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Noga

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[54] **ROLLER CAM LATCH FOR WINDOW**

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[73] Assignee: **Rohr Industries, Inc.,** Chula Vista, Calif.

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[51] **Int. Cl.** **E05c 17/10**

[58] **Field of Search** 292/23, 9, 252, 261, 341.12, 292/341.15, 341.17, 92

[56] **References Cited**

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[57] **ABSTRACT**

A latching flange extending laterally inwardly along the lower edge of a hinge-suspended window is positioned to enter between a pair of cam actuated latch rollers which are journaled on laterally outwardly spring biased members to ride between a pair of laterally outwardly converging cam surfaces. The cam pressed rollers grip the flange when introduced therebetween and prevent its withdrawl, thereby holding the window closed. Manually drawing the spring biased members and its rollers inwardly frees the rollers from the cams and permits the flange to be withdrawn and window to be opened. For releasing the flange from the exterior of the vehicle for automatic window washing a spring biased rail is provided exteriorly of the vehicle, and a roller, rolling along this rail, moves the rollers inwardly to flange releasing position.

6 Claims, 2 Drawing Figures

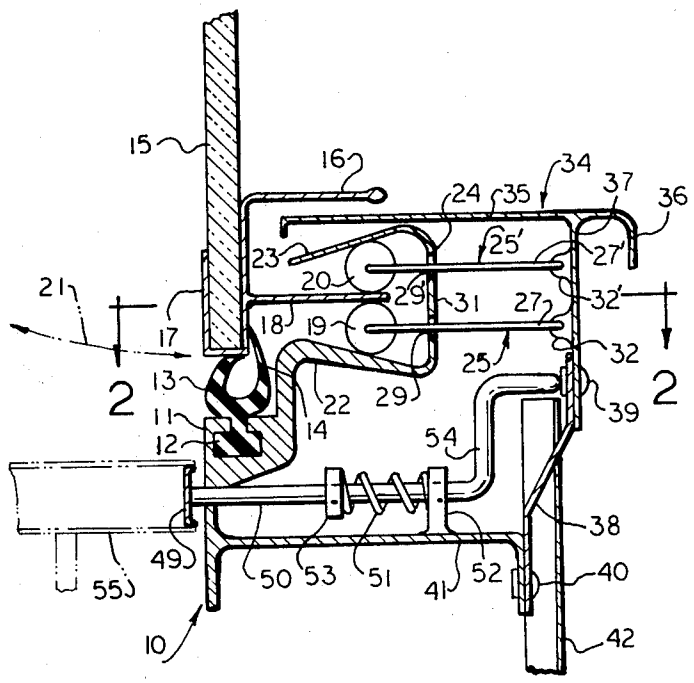
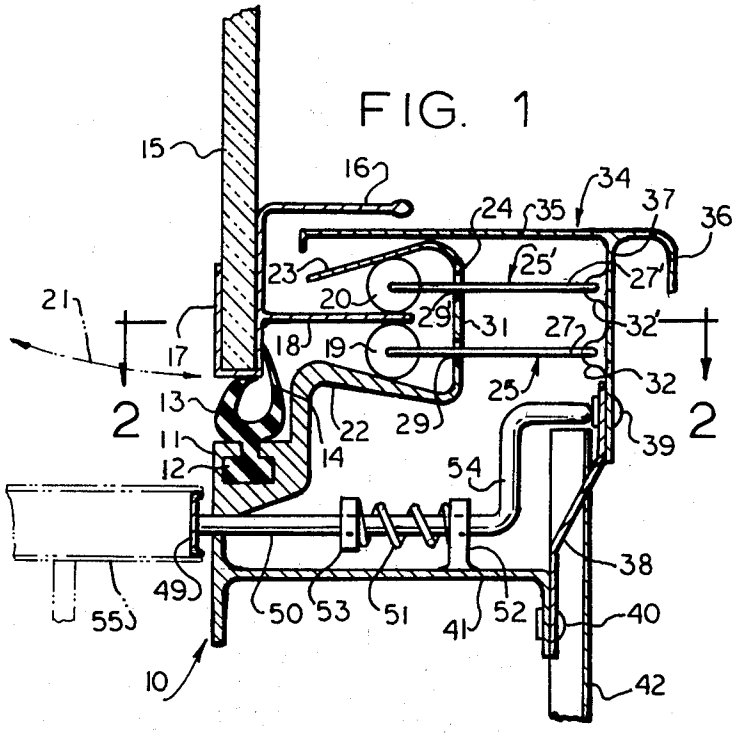


