FIG. 4
STOWABLE EMERGENCY LADDER

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ABSTRACT OF THE DISCLOSURE

An emergency device having a multiple-section, foldable ladder stowed within an enclosure and adapted to fit into a building or structure. The ladder is held under spring tension by retaining means and, when actuated from within the building, ejects and unfolds, extending to the ground to provide safe exit through an adjacent upper story window onto the ladder.

This invention relates to a foldable emergency exit means and, more particularly, to the type of multiple-section, foldable ladder which is stored in a building wall or frame adjacent to a window and which can be released from within the building to provide safe emergency exit means.

It is an important object of this invention to provide a quick-acting, dependable means of emergency exit from an upper floor of a building.

It is another object of this invention to provide a foldable ladder which is fireproof and which can, even after long periods of non-use, be depended upon as a safe emergency exit means.

Another object of my invention is to provide a foldable fire ladder which is stored in such a manner as to minimize tangling and provide quick ejection when actuated.

A specific object of my invention is to provide a spring-loaded foldable ladder which can be easily secured to the existing roof rafters of a building.

Other objects will become apparent from a reading of the following specification and drawings in which:

FIGURE 1 is a detailed perspective view of my novel foldable ladder in an extended position with the retaining door removed whereby most of the details are visible;

FIGURE 2 is a front elevational view of my apparatus in a stored position with the retaining door removed;

FIGURE 3 is a sectional view of my escape ladder taken along section line 3—3 of FIGURE 2 with the folded ladder being held in place by the retaining door; and

FIGURE 4 is a perspective view of another embodiment of my invention designed to be adapted to roof rafters.

Referring to the drawings, wherein like reference characters represent like elements throughout the various views, the device, generally noted as 1, is vertically mounted adjacent an upper story window within the wall. The overall depth of the device allows it to be disposed within the thickness of an ordinary building wall. For purposes of illustration, I have shown the device 1 mounted to and below a lintel in a masonry wall, such as by bolts 5, not shown. Similarly, the unit may be attached by bolts to studs in a frame wall or wall of other construction, in any convenient manner. The location of the unit requires only that the user may quickly and easily mount the ladder and descend to the ground from a nearby upper floor window in case of fire or other emergency.

The unit 1 comprises a generally rectangular enclosure 3 contained entirely within the building wall with vertical sides 4, top 5, bottom 6, and back 7. The enclosure 3 is preferably made of metal so as to be fireproof as well as providing protection for the contents from water and weathering. A retaining door 8 is vertically hinged to the enclosure 3 to open outwardly away from the building. Within the enclosure 3 ladder casing 10 is mounted which has a generally rectangular shape with sides 11, ends 12 and back 13. The casing 10 is supported from a frame designated generally as 14. The frame 14 comprises a pair of bars 15 extending parallel to side 11 of casing 10 and held to the casing by bolts 16. Although I show bars 15 being spaced apart from sides 11, they may be also affixed, as by welding, directly to the casing 10. The frame members 15 extend at their inner end beyond casing end 12.

A horizontal pivot pin 20 parallel to end 12 is rigidly affixed to frame members 15 near their lower ends. The pivot pin 20 is pivotally mounted at both ends in bearing blocks 21 secured, such as by welding, within the lower interior portions of sides 4 near the bottom of enclosure 3. This mounting, it can be seen, allows the casing 10 to pivot outwardly from within enclosure 3 into a horizontal position clear of the enclosure 3. Steps 22 are rigidly secured to the inside of enclosure back 7 at a location adapted to engage the lower end of frame bars 15 to prevent the lower end of bars 15 from rotating more than 90°.

This limiting of movement places the frame 14 and its casing 10 in a horizontal position when fully pivoted outwardly.

Compression springs 25 provide the ejection force for my device and are secured to the sides 11 of the casing 10 by brackets 26. These springs extend rearward and are of sufficient length so that they are in a compressed position against the back 7 of the enclosure 3 when the casing 10 is folded within the enclosure 3.

Adjacent the front end of casing 10 and extending horizontally between sides 11 of the casing is pivot axle 30. Pivotally attached to this axle within the casing 10 and spaced apart from the sides 11 are links 31. The links may be attached by any convenient manner and are shown as having drilled holes to accommodate pivot axle 30 and allow easy movement. The links 31, as seen in FIGURE 3, are of a length whereby they can be folded perpendicular to the door 8 when the ladder is folded within the enclosure 3 without engaging the back 7 of the enclosure. Attached to each of the links 31 by hinges 32 are stiles 33 which, as seen in FIGURE 3, extend when folded, against the back 13 of casing 10 parallel to sides 11.

The remaining length of my foldable ladder 36 is comprised of a series of shorter stiles 34 which are reversely folding in the manner shown, joined by hinges 32. Parallel rungs 35 extend transversely between the stiles at convenient intervals. It is understood that as many stiles are provided as needed so that the ladder when extended reaches to the ground. The hinges may be of any design allowing free movement between the stiles.

A catch mechanism 40 of standard manufacture is located on the inside top of the enclosure door 8 and engages release 41 which is mounted within the enclosure 3. A cable is attached to the release 41 and may be run to any convenient point within the building, such as near a window. Spring 42 holds the catch in a normally closed position.

