March 11, 1969 Y. W. EHRET ETAL 3,431,677

SASH RELEASE MECHANISM

Filed Oct. 12, 1967 Sheet 1 of 2

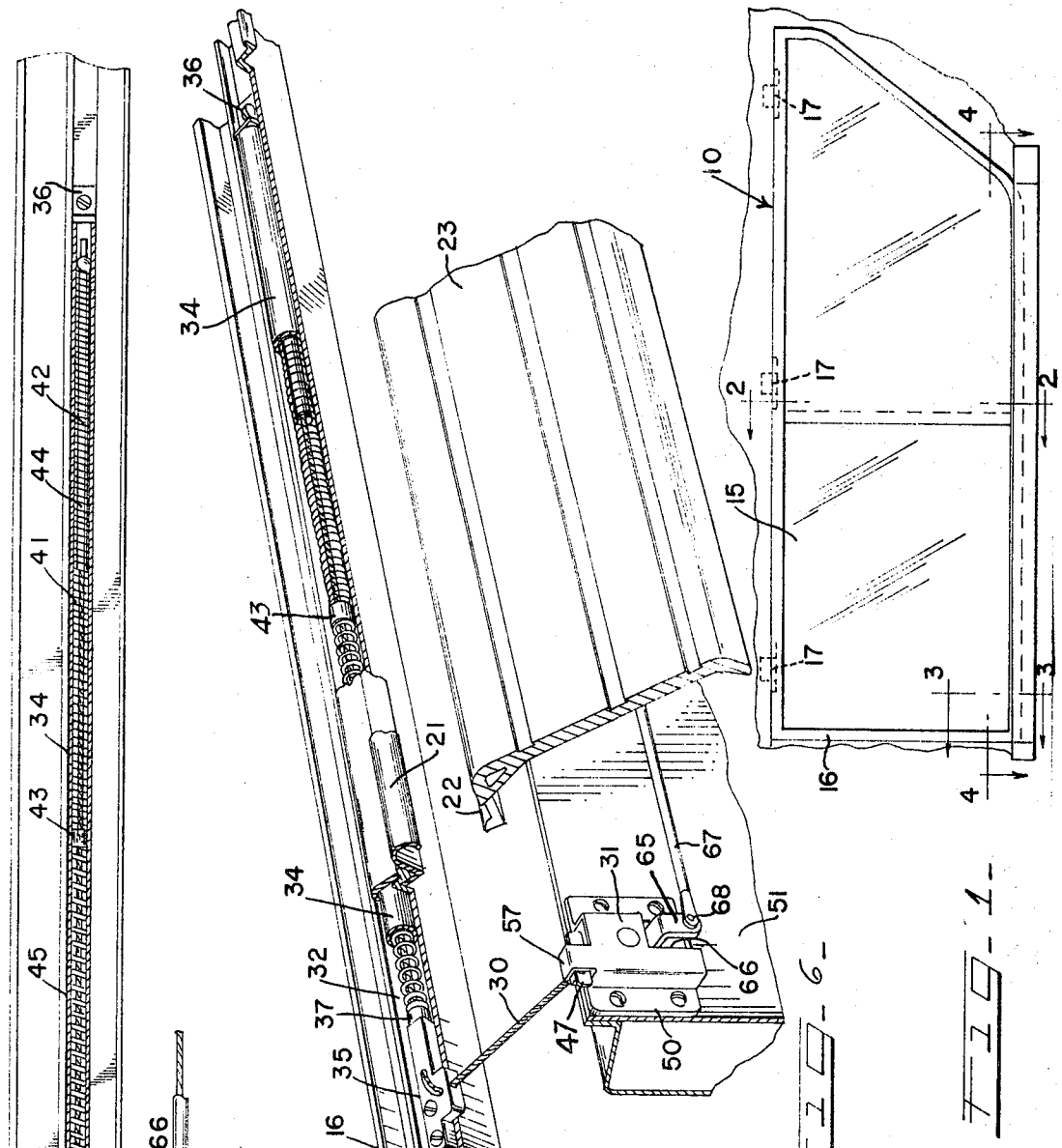


FIG. 4

