June 28, 1966 G. F. LEWIS 3,257,755

SELF-LOCKING AWNING TYPE METAL WINDOWS

Filed Aug. 19, 1964 4 Sheets-Sheet 1

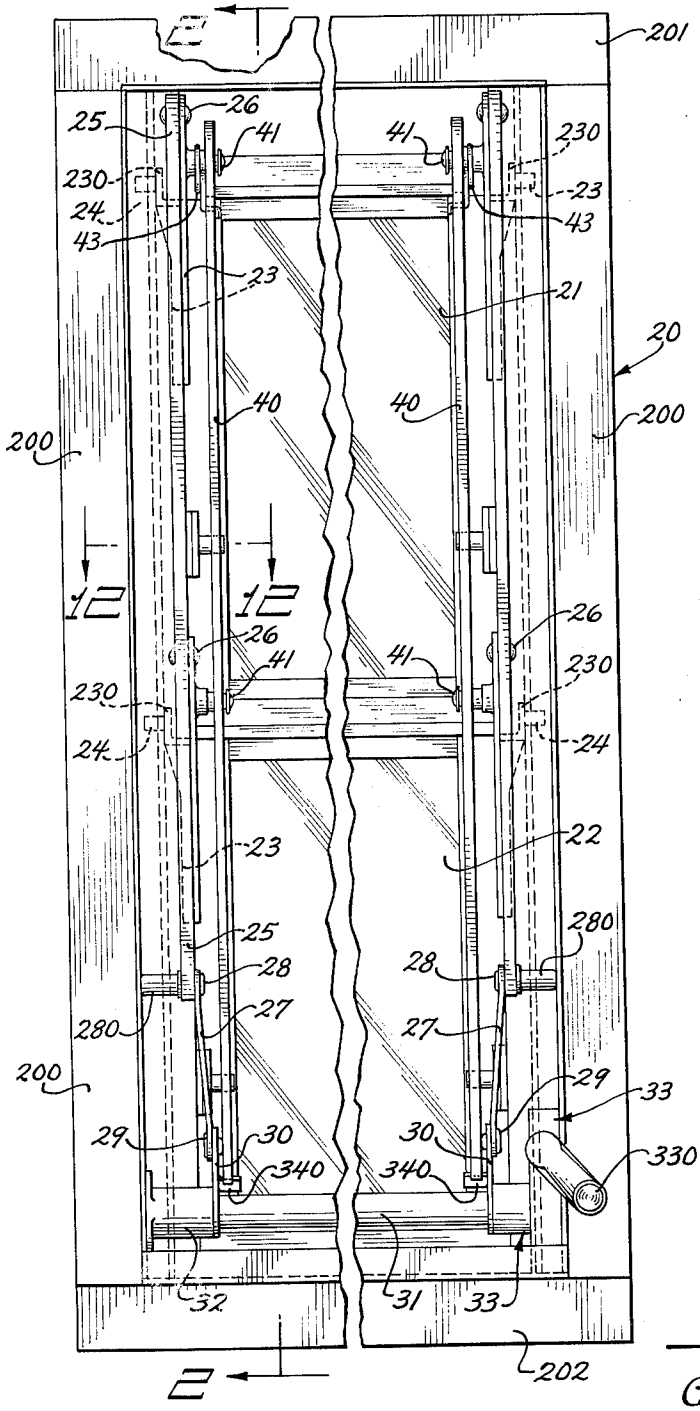


Fig. 1