When my device is in its normal position, the ladder casing 10 is vertically disposed within the enclosure 3 and the actuating springs 25 are compressed against the back 7 of the enclosure 3. The casing 10 and its contents are held in place by retaining door 8. The foldable ladder 36 comprising stiles 34, hinges 32, and rungs 35 is folded in a stored condition within the receptacle as seen in FIGURE 3.

In case of an emergency, the user simply actuates the emergency device by pulling the cable attached to the catch-releasing mechanism 41, which causes the door 8 to
be projected outwardly from the building as compressed springs 25 uncoil, swinging ladder casing 10 into a horizontal position with stops 22 engaging frame members 15.

The ladder 56 unfolds in an orderly fashion due to its own weight, with the outermost section being ejected first. Because of the manner in which my ladder is constructed and folded within its enclosure, no possibility of tangling occurs. The user can climb through the window, onto my device, and to safety.

The foldable ladder illustrated in FIGURE 4 is constructed in substantially the same manner as the ladder shown in the other figure; however, this embodiment eliminates the need for a separate enclosure. This construction is designed especially to be adapted to existing roof rafters of the overhang of a building.

Rafters 50 extend outwardly to support the roof of a building in known manner. Pivot pin 51 extends horizontally between rafters 50 at a convenient position above a subjacent window or windows. The ladder 56 is comprised of a pair of long stiles 52 pivotally connected to the pivot pin. A plurality of stiles 53, having rungs 54 extending horizontally, are joined by hinges. The ladder 56, in an enclosed position, is folded generally horizontally, as shown, between the rafters which serve as the enclosure.

A retaining door 58 is affixed by hinges 55 to the rafters 50 and is held in place by conventional means such as magnetic catch 60 and release 61. Cable 62, extending to a convenient point within the building, serves to actuate the release. From the foregoing, it will be appreciated that a person wishing to escape simply pulls cable 62, releasing door 58, which opens downward. The ladder 56 unfolds due to gravity, extending to the ground and providing an easy means of escape from the upper stories.

From the standpoint of safety it should be obvious that my device is simple and reliable as there is a minimum of moving parts that can become inoperative. Even after years of non-use, my device would be available for instant use. Further, my foldable ladder is unobtrusive and is not required to be mounted within the building, where it would be unsightly or hazardous or could be tampered with.

My device can be adapted to accommodate buildings of various construction and can be placed where space limitation does not allow the installation of a standard fire escape.

It will be obvious to those skilled in the art that particular structural and functional aspects of my novel escape ladder can be modified without departing from the scope and spirit of my invention.

I claim:

1. A fast-acting, emergency escape device comprising:
   (a) an enclosure having a top, bottom, sides, and back, said enclosure being adapted for installation within the confines of a structure wall;
   (b) a ladder-supporting frame pivotally affixed within said enclosure whereby the frame can be pivoted from a position of non-use within the enclosure to a generally horizontal position of use with said frame outwardly extending from said enclosure;
   (c) a multiple-section foldable ladder pivotally connected to said ladder-supporting frame, said ladder being folded within the enclosure when the ladder frame is in a position of non-use and hanging vertically from the outwardly extending portion of said frame in a position of use;
   (d) releasable retaining means for retaining said ladder frame and ladder within said enclosure during non-use;
   (e) means for releasing said retaining means; and
   (f) means for pivotally projecting said ladder frame and ladder outwardly upon release of said retaining means whereby said ladder frame pivots into a generally horizontal, outwardly extending position causing the ladder to extend.

2. An emergency escape device for mounting within a building wall adjacent a window comprising:
   (a) a generally rectangular enclosure with a front opening and having top, bottom, rear, and side walls, said enclosure being mounted within the confines of the building wall;
   (b) a door mounted on said enclosure, said door being arranged to pivot outwardly from the building wall;
   (c) an axle extending transversely between, and rigidly connected to, said enclosure side walls;
   (d) a ladder frame including a pair of parallel, spaced apart bars pivotally connected to said axle;
   (e) a ladder casing, said casing being generally rectangular and having side, end, and rear walls, each of the side walls being rigidly supported by said ladder frame, whereby said frame and casing are arranged vertically within the enclosure in a position of non-use and pivot to a generally horizontal position of use with the casing extending outwardly from said enclosure;
   (f) stop means on the rear of said enclosure to engage said frame when the frame is pivoted outwardly;
   (g) pivot means extending transversely and being rigidly attached to the sides of the ladder casing;
   (h) a foldable, multiple-section ladder including a pair of parallel first links connected to said pivot means and extending to the rear of said casing when folded, a first pair of parallel stiles linked to said first links and being adjacent the rear of the casing and extending substantially along its length when in a folded position, a series of linked together ladder sections linked to said first pair of stiles being folded in reverse order within the casing;
   (i) spring means affixed to said casing and arranged to be compressed against the rear of the casing when the casing is in a position of non-use;
   (j) catch means to hold said retaining door in a closed position against said enclosure; and
   (k) release means which may be actuated from within the building, for releasing said catch, whereby the ladder casing and frame pivot into an outwardly extending position, allowing the ladder to extend in an orderly fashion.

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