FIG. 6

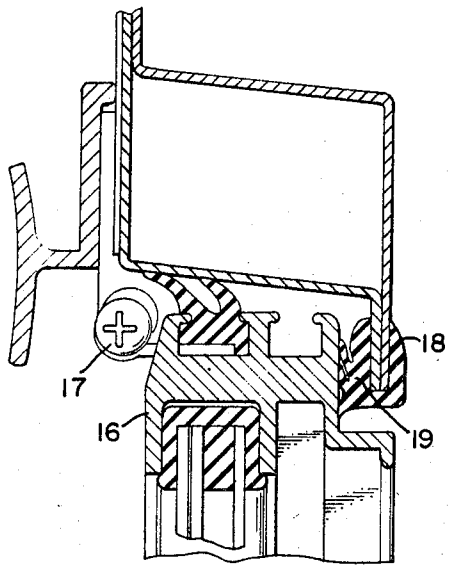
FIG. 1

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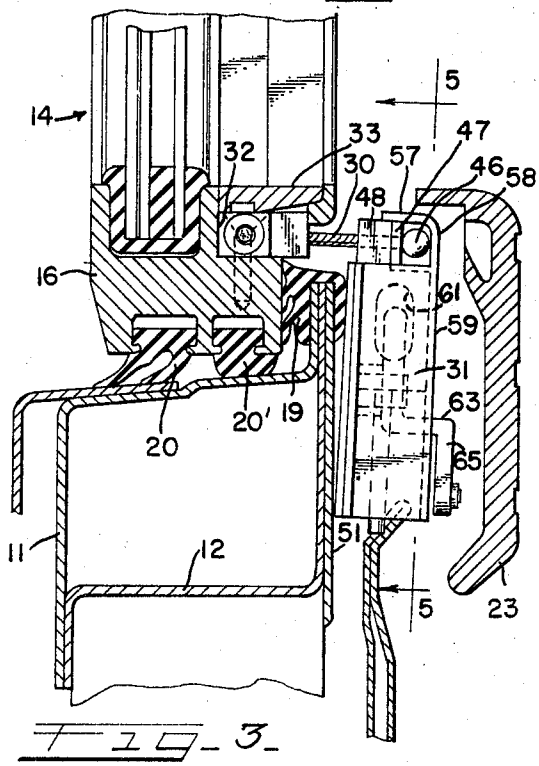