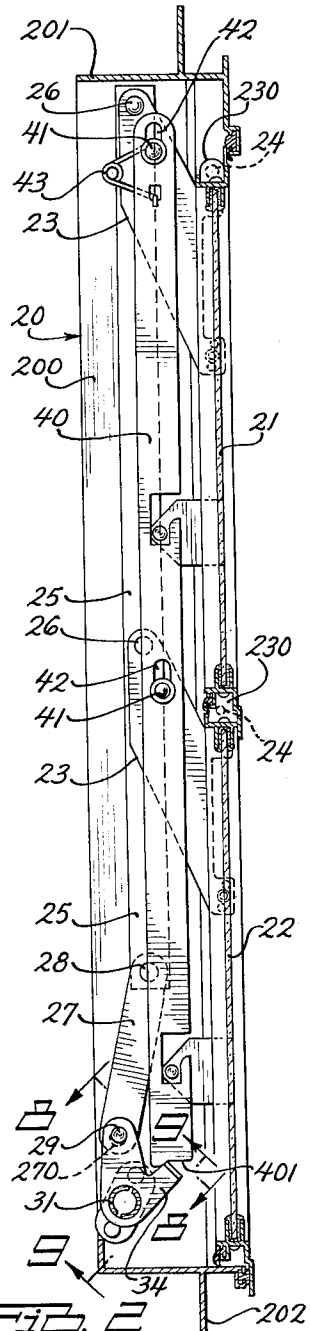


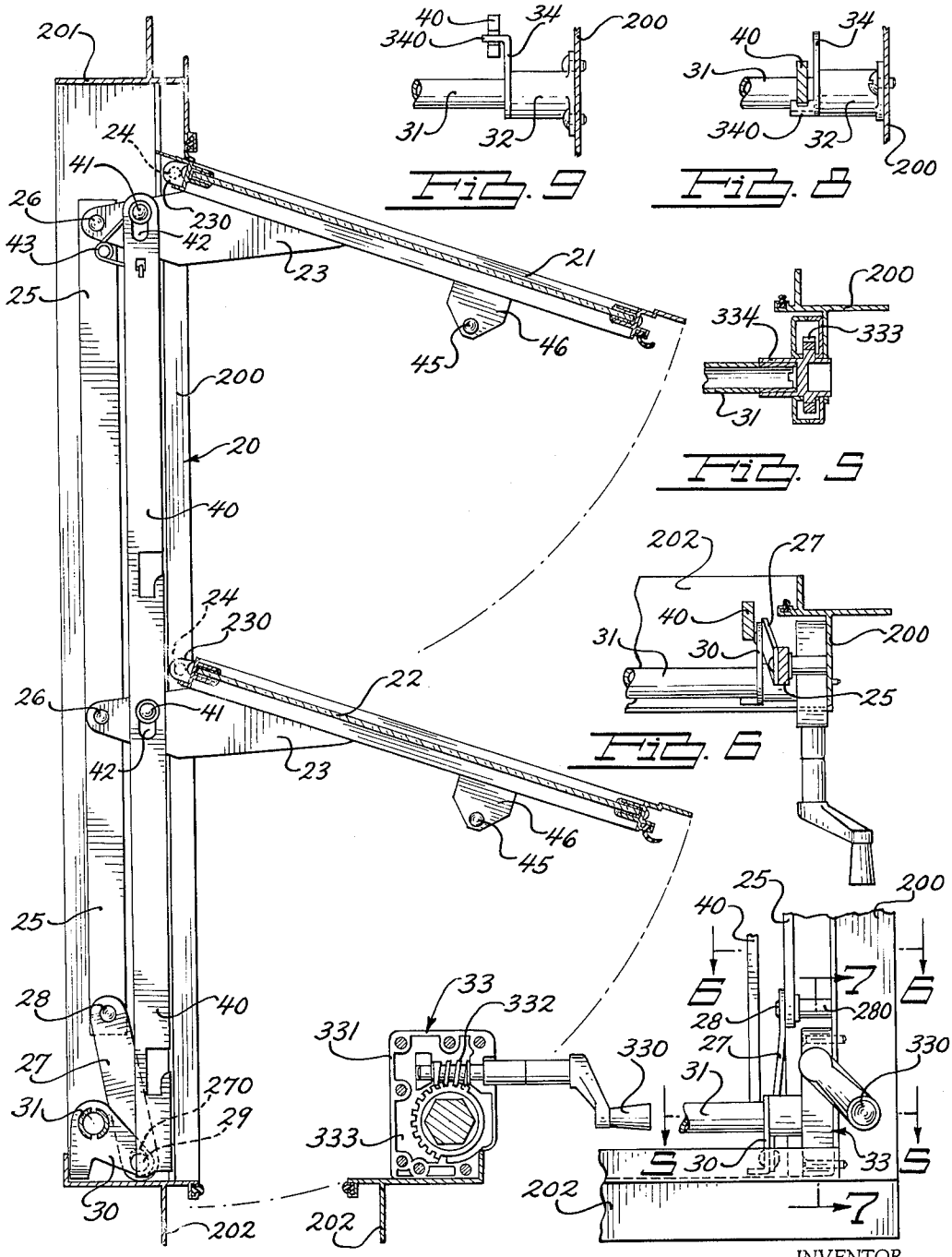
Fig. 2

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SELF-LOCKING AWNING TYPE METAL WINDOWS

