March 3, 1970 W. D. NOBES 3,498,000

TAKEOUT APPARATUS FOR ALUMINUM WINDOW SASH

Filed Aug. 16, 1966

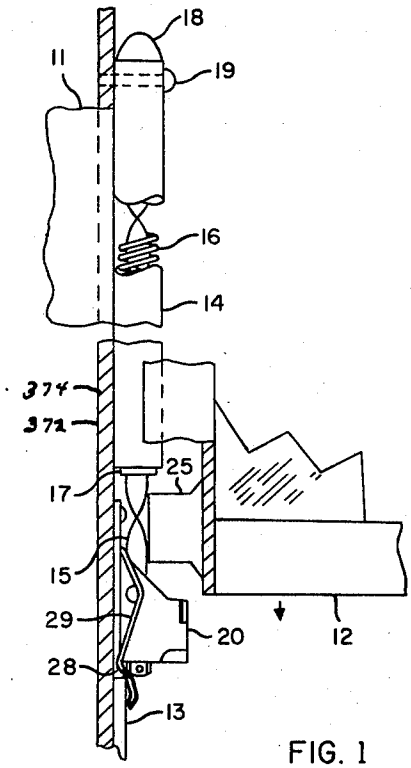


FIG. 1

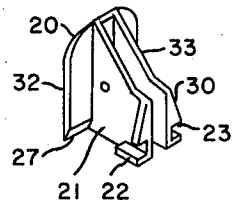


FIG. 2

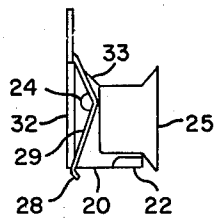


FIG. 4

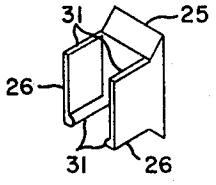


FIG. 3

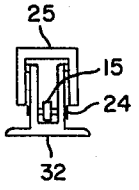


FIG. 5

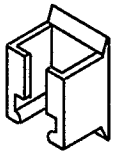


FIG. 8



FIG. 9

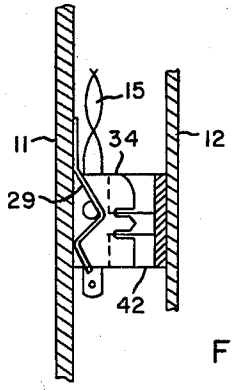


FIG. 6

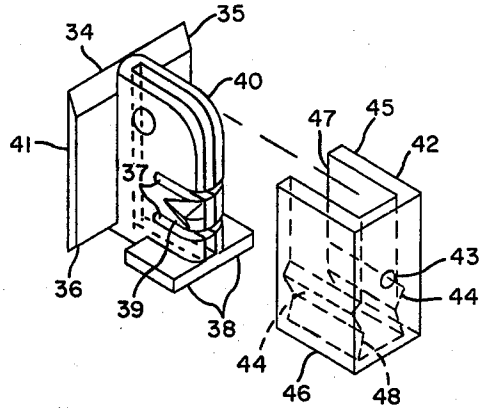


FIG. 7

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TAKEOUT APPARATUS FOR ALUMINUM WINDOW SASH

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ABSTRACT OF THE DISCLOSURE

An apparatus for effecting a detachable connection between a sash in a window, and a sash balance, carried by the window frame, having a sash carrier mounted on the sash balance with a sash clip, which includes a pair of opposing arms, the arms engaging an extension on the sash balance when the sash is lowered on to the carrier, and the arms disengaging when the sash is withdrawn.

This invention relates to improvements in window sash mounting and more particularly to a removable sash mounting arrangement for a sash balance and window sash.

It is customary to provide a tubular sash balance or other counterbalancing means for slidable sash in a window. It is further conventional in certain window structures to provide means for removing a slidable sash from the window frame for cleaning and other maintenance. One such means provides for a detachable connection between the sash balance and the sash such that when the sash is removed from the frame the sash balance is retained in its tensioned condition. Further embodiments of this basic concept have provided for either retention of the sash balance connection at the point of sash removal, or for moving the sash to a predetermined location along the frame and then removing the sash. One disadvantage inherent in the prior art embodiments is that many of them rely on moving parts. That is, a pivotal member may effect the locking of the sash balance, or a member will be caused to engage a surface of the sash guideway. However, moving parts are vulnerable to wear, and when worn are seldom replaceable meaning that an entire sash balance or connection assembly may need to be replaced. Another disadvantage inherent in the prior art embodiments is the problem of dirt and mortar etc., fouling the flanges or tract, said fouling leading to malfunctioning or failure of the window unit. Especially disadvantageous is the combination wherein the operator must move the sash laterally against resiliently disposed guideway to effect the disconnection between the sash and the sash balance, while at the same time perform some manual movement of a part to release or engage some member of the detachable connection.

