Dec. 16, 1952 M. MEYERS 2,621,377

EXPLOSION-TYPE MOUNTING FOR WINDOWS

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FIG. 1.

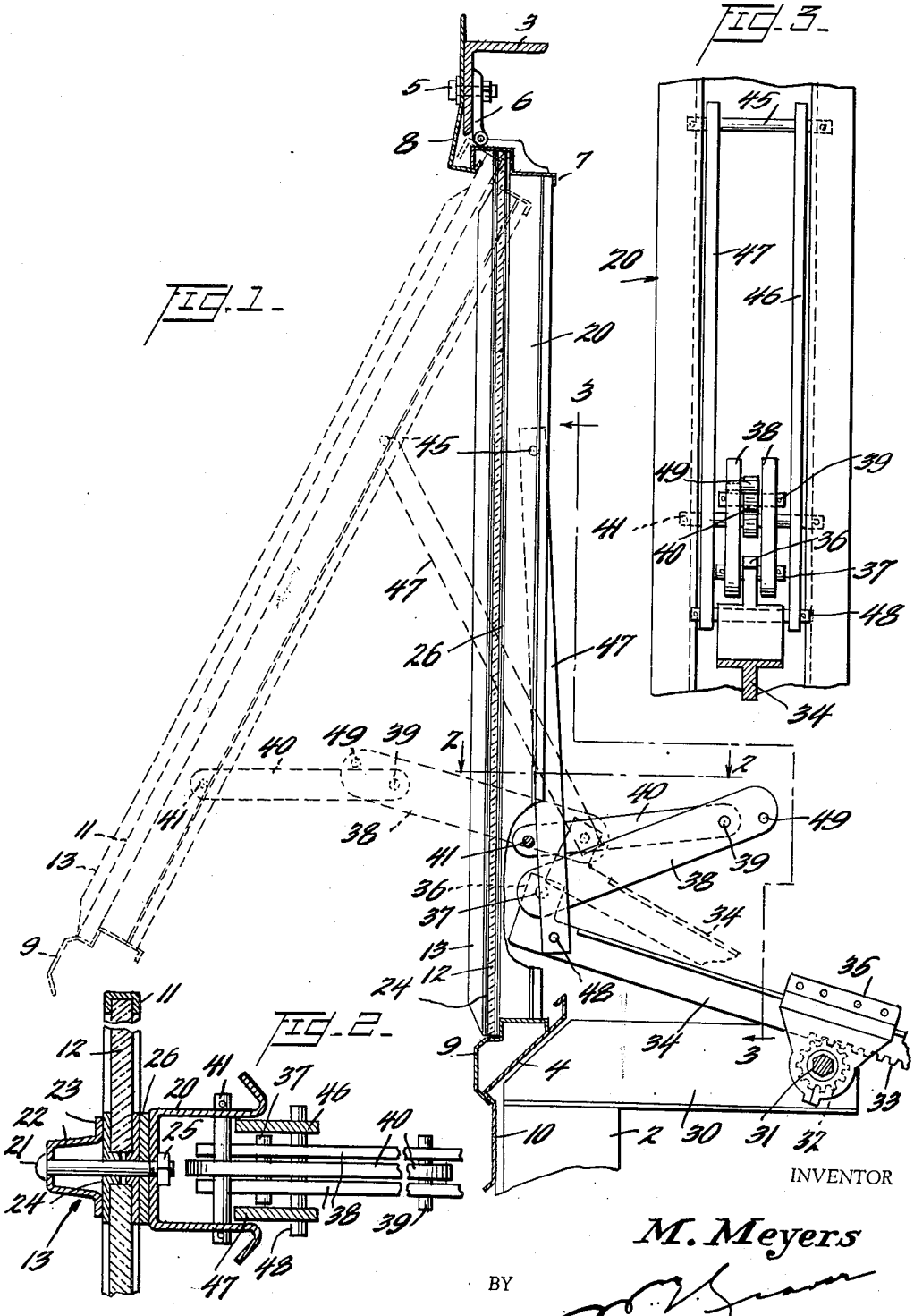


FIG. 3.