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SELF-LOCKING AWNING TYPE METAL WINDOWS

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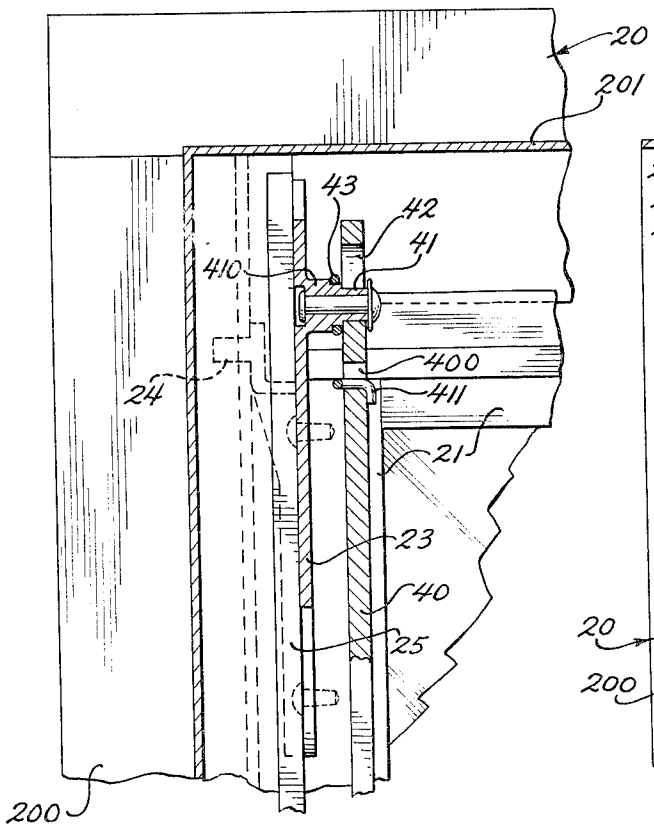
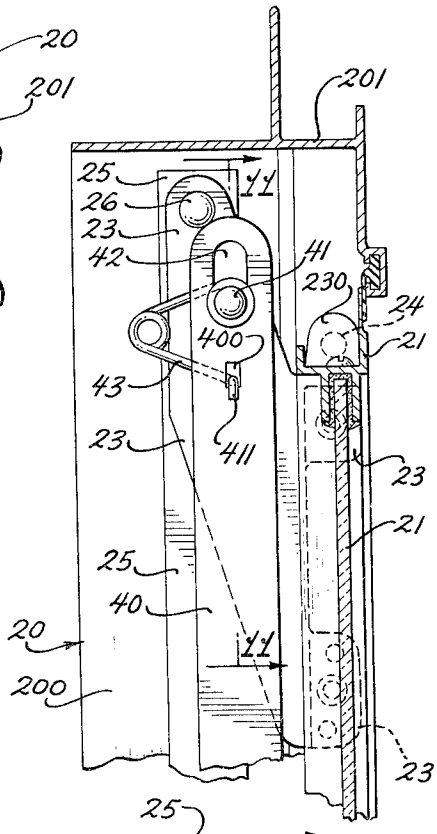


Fig. 11



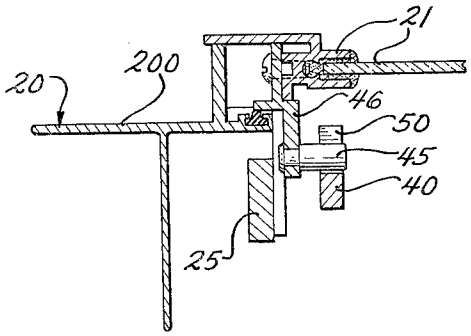


Fig. 12

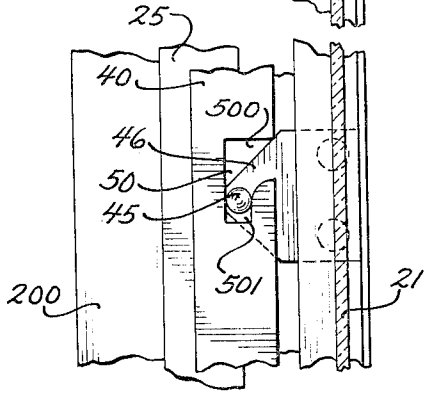


Fig. 10

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SELF-LOCKING AWNING TYPE METAL WINDOWS