FIG. 3

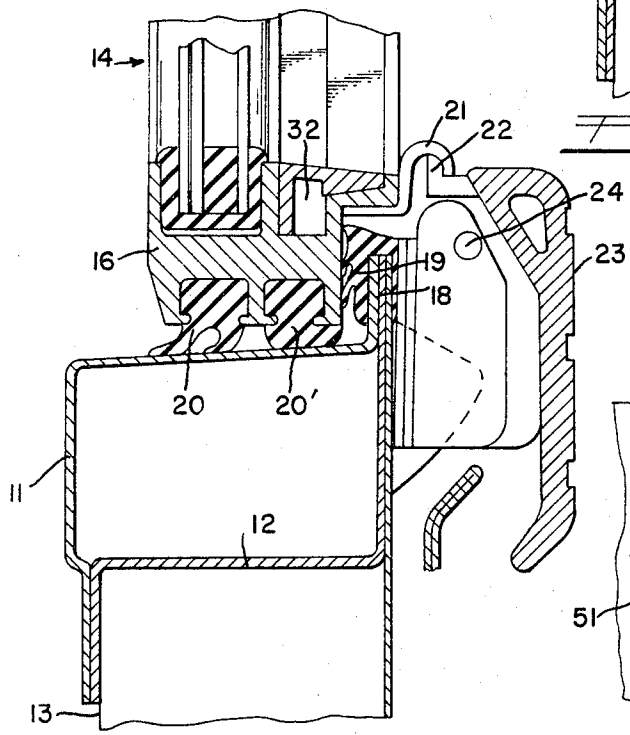


FIG. 2

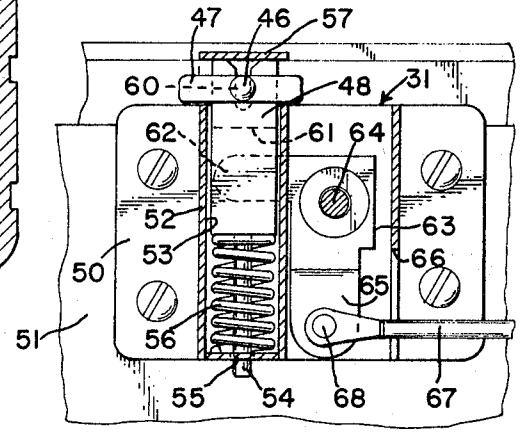


FIG. 5

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SASH RELEASE MECHANISM

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U.S. Cl. 49—141 9 Claims
Int. Cl. E05c *15/02;* E05b *65/10*

ABSTRACT OF THE DISCLOSURE

A secondary release mechanism for an escape sash in a bus or other vehicle wherein the sash is mounted in the wall opening so as to pivot outwardly on hinges located at the top edge and is normally held closed by a locking bar pivoted on the frame in which the sash is mounted and having hooks which engage keepers on the lower edge of the sash, the release mechanism including a pull cord operated lock on the sash mounting frame and a cable having one end connected to the sash and the other end releasably connected to the lock, the cable connection with the sash limiting the movement of the sash to a predetermined, partially open position when the sash is released by the locking bar and a further manual operation being required to disconnect the cable and permit the sash to swing free for maximum opening.

This invention relates to hardware for closure panels which are pivotally mounted in openings in a vehicle wall or the like and is more particularly concerned with improvements in release mechanism for use in conjunction with vehicle escape sash.

It has been the practice in designing busses, trains and like vehicles to provide one or more individual sash assemblies along the sides of the vehicle which serve as escape sash. In one such arrangement the escape sash is hinged or otherwise pivotally mounted at its upper edge so that it can be swung out of the window opening to provide an emergency exit, the unhinged or free edge thereof being normally maintained in a closed and weathertight condition by a manually releasable lock or latching means. A release mechanism for the lock or latching means is located below the sash adjacent the passengers in the seats which can be easily operated by one person to permit an emergency escape from the vehicle should it become necessary. A relatively simple lock or latching means is employed and in one form thereof the lock or latch is released by swinging movement of a hingedly mounted section of a trim strip which normally extends along the lower edge of the opening in which the sash is mounted. In the operation of vehicles having this or similar type escape sash as a safety feature, it has been found that when a crash occurs an escape sash may be prematurely opened by the impact or by manual operation of the release mechanism, and there is sometimes increased passenger injury due to passengers falling or being thrown out of a window opening while the bus is rolling or the like. This has made it desirable to provide some arrangement for preventing the sash from opening fully when it is released either due to impact or panic on the part of a passenger. Accordingly, it is an object of the present invention to provide a mechanism to supplement the normal locking or latching mechanism of an escape sash so as to prevent the sash from opening fully when the release mechanism is operated and requiring an additional manual operation to permit full opening of the sash for passenger exit.

It is a more specific object of the invention to provide an escape sash assembly for a vehicle or the like wherein the sash is mounted so that it can be swung outwardly of

the vehicle with a lock or latch normally holding it in closed position which may be released manually and a supplemental holding device which normally operates to permit only partial opening of the sash and which supplemental holding device may thereafter be operated manually to fully release the sash for further outward swinging movement so that it may be opened sufficiently to serve as an emergency exit.

It is another object of the invention to provide an escape sash assembly for a vehicle wherein the sash is mounted for swinging movement about its uppermost edge and normally held in closed position by a manually operable lock mechanism located at the free edge of the sash and wherein there is provided a mechanism for preventing the opening of the sash beyond a certain point when the lock mechanism is released with the secondary mechanism being manually releasable so as to permit full opening of the sash and incorporating a shock absorbing feature.

