit 4 and the window frame 2.

Referring again to FIG. 3, the flexible ladder rope 10 has its end portion 34 secured to the lower rail 16 of the sash 12 by a securing device 36 which may be of any conventional nature. From its point of attachment to the lower rail 16, the ladder 10 extends downwardly through an opening 38 defined in the window sill 27 into a hollow storage compartment 40. The storage compartment 40, as illustrated, is defined by a pair of spaced studs 42 in the exterior wall 26 and the exterior and interior coverings 44 and 46 respectively. Spaces such as storage compartment 40 are conventional in a residential structure. This invention takes advantage of this storage space in order to maintain the ladder 10 in a ready position at the window unit 4 so that upon release of the window unit the ladder 10 will move upwardly through the opening 38 to be positioned exteriorly of the building structure as shown in broken lines in FIG. 3.

In instances where the spacing of the studs 42 in the exterior wall 26 is such that the storage compartment 40 is not centrally located relative to the window opening as illustrated in FIGS. 1 and 2; for instance where a stud occurs directly beneath the center of the window opening, certain modifications can be adopted to provide an appropriate storage space 40 within the interior portion of the exterior wall 26. For instance, such a centrally located stud can be terminated at a position spaced beneath the window opening and a cross member tied to the top of said central stud and the adjacent studs defining above said cross member a storage space having as its side walls the studs adjacent that centrally located stud. In such a situation the ladder 10 would not extend down the

exterior wall as shown in FIGS. 1 and 2 but rather would be in a folded position similar to that shown in FIG. 4. Otherwise, however, the structure would be the same as that illustrated in FIGS. 1 and 2. Of course when constructing new houses specially designed for containing such escape mechanisms as that of the subject invention, the stud spacing can be arranged at any particular window to provide the appropriate storage space 40 similar to that disclosed in FIGS. 1 and 2.

Referring to FIG. 4, a modification of this invention is illustrated wherein a storage compartment is defined for the rope ladder 10 by means of the storage device 50. Like the window frame 2, an opening 52 is defined through the upper portion of the storage device 50 for the ingress and egress of the rope ladder 10. The storage device 50 may be of various shapes and materials, its prime purpose being to store ladder 12 in a ready position while of course giving a sufficiently pleasing appearance at the window frame 2 so as not to detract from the interior decor.

The ladder 10, as illustrated, has an abutment member 49 secured to the end of said ladder 10 opposite that end attached to the ladder 10 to retain said opposite end of the ladder 10 at the frame 2 when the ladder 10 is disposed in its escape position. The abutment member 49 is greater in size than opening 38 in the sill 27 so that it does not move through opening 38 when the ladder 10 is positioned. Other types of mountings for the end of the ladder 10 opposite the window are, of course, possible. For instance where the rope ladder 10 is in a folded position as shown in FIG. 4 or as previously discussed in relation to an exterior wall where the spacing of the studs does not permit a centrally located storage compartment 40, the end of the rope ladder normally containing the abutment member 49 can be securely mounted either to the bottom of a storage device 50 or the cross member above mentioned in relation to the central stud arrangement.

Cooperative latch means 8 are provided on the window frame 2 and window unit 4 for selectively drawing the window unit 4 into tightly fitting relation to the frame 2 thereby sealing the frame 2 and the window unit 4 by means of the weather stripping 32 and for quickly releasing the window unit 4 in times of emergency from the window frame 2 so that the window unit 4 will drop from the frame and position the rope ladder 10 on the exterior of the building structure. In the illustrated embodiment, a pair of latch members 54 are mounted in opposed, spaced relation on the frame member 2 at opposite sides of the window sash 12. Each of the latch members 54 is comprised of a latch handle 56 and a hook portion 58, best illustrated in FIG. 7. The hook portion 58 is engageable with a cooperative means on the window sash 12 illustrated herein as a horizontal bar 60. Each of the bars 60 are positioned in a recess 62 within the posts 18 and 20 respectively of the window sash 12.

The hook portion 58 of each of the latch members 54 is swingable about a pivot 64 whereas the latch handle 56 is swingable about a second pivot 66. Referring again to FIG. 7 the hook portion 60 is secured about the horizontal bar 60 with the handle 56 in a position outward from the frame 2 and that position illustrated in FIG. 7. The rotation of the handle 56 to the position illustrated in FIG. 7 causes the pivot point 64 to swing about pivot 66 to an extreme spaced position from the bar 60 whereby the window unit is pulled into tightly fitting relation with the window frame 2 and the weather stripping 32 is compressed between members 24 and 28. When the latch handle 56 is rotated about the pivot 66 outwardly from the window frame 2 the pivot point 64 moves inwardly toward frame 2 thereby reducing the distance between pivot point 64 and the horizontal bar 60 and allowing the hooked portion 58 of the latch 54 to become disconnected from the bar 60 thereby releasing the window unit 4 from the window frame 2.

Referring to FIG. 8, a modified form of the latch means is illustrated and designated by the reference numeral 70. Latch means 70 is a conventional window latch assembly typically employed on casement type window units.