FIG. 1


15
16
34
24
35
37
36
23
25'
27'
21
20
29
31
27
32'
17
18
19
25
32
2
13
22
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49
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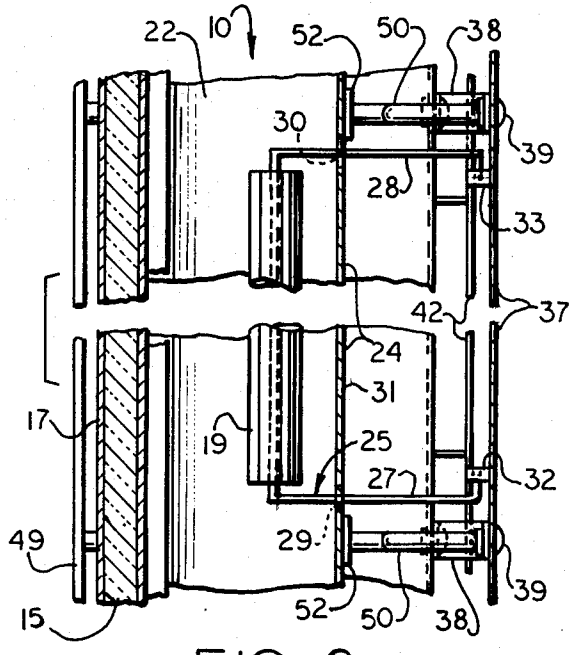

22
10
52
50
38
30
39
28
33
42
37
24
31
17
19
25
27
32
49
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39
15
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50
38

FIG. 2

ROLLER CAM LATCH FOR WINDOW

BACKGROUND OF THE INVENTION

A hingedly suspended window designed primarily for use in a transportation type vehicle, such as a bus or train car, is disclosed and claimed in co-pending U. S. Pat. application, Ser. No. 267,427, filed 6/29/72, by K. W. Tantlinger and assigned to the assignee of the present invention. The window of the foregoing application comprises a single sheet of suitable transparent material, such as, for example, glass, and is hingedly suspended from its upper edge. In use it is mandatory that the windows remain securely closed under relatively high loads, as in the event of a collision, and still be easy to release for cleaning or emergency escape. A roller cam latch based on the same scientific principle as the present invention, but different in many respects, is disclosed in co-pending U. S. Pat. application, Ser. No. 294,959, by Charles C. Hill, filed of even date herewith and assigned to the assignee of the present invention. The latch of the present invention is particularly effective for use on such window, and may also be used on other types of hingedly mounted windows.

PURPOSE OF THE INVENTION

A primary objective of the present invention is to provide a simple, positive cam-roller latch for use on a hingedly suspended window.

A further objective of the invention is to provide such a window latch comprising an inwardly extending latching flange mounted along the lower edge of such window, and positioned to enter between a pair of laterally outwardly biased gripping rollers riding between a pair of outwardly converging cams mounted on the window frame structure. The outward biasing force urges the rollers outwardly between the converging cams so as to grip the latching flange when introduced therebetween. Manually actuated release means is provided to move the rollers inwardly free of the cams when it is desired to release the latching flange and thus free the window for opening. A secondary release may be provided to operate from the exterior of the vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing objectives and advantages of the invention will be apparent from the following description and the accompanying drawings, wherein

FIG. **1** is a fragmentary vertical, transverse, sectional view, in the zone of the window sill, of a portion of a side wall of a transportation type vehicle having the invention embodied therein.

FIG. **2** is a fragmentary section view taken along line **2—2** of FIG. **1.**

DETAILED DESCRIPTION OF THE DRAWINGS

Referring to the drawings in detail, a vehicle side wall extrusion **10,** which may be of aluminum, preferably extends the entire length of the side wall of a transportation type vehicle, such as a bus or rail car, in which the invention is embodied. An upwardly open channel **11,** with undercut side walls, is provided in the extrusion **10,** and the thickened lower edge portion of a bottom sealing strip **12** is inserted in retained position in this channel. The sealing strip **12** has two integral, tapered flanges **13** and **14,** which are engaged by, and seal, the bottom of a hingedly suspended window **15**

when the latter swings downwardly and inwardly to its closed position as illustrated.