Accordingly, it is a main object of this invention to provide an arrangement for mounting window sash and sash balances, whereby the window is made readily removable from the window frame without preliminary manipulation of detaching devices, and wherein the sash balance is maintained in its original tensioned condition without the requirement for longitudinal vertically extending tract or flanges to restrain the torsional movement of the sash balance, which flanges or track are prone to fouling with dirt and mortar, etc., said fouling leading to malfunctioning or failure of the window unit.

A further object of the invention is the elimination of the requirement for resiliently disposed guideways, which permit lateral movement of the sash for disengagement from the window frame. Such guideways are costly, and do not permit positive lateral constraint of the movable

sash, resulting in unsightly cocking and tipping of the sash in the opening. Additionally, such resiliently mounted guideways induce an unwanted frictional force on the movable sash, which force inhibits the free movement of the sash in its normally disposed condition within the window frame.

Another object of the invention is to provide a positive means of guiding the movable sash into a centered position in the window frame upon its insertion into said frame, so as to ensure proper alignment with the detachable sash balancing means eliminating the possibility of a misaligned sash improperly contacting the detachable connection and causing a malfunction of the window unit.

An additional object of the arrangement is the provision of convenient means of adjusting the sash balances, both with the window sash in place in the window frame, and with the window sash removed from the window frame.

Another object of this invention is to provide a detachable connection between a sash balance and a sash wherein the simplicity of the device in combination with the selection of material for its construction provide exceptionally long life.

In carrying out the objects of the invention, there is provided in a window, a detachable connection in combination with a slidable removable sash and a sash balance including a sash carrier carried by the sash balance, a sash clip carried by the sash and adapted to engage the sash carrier, and means mounted to the window frame guideways adapted to immobilize the sash carrier when the sash clip is disengaged therefrom, said means also adapted to provide lateral centering guidance to the bottom corners of the sash, when said sash is inserted into the window frame.

At least one modification is contemplated wherein the basic concept is carried out in more rigid structure. An additional modification provides for more positive engagement of sash clips and sash carriers.

Other objects and advantages will become apparent from a reading of the following detailed specification with reference to the accompanying drawings, in which:

FIG. 1 is a longitudinal side elevation of a portion of a window, with parts cut away to show the combination of this invention.

FIG. 2 is a perspective view of the sash carrier, illustrating its details.

FIG. 3 is a perspective view of the sash clip, illustrating its details.

FIG. 4 and FIG. 5 are fragmentary elevation and plan views respectively, showing the disposition of the sash carrier and the sash clip in operative engagement.

FIG. 6 is a fragmentary sectional view of a modification of the invention.

FIG. 7 is a perspective view of the members of the modification of FIG. 6.

FIG. 8 is a perspective view of a modification of a sash clip which provides a "surrounding" engagement with the sash carrier.

FIG. 9 is a fragmentary plan view showing the disposition of the sash carrier and the modified sash clip in operative engagement.

Referring to FIG. 1, a substantially conventional structure of a window includes a frame **11** and a sash **12** for vertical sliding engagement along a frame **11**. The sash **12** is understood as being removable from the frame because its overall width is less than the distance from the frame guideway surface **372** to the opposite frame guideways, not shown. That is, when the sash is moved laterally toward the frame guideway surface **372**, so that its edge **374** is in contact with the guideway surface **372**, the opposite edge of the sash is clear of the opposite guideway edge, not shown, and the sash may be pivoted out of the frame opening.

A sash balance **14** may be disposed along the frame **11**, and secured at one end thereto by a screw, or the like at **19**. Any suitable sash balance cap **18** may also be secured by screw **19** for preventing the entrance of dust, mortar, and the like into the sash balance **14**, but this cap is not necessary to the arrangement.

The sash balance **14** may be of the conventional spiral tubular type, although this is merely representative and not restricted to this particular type. Such tubular balances generally include a coil spring **16** anchored at the top of the balance and connected at the lower end to a connector element **17**, which is adapted to be rotated in place at the bottom end of the balance. A twisted slider rod **15** is disposed through a slot in the element **17** and otherwise is freely disposed through the balance. The lower end of rod **15** extends through element **17** and is adapted to be connected to a sash, and movement of the sash along the frame **11** causes winding of spring **16** as the rod **15** slides through the element **17**, creating a torsional force to exert lift on the rod **15** and thence to counterbalance the weight of the sash. It is understood that the sash balance may be pretensioned according to the weight of the sash for which it will be employed.