FIG. 2.

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EXPLOSION-TYPE MOUNTING FOR WINDOWS

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4 Claims. (Cl. 20—53)

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This invention relates to window construction, and more particularly to an explosion-type mounting for a window such for example as to be found in factories or buildings where explosions might occur, the principal object of the invention being to provide a window mounting which automatically will be yieldable under the instantaneous force of the tremendous pressure created by an explosion, thereby preventing the shattering of the glass in the window with consequent possible damage or injury to people and/or property.

Another object of the invention is to provide a mounting for a window which will operate in conjunction with means for permitting desired degrees of openings of the window for ventilation purposes, and which after the force of the explosion has become expended will permit the window to return to its preset degree of ventilation opening.

Other objects and advantages will become apparent as the following description is studied and the drawings are examined.

Referring to the accompanying drawings forming a part of this specification and in which like numerals designate like parts in all of the views—

Fig. 1 is a vertical sectional view through a window to which this invention has been applied;

Fig. 2 is a horizontal sectional view taken as on the line 2—2 of Fig. 1 and looking in the direction of the arrows; and

Fig. 3 is a vertical sectional view taken as on the line 3—3 of Fig. 1 and looking in the direction of the arrows.

The building wall is generally indentified by the numeral 2 and is provided with a suitable opening therein for receiving the window frame comprising an upper structural member 3, a sill member 4, and appropriate side frame members not shown but readily understood. To said upper member 3 there is rigidly secured as by bolts 5 one leaf of a hinge 6 the other leaf of which is rigidly attached to the upper sash member 7 of the window to permit outward swing of the sash, and a sheet of suitable flashing 8 is provided as usual to serve as a drip for rain flowing down the outer surface of the building wall. The bottom member 9 of the sash comprises a member complementally formed with respect to the sill 4 of the window frame and adapted to lead rain from the window sash onto the outer surface of flashing 10. The side members of the sash may be of any desired formation, one side member being indicated at 11 as being of channel-shape in cross-section to receive therein an edge of a pane of

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glass 12. Dividing strips such as indicated at 13 may be provided at the joints between adjacent panes.

On the inner side of the window sash, and preferably at the central longitudinal portion thereof, there is provided a vertical channel 20 for reinforcement, said channel extending from the top sash member 7 to the bottom sash member 9 and having its extremities rigidly secured. In accordance with the vertical extent of the sash, there may be provided one or more bolts 21 for securing the glass panes in the sash to said channel, there being shown in Fig. 2 on the outside of the sash a channel-like member 22 through the web portion of which the said bolt extends, the legs of said channel 22 having their edge portions flanged outwardly as indicated at 23 for seating against the outer surface of an intermediate vertical separator strip 24 between adjacent panes, nut 25 being provided on the opposite end of said bolt for perfecting the securement of said sash to the reinforcing channel 20, with suitable cushioning material 26 therebetween.

The means for opening and closing the sash will now be described. At approximately the horizontal plane of the window sill there is provided an inwardly directed rigid bracket 30 serving as a bearing for a horizontal shaft 31 having a polygonal section to which is fitted a pinion 32 adapted to mesh with a rack 33 comprising teeth formed upon the lower edge of a T-bar 34 slidably mounted within a complementally formed housing or bracket 35 serving as a guide for said T-bar, the complemental formation being such as to maintain engagement of the rack teeth with the teeth of the pinion. This rack guide and pinion assembly forms the subject matter of the application for Letters Patent of the United States by Morris Meyers filed June 8, 1949 under the Serial No. 97795, now Patent No. 2,509,161, and entitled Rack Guide and Pinion Assembly.