The window **15** is essentially a single pane of suitable, transparent material, such as, for example, tempered or safety glass or a suitable transparent plastic material, with a channel member **17,** which preferably is an extrusion of suitable material, such as aluminum, fitted to, and adhesively secured to, its lower edge. A latching flange **18** extends inwardly from an intermediate portion of the inner side flange of the channel member **17** substantially perpendicularly to the plane of the window **15.** The flange **18** is positioned to enter between a pair of relatively superposed cam rollers **19** and **20** when the window **15** is swung from open to closed position along the broken line **21.** A second or guard flange **16** preferably is provided to prevent injury by the flange **18,** and extends inwardly from the upper edge of the inner side flange of the channel member **17.**

The latching rollers **19** and **20** preferably are of relatively uncompressible material, with their peripheries having a suitably high co-efficient of friction, and are mounted between the outwardly converging side flanges **22** and **23** of a channel **24,** which, as illustrated, is integral with the extrusion **10.** The length of a few inches for each roller has been found satisfactory, with three pairs of the rollers provided for each window, one pair mounted centrally of the window, and one pair near each side thereof. The rollers **19** and **20** of each pair are similar, and are generally similarly mounted, so that the mounting structure of only the lower roller **19** is described in detail herein. Corresponding parts of the upper roller are designated by the same numerals, with the prime (') added.

The roller **19** is journaled on a mounting member **25** in the nature of a wire bail, with side arms **27** and **28** thereof, see FIG. **2,** passing for free axial movement through holes **29** and **30,** respectively, provided in the upright bottom portion **31** of the channel **24.** The inner end portions of the side arms **27** and **28** are bent inwardly at right angles, and are pivotally mounted in holes provided therefor in a pair of mounting brackets **32** and **33** secured to a spring mounted window sill **34** provided for each window.

The window sill **34** comprises an angle member of suitable sheet metal with a generally horizontal top flange **35** and a generally upright inner flange **37.** A flange **36** to permit drawing the sill **34** inwardly extends inwardly co-extensively with the tip flange **35** and is bent downwardly to facilitate grasping manually. The sill **34** is mounted on a required plurality of leaf springs **38** secured at their upper ends by rivets **39** to the window sill **34,** and at their lower ends by rivets **40** to a downwardly extending portion of a sill support flange **41** integral with the vehicle side wall extrusion **10.** The springs **38** bias the window sill **34,** and thereby the cam rollers **19** and **20,** laterally outwardly along the converging inner cam surfaces of the side flanges **22** and **23** of the channel **24.** In their manimum outwardly biased position, the rollers **19** and **20** are separated by a distance less than the thickness of the latching flange **18.**

For releasing the latches from the exterior of the vehicle a presser rail **49** of suitable material, such as stainless steel, is provided along the exterior of each side of a vehicle embodying the invention, the rail being mounted on the outer ends of a plurality of spring biased push pins **50,** one of which is provided adjacent

each end of each pair of the rollers **19** and **20.** A coil spring **51** encircles each push pin **50,** and is held in compression between a pin mounting bracket **52** on an inwardly extending portion of the flange **41,** and a collar **53** secured on each pin **50.** The inner end of each pin **50** is offset at **54** to clear the liner **42** and to engage the sill **34** and move it inwardly to free the latching flange **18** from its rollers **19** and **20.** A double flanged presser roller **55,** shown in broken lines in FIG. **1,** is assumed to be part of a window washing mechanism, not otherwise shown, and presses the rail **49** inwardly to free the windows for opening. This roller **55** is not, however, material to the present invention, and further details thereof are, therefore, omitted.

OPERATION OF THE ILLUSTRATIVE MECHANISM

In explaining the operation of the illustrated mechanism, it is assumed that initally the lower end of the window **15** has been swung outwardly along the broken line **21** to open position, with the latching flange **18** and guard flange **16** laterally outwardly beyond the latching rollers **19** and **20,** and the window sill **34** free from extraneous forces. Under these conditions the sill support springs **38** urge the window sill **34,** and thereby the gripping rollers **19** and **20,** outwardly, whereby the cam action of the converging flanges **22** and **23** urges the rollers toward each other to a point where they are either in peripheral contact with each other, or are spaced apart by a distance less than the thickness of the latching flange **18.**

Upon releasing the thus outwardly swung window **15,** gravity, aided by the resilience of the supporting hinge member, not shown, if the latter is of the resilient type swings the window **15** inwardly along the broken line **21** of FIG. **1** to its closed position shown in the drawings.