Another feature of the invention is the provision of an escape sash for vehicles wherein the sash is hinged, preferably at the top edge, in a wall opening and provided with mechanism for manually controlling from inside the vehicle the extent to which the sash may be opened by an initial manual release of a latch or lock mechanism which enables the sash to hinge outwardly a limited distance where the opening movement is arrested by a cable member having a shock absorbing connection with the sash at one end and at the other end having a separable connection with an anchoring mechanism mounted in fixed relation adjacent the latch release mechanism which anchoring mechanism is operable by a pull cord to free the cable end and permit full opening of the sash.

These and other objects and advantages of the invention will be apparent from a consideration of the vehicle sash structure which is shown by way of illustration in the accompanying drawings wherein:

FIGURE 1 is a side elevation of a vehicle mounted escape sash and release mechanism therefor, the view being taken from the inside of the vehicle in which the sash is mounted;

FIGURE 2 is a cross section taken on the line 2—2 of FIGURE 1 to an enlarged scale and with portions broken away;

FIGURE 3 is a section taken on the line 3—3 of FIGURE 1 to an enlarged scale and with portions broken away;

FIGURE 4 is a horizontal section taken on the line 4—4 of FIGURE 1 to an enlarged scale and with portions broken away;

FIGURE 5 is a cross section taken on the line 5—5 of FIGURE 3, to an enlarged scale; and

FIGURE 6 is a perspective view with portions broken away showing the secondary release mechanism holding the sash in partially open condition.

Referring to the drawings, there is illustrated an escape sash which is mounted in the wall of a vehicle and which incorporates the release mechanism of this invention. The sash assembly **10** comprises a mounting or supporting frame **11** set in an opening **12** in a vehicle wall **13** and a sash **14** which contains a horizontally slidable panel **15** mounted in the sash frame **16**. The sash frame **16** is connected at its upper edge by hinge members **17** with the mounting frame **11** and when positioned in closed relation an inner face thereof is in substantial abutment with the outer face of an inner flange **18** of the mounting frame **11**, there being an interposed weatherseal **19**. The sash frame **16** is provided with a sealing gasket **20** extending about the periphery thereof and engageable with the opposed face of the supporting or mounting frame **11**, and a bottom edge spacer or support strip **20'**.

The sash **14** is locked or latched in closed position in the frame **11** by hook-shaped elements **21** carried in spaced relation along the bottom of the sash frame **16** as shown in FIGURE 2 which are engaged by co-operating latch members **22**, formed by cutting away portions of the bead on the top edge of a bar **23** which extends along the bottom edge of the opening **12** and constitutes a section of the inside trim for the vehicle. The trim section or bar **23** is pivotally mounted at **24** at opposite ends of the sash assembly and serves to cover the lower edge of the frame **16** and the top edge of the frame **11**. The trim strip **23** is of substantial width and is adapted to be mounted so that it may be grasped along the lower edge and swung upwardly to disengage the latch members **22** and the hook formations **21** allowing the sash to be swnug out on its hinges **17**. The pivots **24** may be provided with torsion springs (not shown) or other suitable resilient means normally holding the bar **23** in position shown in FIGURE 2. Also, if desired, the trim member or bar **23** may be provided with portions (not shown) spaced longitudinally of the hook engaging latch members **22** which are adapted to engage with keeper plates (not shown) on the sash for use in camming the sash open.