Attached to the end of the rod **15** as by any suitable rivet or the like, is a carrier **20** forming part of this invention. The sash carrier **20** comprises (FIG. 2) a formed body having a generally planar shoe **32** from the face of which extend parallel opposing extensions **21**. Extensions **21** are semi-rigid, being adapted to be flexed slightly and momentarily, as will appear. Each extension **21** may have formed therefrom a beveled detent **30** and a platform **22**, defining a slot **23** therebetween, also as will appear.

Attached to the sash along the side edge thereof is a sash clip **25** adapted to engage the sash carrier **20** for forming an operative connection between the sash balance **14** and the sash **12**. The sash clip **25** (FIG. 3) comprises a generally planar body from which extends a pair of opposing arms **26**.

A bowed leaf retainer spring **29** is attached to the frame **11** at the bottom end of the sash balance **14**. The spring **29** is bifurcated forming a pair of arms. The slot between the arms is large enough to permit the extensions **21** of the sash carrier **20** to enter between the arms while the shoe **32** of the carrier **20** is flat against the frame **11**.

The arms of the retaining spring **29** extend upward, and one in particular is lengthened and arced at the end to provide for a light spring contact against the sash side rail **11** to eliminate any gap between retainer spring **29** and rail **11**, e.g., to prevent retainer spring **29** from sliding through, and to provide a large entry angle for carrier **20** which may not be lying flat against the frame surface **372** because of extreme torsional loading causing distortion and excessive clearance between sash **12** and frame **11** due to normal manufacturing variations in sash and frame widths.

The overall effect of the spring **29** is to permit the carrier **20** to be moved between the bifurcations (by passing under the cam-like recurved ends of the bifurcations as at **28**), and be clamped thereby in position adjacent the end of the sash balance **14**.

In discussing the operation of the invention, it will be assumed that a complete window is being assembled initially, as at a place of manufacture, and that the sash **12** is yet to be placed in operative position within the frame **11**. The sash balance **14** and sash carrier **20** have been assembled and are in the position shown in FIG. 1. The sash balance **14** has been pretensioned for the weight of the sash to be used, and the tension is maintained without the sash **12** in place, due to the sash carrier **20** being clamped by the spring **29** against rotary motion which would unwind spring **16** and release the tension.

Sash spring **29** has projecting legs to ensure positive lead-in of sash carrier, and compensate for a loose fit

of the sash in the frame. It also limits upward travel of the sash carrier when the sash in raised to the removal position, and enables the sash clip guide to disengage from the sash carrier, and retains the sash carrier when the sash is removed to lock the tension in the balance.

The sash spring **29** guides the bottom of the sash into the normal operating position, and positions the sash clip guide directly over the sash carrier for positive engagement of the clip guide and carrier when the sash is inserted. The retainer spring **29** is spring-loaded against the frame jamb, and holds the sash carrier until the sash clip guide is securely engaged with the carrier. The clip is always latched to the sash carrier prior to operating the sash.

The sash **12** with the sash clip attached thereto, as by any suitable screw or the like, preferably the screw joining side and bottom rails of sash, is inserted in the window frame **11** at some point above the location of the sash carrier **20**, and is then moved downwardly in the direction of the arrow in FIG. 1. As the sash clip **25** approaches the carrier **20**, the beveled detents **30** of the carrier **20** enter the lower bosses **31** of the arms **26**. It should be noted that the width across the beveled detents **30** in lateral dimension is greater than the space between the bosses **31**; and that the sash clip **25** is disposed in the usual groove in the edge of the sash **12** and is therefore rigid.

The extensions **21** of the carrier **20** are compressed or flexed toward each other by the action of the detents **30** against the bosses **31**, permitting the entire detents **30** to eventually enter the space between the arms **26** of clip **25**. Further movement is not possible since the bottom of clip **25** now engages the platform **22** of each extension **21** and the lower bosses **31** are in the slots **23**.

Further downward movement of the sash **12** causes movement of the carrier **20** out of clamping engagement by the spring **29**. The engagement of the sash clip **25** with the sash carrier **20** "locks" the tension in the balance and no external guideways are required. The sash, sash balance, and operative connection between them is now fully operative, and the sash may be raised and lowered with normal counterbalancing.