The outermost end of said T-bar has an upward extension 36 to which is pivotally attached as at 37 one end of a short link 38 to the other end of which is pivotally attached as at 39 one end of a second short link 40, the other end of said second link being pivotally attached as at 41 to the channel 20. This second short link may be a single strip of strap metal, and the first mentioned short link 38 may be formed as a pair of spaced similar strips of metal between which the second link 40 is disposed, said pair of spaced straps straddling the upturned end 36 of said T-bar. In closed position of the sash, the two short links are disposed angularly to each other (as

shown in full lines in Fig. 1) so that it is impossible for them to occupy a dead-center relationship, and consequently at all times they form a toggle.

It thus results that when the pinion 32 is rotated, the T-bar will be reciprocably moved for example to the left as seen in Fig. 1, and in this movement the joined short links will be moved to the left and effect an opening or ventilating movement of the sash, said T-bar having slight rotary movement about the axis of said pinion to accommodate for the swinging movement of said pivoted links. Under ventilating conditions the sash may be secured by any suitable means in any position to which it has been moved by the rack and pinion, but this present invention contemplates additional means by which the sash may be moved further outwardly of its window frame automatically by and when an explosion takes place within the building, this further outward movement being at least to such an extent as will permit the force of the expanding explosion gases to escape through the opened sash, and this means will now be described.

At a somewhat elevated position on the channel 20 there is pivotally mounted as at 45 (as by a short shaft or cotter pin) the upper ends of a pair of parallelly spaced similar supporting links 46 and 47, the lower ends of which are pivotally connected as at 48 to and straddle the T-bar 34 relatively adjacent to its upturned end 36. These two long links therefore establish a specific distance between the pivots 45 and 48, or in other words substantially maintain the elevation of pivot 48 except for the relatively inconsequential rotary movement of the T-bar about the axis of its operating pinion. With this elevation maintenance, and the relative relationship of the pivots 37, 39 and 41 to each other when the sash is in closed position, it will be understood that pivot 39 will never move to a position in and/or below the horizontal plane of pivot 41 but will always be above said plane. Consequently, the pivots 39 and 41 will never occupy a dead-center relationship, but rather pivot 39 will be always in position to move upwardly when sufficient force (e. g. rack bar and/or explosion) is exerted against the sash to open the same.

By this construction, it therefore results that when the pinion 32 is intentionally given rotary motion, the T-bar 34 will be moved to the left as seen in Fig. 1, and in this movement the joined short links 38 and 40 will move with it, said links angularly moving with respect to each other through only a relatively small degree but nevertheless permitting a sash opening movement for ventilating purposes. When, however, an explosion occurs within the bulding, the force of the gases of explosion will be directed upon the inner surface of the sash (whether closed or in open ventilating position) and will cause the sash to move outwardly with respect to the building wall. When this occurs the degree of separation between the short links will be increased as to the maximum shown in dotted lines in Fig. 1, the supporting links 46 and 47 still tying the sash to the T-bar but slightly elevating the pivot 37 thereof as to the dotted line position shown in Fig. 1, the T-bar turning about the axis of pinion 32. This results in a further opening of the window sash as to the dotted line position shown, thereby permitting a sufficient opening of the sash to let the force of the expanding explosion gases be expanded harmlessly through the further opened sash. During this further outward movement of the sash under the force of the explosion, the engagement of the rack and pinion may yield from its secured position through still maintained in inter-enmeshment.

When this force has been expended, the combined weight of the sash and the long links 46 and 47 will be sufficient to cause an automatic closing movement of the sash until the sash and the various links return for example at least to the positions which they had occupied for ventilation prior to the explosion. So that the short links will not occupy a dead-center position with respect to each other when the explosion gases are expending themselves through the further opened sash, a stop pin 49 or its equivalent may be provided on one of the short links for engagement with an edge of the other short link, as clearly indicated in dotted lines in Fig. 1.