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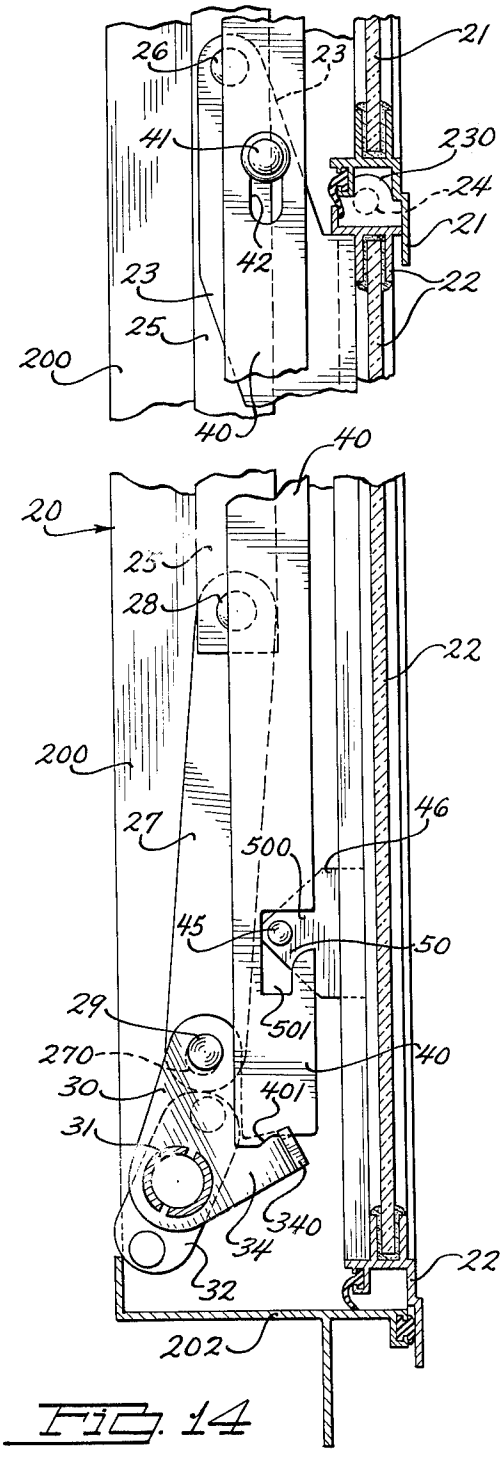


FIG. 14

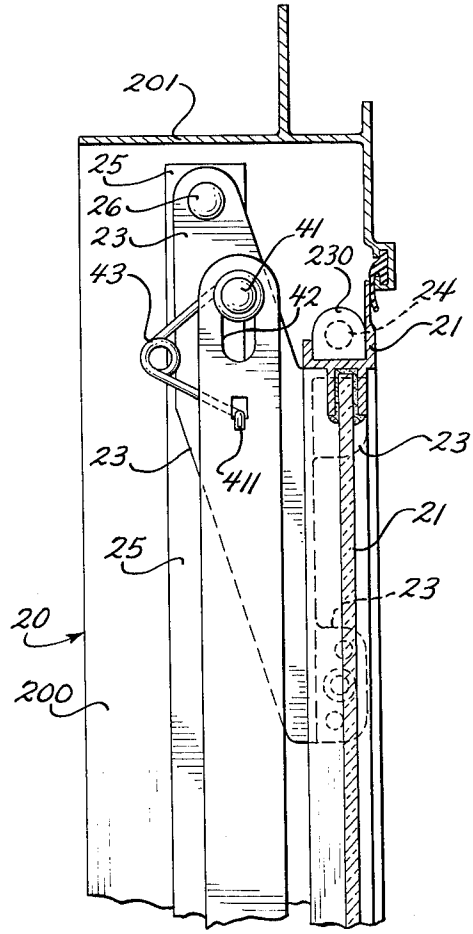


FIG. 13

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SELF-LOCKING AWNING TYPE METAL WINDOWS

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Filed Aug. 19, 1964, Ser. No. 390,606
2 Claims. (Cl. 49—85)

This invention relates to improved and simplified self-locking awning type metal windows in which the opening and closing thereof by conventional hand-cranked or power operated window regulator means locks and unlocks respectively locking means incorporated in the window opening and closing mechanism employed.