The secondary or supplemental release mechanism for the sash comprises a cable **30** (FIGURES 3 and 4) which is anchored in the sash frame **16** with a free end releasably held by a lock assembly **31**, duplicate mechanisms being preferably mounted adjacent opposite ends of the lower sash frame member when the sash is of substantial length. The mechanism for anchoring the cable **30** is enclosed in an upwardly opening recess **32** which extends along the inner portion of the sash frame **16** and which is covered by a filler strip **33** retained in the top of the recess **32** by any suitable fastening means. The cable anchoring mechanism comprises a housing forming outer tube **34** which extends between a guide block **35** and an angle bracket **36**, both of which are secured in the recess **32** by screws or other suitable fasteners. The one end of the tube **34** telescopes over a small flange formation **37** extending from an end face of the guide block and communicates with a right angled guide slot **38** in the block **35** for accommodating the cable **31**. The tube **34** is, of course, concealed in the recess **32** by the filler strip **33**. The end of the cable **31** is anchored at **40** to the end of a relatively soft coiled spring **41** which encompasses the end section **42** of the cable **31** and extends to a collar member **43** normally spaced a predetermined distance from the end of the cable **31** and slidable on the latter. A relatively short section of tubing **44** is telescoped over the end section **42** of the cable **31**, which tubing **44** is of lesser length than the spring **41** when the latter is free of compressive force. A relatively stiff coiled spring **45** extends between the collar member **43** and the flange formation **37** on the guide block **35** which limits the movement of the tube **44** and functions as a shock absorber. The free end of the cable **31** carries a terminal ball **46** and cross bar **47** with the latter adapted to be engaged in releasable relation with the forked end of a vertically extending clamping bar **48** constituting part of the lock mechanism **31** for the secondary release.

The lock mechanism **31** is mounted on the frame **11** at the edge of the opening **12** and is concealed by the trim strip or release bar **23**. The lock mechanism **31** includes a base plate **50** which is secured by screws or any other suitable means to the inside face **51** of the frame **11** and a housing **52**. A rectangular compartment **53** is formed in one side of the housing in which the lock bar **48** is mounted for vertical sliding movement. The lock bar **48** has a pin **54** depending from the bottom end which is slidable in a bore **55** in the bottom wall of the housing **52**. A compression spring **56** surrounds the pin **54** and urges the bar **48** toward an upwardly extended position. The upper end of the bar **48** is adapted to abut

against a stop member **57** formed by the turned over end of an extension **58** on the wall **59** of the housing **52** which is opposite the base plate **50**. The upper end of the bar **48** is of reduced thickness and is slotted at **60** to receive the end of the cable **31**, with the cross bar **47** trapped between the end of the bar **48** and the wall extension **58** when the bar **48** is in extended position (FIGURE 3). Intermediate its top and bottom ends the bar **48** is recessed at **61** to receive one arm **62** of a bell crank control lever **63**. The lever **63** is pivoted at **64** in the housing **52** with the other arm **65** offset relative to the plane of the arm **62** so as to extend outside an opening **66** in the wall **59** of the housing **52**. A pull cord **67** has one end connected at **68** to the free end of the arm **65** and the other end anchored to a fixed portion of the vehicle frame or connected to the corresponding arm on a lock mechanism **31** at the other end of the sash opening **12** so that a pull on the cord **67** will swing the crank lever **63** so as to retract the lock bar **48** against the force of the compression spring **56** and free the end of the cable **31**.

The sash is normally held in closed position by the engagement of the latch members **22** with the hooks **21** on the sash frame. To break this connection and release the sash for outward swinging movement the lower edge of the trim bar **38** is grasped and the bar is pivoted upwardly to disengage the latch members **21** and **22**. The sash may then be swung outwardly on the hinges **17** to a partially open position. The secondary release cable **30** will extend only the amount permitted by spring **41**. If the sash is swung out with considerable force the spring **45** will act as a shock absorber and prevent breaking of the mechanism. The secondary release cable **30** prevents full opening of the sash. The end of the cable **30** is disconnected by pulling on the cord **67** so as to retract the lock bar **48**. This releases the sash for full opening movement. When it is desired to close the sash, after it has been opened, the end of the cable **30** is manually engaged with the lock mechanism **31** and the sash is closed by engaging the primary latch members **21** and **22**.

While particular materials and specific details of construction are referred to in describing the form of the apparatus illustrated it will be understood that other materials and equivalent structural details may be resorted to within the spirit of the invention.