From the foregoing description it will thus be seen that by this invention there is provided an explosion type mounting for a window comprising a sash pivotally hung as at 6 from the window frame, said sash including a reinforcing member comprising a vertical channel 20 disposed with its flanges extending from said sash in a direction inwardly of the window, a toggle comprising a short link 40 pivotally connected as at 41 to said reinforcing member, the pivot 41 being relatively at the lower end portion of said reinforcing member, and actuating means comprising the T-bar 34 for said toggle to move said sash into desired ventilating positions. To this basic construction there is added a long link 46—47 the upper end of which is pivotally connected as at 45 to the relatively upper portion of the channel 20, and the lower end of which is pivotally connected as at 48 to the toggle actuating means or T-bar 34, said long link constituting means permitting movement of said sash outwardly of the window frame automatically beyond any ventilating position through the unfolding or opening-up of the toggle comprising the two short links 38 and 40, this taking place upon application of the force of an explosion to the inner surface of said sash, said short link 40, said long link such as 47, and said toggle actuating means 34, each having portions overlapping each other and extending into the space between the flanges of said channel 20.

It is obvious that those skilled in the art may vary the details of construction and arrangements of parts without departing from the spirit of this invention wherefore it is desired not to be limited to the exact foregoing disclosure except as may be required by the claims.

What is claimed is:

1. An explosion type mounting for windows comprising a sash pivoted at one end for swinging movement in and out of a window opening, an actuator bar mounted near the free end of said sash for slidable movement toward or away from the latter, toggle links pivotally connected together at adjoining ends and at their opposite ends in spaced relationship to said actuator bar and said sash respectively, a supporting link pivoted at one end to said sash relatively remote from said toggle links and pivoted at its opposite end to said actuator bar, the length of the supporting link being such that the pivot connecting the adjoining ends of said toggle links lies in a plane between parallel planes passing through the pivotal connection of the supporting link with the sash and the pivotal connection of the toggle link with said sash, and means for sliding said actuator bar.

2. An explosion type mounting for windows comprising a sash pivoted at one end for swinging movement in and out of a window opening, an actuator bar mounted near the free end of said sash for reciprocation in the direction of said swinging movement, a toggle link pivoted at one end to said bar and extending rearwardly thereof, a second toggle link pivoted at one end to the rear end of said first toggle link and at its opposite end to said sash in spaced relationship to the pivotal connection of the first toggle link with said actuator bar, and a supporting link pivoted at one end to said sash and at its opposite end to said actuator bar, the length of the supporting link being such that the pivot connecting the adjoining ends of said toggle links lies in a plane between parallel planes passing through the pivotal connection of the supporting link with the sash and the pivotal connection of the toggle link with said sash.

3. An explosion type mounting for windows comprising a sash pivoted at one end for swinging movement in and out of a window opening, a channel member secured to the inside of said sash, an actuator bar mounted near the free end of said sash for slidable movement toward or away from the latter, toggle links connecting the free end of said bar and said channel member, and a supporting link pivoted at one end within said channel member relatively remote from said toggle links and pivotally connected at its opposite end to said actuator bar, the length of the supporting link being such that the pivot connecting the adjoining ends of said toggle links lies in a plane between parallel planes passing through the pivotal connection of the supporting link with the sash and the pivotal connection of the toggle link with said sash.

4. An explosion type mounting for windows comprising a sash pivoted at one end for swinging movement in and out of a window opening, a channel member secured to the inside of said sash, an actuator bar mounted near the free end of said sash for reciprocation in the direction of said swinging movement, a toggle link pivoted at one end to said bar and extending rearwardly thereof, a second toggle link pivoted at its rear end to the corresponding end of said first link and at its forward end to said channel member, and a supporting link pivoted at one end within said channel member relatively remote from said toggle links and at its opposite end to said bar, the length of the supporting link being such that the pivot connecting the adjoining ends of said toggle links lies in a plane between parallel planes passing through the pivotal connection of the supporting link with the sash and the pivotal connection of the toggle link with said sash.

MORRIS MEYERS.

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