It is the primary object of the invention to provide improved and simplified self-locking awning type metal windows employing inexpensive yet positive operating window opening and closing mechanism which automatically locks the window responsive to continued closing movement of the window regulator means employed to open and close the window, and which automatically unlocks the window responsive to the initial movement of the said conventional window regulator means prior to opening the window therewith.

Other objects of the invention will become apparent by reference to the following detailed description taken in connection with the accompanying drawings, in which:

FIG. 1 is an inside elevational view of an awning type window embodying the invention with the sash shown in their closed and locked position.

FIG. 2 is a vertical sectional view taken on the line 2—2 of FIG. 1.

FIG. 3 is a vertical sectional view similar to FIG. 2 except that the sash are shown in their open position.

FIG. 4 is a fragmentary elevational view of the construction shown in the lower right hand corner of FIG. 1 except that the window regulator has been turned to its unlocked open position.

FIG. 5 is a horizontal sectional view taken on the line 5—5 of FIG. 4.

FIG. 6 is a horizontal sectional view taken on the line 6—6 of FIG. 4.

FIG. 7 is a vertical sectional view taken on the line 7—7 of FIG. 4.

FIG. 8 is a fragmentary sectional view taken on the line 8—8 of FIG. 2.

FIG. 9 is a fragmentary sectional view taken on the line 9—9 of FIG. 2.

FIG. 10 is an enlarged vertical sectional view similar to the upper portion of FIG. 2.

FIG. 11 is a vertical sectional view taken on the line 11—11 of FIG. 10.

FIG. 12 is an enlarged horizontal sectional view taken on the line 12—12 of FIG. 1 showing a preferred keeper pin assembly as attached to the sash frame.

FIG. 13 is an enlarged fragmentary vertical sectional view similar to FIG. 2 showing the upper portion of the window with the upper sash closed and with the locking bar disposed in its unlocked position.

FIG. 14 is an enlarged fragmentary vertical sectional view similar to FIG. 2 showing the central and lower portions of the window with the locking bar and lever means disposed in their unlocked position.

Referring now to the drawings wherein like reference numerals refer to like and corresponding parts throughout the several views, self-locking metal window construction of the invention is disclosed herein in connection with a conventional awning type window consisting of a window frame 20 having jambs 200, a head 201 and a sill 202 into which frame upper and lower glazed sash elements 21 and 22 respectively are pivoted. Hinge arms 23 are fixed on each side of said sash elements 21 and 22 and carry hinge pins 24 at the ear 230 thereof by means of which the said sash elements 21 and 22 are pivoted substantially at the top thereof to the jambs 200 of the window frame 20.

A sash operator bar 25 at each jamb 200 is pivotally connected by a pivot 26 to the upper portion of the hinge arms 23 adjacent each said jamb 200. The bottom of the sash operator bars 25 at each said jamb 200 is linked by a link 27 and pivots 28 and 29 to an operator lever 30 non-rotatably fixed on the torsion bar 31 rotatably mounted at one end in a suitable bearing means 32 fixed to one window jamb 200. The pivot 28 terminates in a laterally disposed spacer pin 280, the outer end of which abuts the jamb 200, see FIG. 1. The other end of the torsion bar 31 is mounted in and the said torsion bar 31 is rotated by a convention crank type window regulator means 33 fixed to the other window jamb 200. The turning of the crank 330 of the window regulator means 33 opens and closes the sash elements 21 and 22 simultaneously. So much of the self-locking metal window construction employing the instant invention is conventional, and, it is contemplated that the self-locking features of the invention hereinafter described may be employed with the foregoing or other more or less conventional awning type metal windows.

Although, not a part of the instant invention, a conventional crank type window regulator means 33 that may be employed therewith is shown in the drawings, and in particular in FIGS. 4, 5, 6 and 7. The said window regulator means 33 consists of a housing 331, a worm gear 332 turned by a crank 330 driving a pinion gear 333 having an integral shaft 334 suitably keyed to the torsion bar 31 onto which the operator lever 30 is non-rotatably fixed. Obviously, other window regulator means may be employed.