Latch means 70 includes a swingable arm 72 having a handle 74 and an engagement hook portion 76 at opposed ends. The arm 72 is swingable about a pivot 78 for engagement and disengagement with a horizontal bar 79 mounted in a recess 80 in member 24 on opposed sides of the window sash 12. Like latch means 70 is comprised of a pair of latch assemblies mounted respectively at opposite sides of the frame 2, the recess 80 may be defined by a lining 82 as illustrated in FIG. 8. The arm 72 is retained in the closed position illustrated in FIG. 8 in a conventional manner by frictional engagement of the arm 72 with the sides 84 of the opening 86 through member 28 or by any suitable frictional engagement means or over center spring mechanism of a conventional nature such that a predetermined force in excess of that exerted on the latch by the weight of the window sash 12 is necessary to raise handle 74 to disengage the hook portion 76 from the bar 79.

When the window unit 4 is placed within the window frame 2 the hook portion 58 is disposed over the bar 60 and the handle 56 of each of the latches 54 rotated downwardly to a position adjacent the frame member 28 as illustrated in FIG. 7 thereby drawing the window unit 4 into tightly fitting relation to the frame 2 and compressing the weather stripping 32 between the sash member 24 and the frame member 28. In this position the rope ladder 10 which is connected to the lower rail 16 of sash 12 is positioned interiorly of the building structure in storage compartment 40 defined by the studs 42 and exterior and interior walls 44 and 46 respectively.

When an emergency occurs it is only necessary in order to position the ladder 10 that one release the two latches 54 by rotating the latch handles 56 upwardly and away from the frame 2. In this manner the hook portion moves inwardly and becomes released from the bar 60 allowing the window unit 4 to rotate outwardly and downwardly from the window frame 2 through the opening 30 at the upper rail 14 of the window sash 12. The window unit 4 then falls downwardly from the frame 2 and the ladder 10 is pulled upwardly from storage compartment 40 through opening 38 in the window frame 2, or opening 52 in the storage device 50, and is disposed over the frame 2 and downwardly from the frame 2 to a position of safety beneath frame 2. When a sufficient length of the rope 10 has passed from the window frame downwardly to a position of safety beneath the frame the abutment member 49 secured to the ladder 10 engages the portion of the window frame adjacent opening 38 as illustrated in FIG. 6 to retain that end of the rope ladder 10 at the frame 2 and permit the occupants of the structure to climb from the frame 2 downwardly to a position of safety. The window unit 4 may later be reinstalled in the window frame 2 in the manner previously described.

It is to be understood that while I have illustrated and described one form of my invention, it is not to be limited to the specific form or arrangement of parts herein described and shown except insofar as such limitations are included in the claims.

I claim:

1. An escape mechanism for mounting on a building structure comprising:

a frame,

a closure member mounted in said frame, said frame defining an opening having a vertical dimension, the vertical dimension of said closure member being sufficiently less to permit the closure member to rotate outwardly and downwardly allowing the closure member to fall from the

frame,

an escape device comprised of flexible means, an end of said flexible means being secured to said closure member and for use by occupants of said structure for climbing from said frame to a position below said frame, said flexible means being located at said closure member in a ready position and being positionable downwardly from the said frame and exteriorly of said structure to a position of safety by the weight of said closure member when the member is displaced from the frame and caused to fall therefrom,

cooperative latch means on said frame and said closure member for selectively drawing said closure member into tightly fitting relation to said frame, and to quickly release said closure member from the said frame whereby said closure member drops from said frame to thereby position said flexible means downwardly from said frame on the exterior of said structure to a position of safety, and

cooperative means at said frame and on the end of said flexible means opposite the flexible means and secured to said closure member to retain the said opposite end of said flexible means at said frame when the closure member positions said flexible means exteriorly of said structure to a position of safety below said frame.

2. A building structure comprising:

an exterior wall comprised of spaced vertical studs, an exterior covering, and an interior covering, each of said coverings being mounted on said studs, said spaced studs and coverings forming a plurality of storage compartments,

a window frame structurally mounted to said studs at an elevated position above the base of said exterior wall,

a window unit mounted in the frame,

an escape device comprised of flexible means having one end thereof secured to said window unit said flexible means being used by an occupant of said building structure for climbing from said window frame to a position below said frame, said flexible means being stored in one of said storage compartments and being positionable downwardly from the said window frame by the weight of said window unit when the window unit is displaced from the window frame and caused to fall therefrom,

cooperative latch means on said window frame and said window unit for selectively drawing said window unit into tightly fitting relation to said frame and to quickly release said window unit from said frame whereby said window unit drops from said frame to position said flexible means, and

cooperative means at said frame on the end of said flexible means opposite the end secured to said window unit to retain the said opposite end at said frame when the window unit positions said flexible means exteriorly of said structure to a position of safety below said frame.

3. A combination as recited in claim 2 wherein said window frame includes a window sill and wherein said sill defines an opening therethrough in communication with a storage compartment, said flexible means being movable through said opening to an operative position disposed from said window frame exteriorly of said structure to a position beneath said frame and to a second position of storage extending downwardly from said frame in one of said storage compartments.

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