We claim:

1. In a window construction for a vehicle comprising a sash assembly having a generally rectangular sash frame mounted for swinging movement in a supporting frame and a releasable latch mechanism disposed inside the vehicle for normally holding the sash frame in closed position in the supporting frame, a secondary release mechanism disposed inside the vehicle which includes a movement limiting cable member having means permanently anchoring one end thereof to the sash frame and means separably connecting the other end to the supporting frame, said anchoring means permitting the cable member to extend a predetermined limited amount when the sash frame is released for opening movement by operation of said latch mechanism thereby permitting free outward swinging movement of the sash to a predetermined partially open position, and means for thereafter manually operating said separable connecting means to free the end of the cable which is connected to the supporting frame so as to permit full opening of the sash.

2. In a window construction as recited in claim **1**, and said means for separably connecting the end of the cable to the supporting frame comprising a pull cord actuated lock mechanism.

3. In a window construction as recited in claim **1**, and the means for separably connecting the end of the cable to the supporting frame comprising a lock mechanism having a sliding lock bar with a cable end retaining means and a manually actuable bar moving means.

4. In a window construction as recited in claim **1** and the means for separably connecting the end of the cable to the supporting frame comprising a lock mechanism normally concealed by said latch mechanism, and means adapted to be quickly grasped for manually operating said lock mechanism.

5. A window construction comprising a sash hingedly mounted in an opening in a supporting wall, manually operable, readily releasable primary means for latching the sash when in closed position, manually operable, readily releasable secondary means connecting the sash and the supporting wall which is accessible on the inside of the wall only when the sash is unlatched by operation of said primary means and which is operable to releasably hold the sash against opening beyond a relatively small, predetermined distance, and said secondary means being thereafter manually operable to disconnect the sash for unlimited hinging movement.

6. A window construction as set forth in claim **5** and said secondary means including a cable having one end permanently connected to the sash and a lock forming mechanism fixed on the supporting wall and releasably engaging the other end of the cable, which lock forming mechanism is inaccessible for operation when said sash is latched.

7. A window construction as set forth in claim **5** and said secondary means including a cable having one end extending into a housing on the sash and connected to a coiled spring, a latch bar on the supporting wall and associated mechanism for normally holding said latch bar in engagement with the other end of said cable so as to limit the opening of the sash, and means for operating the latch bar to release the end of the cable so that the sash is free to swing to fully open position, which operating means is inaccessible for operation when said sash is latched.

8. In a window construction wherein a sash is hinged for swinging movement in a wall opening, a mechanism for normally limiting the opening movement of the sash which mechanism is releasable to free the sash for movement to a fully open position, said mechanism comprising an elongate tubular housing mounted on the sash in parallel relation with the hinged connection between the sash and the wall and extending along a free edge of the sash, a guide block at the end of the housing having a guideway and a cable member extending through the guideway with one end extending into said housing and having its end connected to the remote end of a coil spring assembly which encompasses the end of the cable member, the other end of the cable member having an enlargement adapted for releasable engagement with a lock mechanism, and a lock mechanism on said wall adjacent the opening for the sash, which lock mechanism includes a spring pressed lock bar for releasably engaging the enlargement on the end of the cable, a pivotally mounted lever for retracting the lock bar to disengage the lock bar and the end of the cable, and a pull cord operator connected to said lever.

9. In a window construction as set forth in claim **8** and said coil spring assembly comprising a light compression spring encompassing the end of the cable, a heavy compression spring encompassing a portion of the cable intermediate the ends thereof and having one end seated against said guide block and a collar separating the two spring members which is freely slidable on the cable.

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DENNIS L. TAYLOR, *Primary Examiner.*

U.S. Cl. X.R.

292—264

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

March 11, 1969

Patent No. 3,431,677

Yale W. Ehret et al.

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 16, "swnug" should read -- swung --; same column 3, lines 45, 48, 50, 52 and 58, and column 4, lines 5 and 21, "cable 31", each occurre should read -- cable 30 --.

Signed and sealed this 31st day of March 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR
Commissioner of Patents