Adjacent to but spaced from each sash operator bar 25 is a locking bar 40 which is slidably and pivotally connected to the adjacent hinge arms 23 of the upper and lower sash elements 21 and 22 by locking bar pivot means 41 extending from each said hinge arm 23 through vertically slotted apertures 42 provided in the upper and central portion of each said locking bar 40. A suitable torsion spring 43 is looped at one end around the shank 410 of the upper locking bar pivot means 41 and is hooked at 411 through a suitable aperture 400 provided in the locking bar 40, all as best shown in FIGS. 10 and 11. The vertically slotted apertures 42 in the locking bars 40 permit them to move vertically in respect to the pivot means 41 provided on the hinge arms 23, and the torsion springs 43 urge the said locking bars 40 downwardly at all times.

Each side of each of the upper and lower sash elements 21 and 22 is provided with a keeper pin 45 mounted on a gusset 46 extending rearwardly from said sash elements. Said keeper pins 45 are disposed parallel to the plane of said sash elements. The said keeper pins 45 are located to enter the upper open horizontal end 500 of the L-shaped bayonet slots 50 formed in the locking bars 40 when the sash elements 21 and 22 are closed by the window regulator 33. This is best shown in FIG. 14 wherein the window elements 21 and 22 have been moved to their closed position and the lower keeper pin 45 carried by the lower sash element 22 has entered the upper open horizontal end 500 of the lowermost bayonet slot 50 in the locking bar 40. Although not shown in FIG. 14, the upper keeper pin 45 of the sash element 21 has entered the upper open horizontal end 500 of the uppermost bayonet slot in the locking bar 40.

Each operator lever 30 has a locking arm 34 extending therefrom disposed in the proper angular relationship with respect thereto so as to engage a cam surface 401 of a locking bar 40, see FIG. 14. After the sash elements

21 and 22 have been moved to their closed position by the action of the operator lever 30 turned by the turning of the crank 330 of the window regulator 33, each operator lever 30, locking arm 34, and locking bar 40 assume the position shown in FIGS. 13 and 14 with the keeper pin 45 carried by each sash 21 and 22 disposed in the upper open horizontal end 500 of a bayonet slot 50 in the locking bar 40.

By reference to FIGS. 8 and 9, it will be observed that the locking arm 34 extending from each operator lever 30 is preferably provided at its outer end with suitable U-shaped guide means 340 disposed normal thereto, which U-shaped guide means receives the cam 401 formed at the lower end of the locking bar 40. Constant contact between the locking bar 40 and the locking arm 34 of the operator lever 30 after the sash elements 21 and 22 are closed is assured by virtue of the constant urging of the locking bar 40 downwardly by the torsion spring 43 into contact with the U-shaped guide means 340 at the outer end of the locking arm 34 of the operator lever 30.

Continued turning of the crank 330 of the window regulator 33 after the sash elements 21 and 22 have been completely closed as shown in FIGS. 14 and 15 continues to move the operator lever 30 beyond its closed position shown in FIG. 14 to its sash locked position shown in FIG. 2. To permit this motion to occur, the lowermost aperture 270 in the link 27 at the pivot 29 between the link 27 and the operator lever 30 is suitably elongated. The aforesaid continued movement of the operator lever 30 causes the locking arm 34 thereof to lift the locking bar 40 upwardly against the downward spring pressure of the torsion spring 43 until each keeper pin 45 becomes disposed in the bottom of the lower vertical closed end 501 of the bayonet slots 50 of the locking bars 400, see FIG. 2. It now is impossible to open the upper and lower sash elements 21 and 22 without release of the keeper pins 45 from the locking bars 40.

By reversing the direction of turning the crank 330 of the window regulator 33, the operator lever 30 is moved clockwise from the position shown in FIG. 2 to the position shown in FIG. 14 which unlocks the sash 21 and 22, and, further turning of the crank 330 of the window regulator 33 in the same reversed direction moves the operator lever 30 further clockwise to its position shown in FIG. 3 wherein the sash 21 and 22 are pivoted to their fully open position responsive to downward movement of the sash operator bar 25 which is connected by the link 27 to the operator lever 30.