As the window swings to its closed position, the free inner edge of the latching flange **18** engages the rollers **19** and **20,** moving them inwardly as required, along with their wire supports **25** and **25'** and the window sill **34** against the bias of the sill supporting springs **38.** As the rollers **19** and **20** are thus moved inwardly along the inner sides of the flanges **22** and **23,** they separate sufficiently to admit the latching flange **18** therebetween. As the window reaches its fully closed position, the rollers **19** and **20,** biased outwardly along their respective flanges **22** and **23** by the sill supporting springs **38,** grip the latching flange **18** therebetween. Thereafter, any attempt to open the window **15,** and thereby withdraw the latching flange **18** from between the rollers **19** and **20,** only tends to roll the rollers outwardly along their converging cam surfaces, and thereby more tightly grip the latching flange **18** in the manner, for example, of a ball cam clutch.

To release the latching flange **18** for opening the window, the sill **34** is moved inwardly slightly, as by inserting the tips of one's fingers beneath the flange **36,** and drawing the sill, and thereby the rollers **19** and **20,** inwardly sufficiently to free the rollers from the flanges **22** and **23.**

For use of the invention with automatic window washing mechanism, such as, for example, the type mentioned previously herein, the presser roller **55** rides along and bears against the rail **49,** depressing the rail **49** laterally inwardly to release the rollers **19** and **20** from their flanges **18** to thereby free the windows **15** for opening.

The invention provides a simple, strong, positive window latch, which is relatively inexpensive, easy to install, and when latched, resists application of increasing opening force with increasing latching effect. It has no tendency to freeze up or seize with the lapse of time, which if this tendency were present, might result in a dangerous situation in the event of an emergency requiring escape of the passengers.

Having thus described the invention, what is claimed as new and useful and desired to be secured by U. S. Letters Patent is:

1. A roller cam latch mechanism for an inwardly closing window hingedly suspended from an upper portion of a window frame comprising:

a latching element mounted on a lower edge portion of the window and extending inwardly therefrom,

a pair of outwardly converging cam members mounted along a sill portion of the window frame and located to receive therebetween the latching element when the window is swung inwardly to its closed position, said cam members comprising side flanges of a horizontal outwardly open channel member mounted on the window frame, said channel member being an integral part of a side wall extrusion extending substantially the entire length of a side wall in which the mechanism is embodied,

a pair of latch rollers mounted for rolling movement with their axes parallel to the plane of the window, one between each of two opposite sides of the latching element and the converging cam member opposite thereto when the window is in closed position,

spring means biasing the rollers into rolling engagement with their respective sides of the latching element and their respective, converging cam members to grip the latching element between the rollers and thereby latch the window in closed position, and

means for moving the rollers inwardly clear of their respective converging cam members to release the latching element and thereby free the window for opening.

2. A cam roller latch mechanism as defined in claim **1,** wherein each latch roller is mounted on an inwardly extending support member and each support member is outwardly spring biased.

3. A cam roller latch mechanism as defined in claim **2,** wherein each roller support member is mounted at its inner end on an outwardly spring biased roller release member which is exposed interiorly of a vehicle in which the mechanism is mounted.

4. A cam roller latch mechanism as defined in claim **3,** wherein said roller release member is an angle member which comprises a sill element.

5. A cam roller latch mechanism as claimed in claim **2,** wherein a presser rail is mounted for limited movement along the sill area of a vehicle in which the latch mechanism is embodied, and means operatively connect the presser rail and each support member for release of the rollers from their respective cam surfaces upon a selected movement of the presser rail.

6. A cam roller latch mechanism as claimed in claim **1,** wherein the latching element is a flange extending along a lower portion of a window upon, which it is mounted, and a protective guard flange extends inwardly along a lower portion of the window substantially parallel to, and in upwardly spaced relation to the latching flange, and in slightly spaced relation above the uppermost of the converging cam members when the window is in closed position.

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