Thus, the invention provides a positive sash locking mechanism useable with conventional sash operating mechanism for awning type windows which positively locks each sash element in its closed position, is inexpensive to manufacture and install, requires substantially no maintenance, and which makes extremely difficult if not substantially impossible, the otherwise easy breaking and entering into establishments through conventional awning type windows.

Although but a single embodiment of the invention has been disclosed in detail herein, it is obvious that many changes may be made in the size, shape, arrangement and detail of the various elements of the invention, all without departing from the spirit and scope thereof as defined by the appended claims.

I claim:

1. In a self-locking metal window construction including a window frame, vertically aligned sash elements, hinge arms on the sides of said sash element, hinge pins carried by the hinge arms pivotally mounting said sash at the top thereof to said window frame, a sash operator bar pivotally connected to said hinge arms on each side of said sash, and sash operator mechanism including a torsion bar mounted on said window frame, lever means fixed on said torsion bar, and a link and pivot means connecting the lower end of each said sash operator bar and said lever means, and window regulator means for turning said torsion bar to open and close said sash,

a locking bar on each side of said sash having vertically spaced elongated apertures therein,

pivot means on and extending from said hinge arms disposed through said elongated apertures in said locking bars pivotally connecting each said locking bar to adjacent hinge arms permitting limited longitudinal movement of said locking bars in respect to said hinge arms at said pivot means,

said locking bars being supported on said pivot means extending from said hinge arms,

spring means on said upper pivot means extending from said hinge arms engaging said locking bars constantly urging the same downwardly in respect to said pivot means,

the turning of said torsion bar in one direction moving said lever means thereon to raise said operator bar whereby to pivot said sash to its closed position,

a locking arm extending from each said lever means engaging each said locking bar upon the pivoting of said sash to its closed position,

continued movement of said lever means by said window regulator after said sash is closed causing each said locking arm to move said locking bar into locking engagement with said sash whereby to maintain said sash in its closed position,

the link and pivot means between said sash operator bar and said lever means being formed to provide lost motion longitudinally of said link whereby to permit said continued movement of said lever means.

2. In a self-locking metal window construction including a window frame, vertically aligned sash elements, hinge arms on the sides of said sash element, hinge pins carried by the hinge arms pivotally mounting said sash at the top thereof to said window frame, a sash operator bar pivotally connected to said hinge arms on each side of said sash, and sash operator mechanism including a torsion bar mounted on said window frame, lever means fixed on said torsion bar, and a link and pivot means connecting the lower end of each said sash operator bar and said lever means, and window regulator means for turning said torsion bar to open and close said sash,

a locking bar on each side of said sash having vertically spaced elongated apertures therein,

pivot means on and extending from said hinge arms disposed through said elongated apertures in said locking bars pivotally connecting each said locking bar to adjacent hinge arms permitting limited longitudinal movement of said locking bars in respect to said hinge arms at said pivot means,

said locking bars being supported on said pivot means extending from said hinge arms,

spring means on said upper pivot means extending from said hinge arms engaging said locking bars constantly urging the same downwardly in respect to said pivot means,

the turning of said torsion bar in one direction moving said lever means thereon to raise said operator bar whereby to pivot said sash to its closed position,

a cam surface formed on the lower end of each said locking bar,

a locking arm extending from each said lever means contacting each said locking bar cam surface upon the pivoting of said sash to its closed position,

keeper pins carried on each end of each said sash extending parallel to the plane of said sash and spaced inwardly therefrom located to be engaged by said locking bar,

continued movement of said lever means by said torsion bar responsive to said window regulator after said sash is closed causing each said locking arm to move along the cam surface of said locking bar whereby to raise said locking bar into engagement

with said keeper pins and lock said sash in its closed position,

the link and pivot means between said sash operator bar and said lever means being formed to provide lost motion longitudinally of said link whereby to permit said continued movement of said lever means,

said locking arm bearing on the cam surface of said locking bar when said sash is locked in its closed position constantly urging the lower end of said locking bar inwardly with respect to said window frame,

each said locking bar having a bayonet cam slot therein opposite each said keeper pin for receiving the same when said sash is closed,

the said locking bar engaging said keeper pins at said bayonet cam slot after said sash is closed and said locking bar is raised.

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