To remove the sash **12** from the window frame **11** for cleaning or other maintenance is equally simple. The sash **12** is merely raised to its upper limit of travel, so that the sash carrier **20** enters into clamping engagement by the spring **29** as described above, so that the sash balance is thereby also locked in its pretensioned condition. It should be recalled that the sash **12** is removable by any conventional facilities not illustrated, but assumed generally to mean that the sash is movable laterally to disengage one edge from the frame opposite the sash balance. At any rate, vertical movement of the sash **12** from the frame **11** simply withdraws the clip **25** from engagement with the carrier **20** and the disconnection is complete.

It should be apparent that the only moving member is the sash, and that the only action to connect the sash with the balance is to insert the sash in the window frame and move it into engagement with the sash carrier **20**. Positive operative engagement is at once effective. It is at once equally simple to disconnect the sash from the sash balance merely by withdrawing the sash from the frame.

The entire operation is relatively noiseless. The shapes of the carrier **20**, clip **25**, and spring **29** guarantee alignment of the balance in the window structure and thus assure operation of the window without the customary rattle of some types of sash balance connection. The physical properties of the plastic material assure extremely long life with virtually no wear, sticking or jamming.

FIGS. 6 and 7 illustrate a modification of the invention wherein the structural concept is carried out for heavy duty such as with a relatively large sash.

The sash clip **42** of the modification has thicker arms **45** in which are formed grooves **44** or the like, with the internal surfaces **47** and **48** remaining. It will be seen that

the surfaces **47** and **48** compare with the bosses **31** of the first embodiment, and the grooves **44** compare with the earlier concave space between the bosses. The hole **43** facilitates mounting of the clip **42** to a sash.

The carrier **34** has a heavier section shoe **41** which is beveled accordingly as at **35** at the upper edge and **36** at the lower edge to enter clip **29** and guideway **13** respectively. The extension **40** has formed therein horizontal slots **37** defining a stud **39**. It will be seen that the stud **39** is enlarged to fit the grooves **44** of the clip **42**. A heavier platform **38** is adapted to underlie the bottom **46** of the sash clip **42**.

The operation of the modifications is basically identical to the preferred embodiment with the following exceptions. As the sash clip **42** is lowered over the extension **40** of the carrier **34**, the stud **39** flexes slightly inwardly as permitted by groove **43** and then snaps into the grooves **44**. The disconnection is the same as the other embodiment.

A preferred embodiment and modifications of the invention having been shown and described for the purposes of illustration, it is to be understood that the invention is not to be limited thereto, but is to be construed in the light and spirit of the appended claims.

I claim:

1. Apparatus for effecting a detachable connection between a sash in a window and a sash balance carried by the window frame comprising a sash carrier attached to the sash balance, a guideway surface on the frame for the carrier, said carrier comprising a shoe slidable on the said guideway surface, extensions formed outwardly from said shoe, and a detent formed on said extensions; a sash clip attached to said sash, said clip comprising a pair of opposing arms defining a concave space therebetween, said extensions being engaged in said space in response to vertical movement of said clip and sash toward said carrier for forming a detachable connection between said sash and the sash balance; a retainer spring attached to the window frame, said carrier being slidable into engagement with said spring, said extension being disengaged from said clip in response to vertical movement of said sash.

2. An apparatus for effecting a detachable connection between a sash in a window and a sash balance carried by the window frame comprising a sash carrier carried by the sash balance, said carrier having an extension; and a sash clip carried by the sash, said sash clip including a pair of opposing arms, said arms engaging said extension when the sash is lowered onto the said carrier, said arms disengaging said extension when the sash is withdrawn, and means for securing and retaining said sash carrier in position when said sash is removed from said window including a spring disposed so as to retain said carrier in a fixed position.

3. Apparatus according to claim **2**, wherein the means for effecting a detachable connection between a sash in a window and a sash balance carried by the window frame comprising a sash carrier attached to the sash balance, a guiding surface on the frame for the carrier, said carrier comprising a shoe slidable on said guiding surface, extensions formed outwardly from said shoe, and a detent formed on said extensions; a sash clip attached to said sash, said clip comprising a pair of opposing arms defining a space therebetween, said extensions being engaged in said space in response to vertical movement of said clip and sash toward said carrier for forming a detachable connection between said sash and the sash balance; a retainer spring, said carrier being slidable into engagement with said spring, said extension being disengaged from said clip in response to vertical movement of said sash.

4. A window including a frame, a removable sash slidable in said frame, a sash balance secured to the frame and adapted to counterbalance said sash, and a detachable connection between the sash and the sash balance comprising a sash carrier attached to the sash balance and a sash clip attached to the sash; an extension formed outwardly from the body of said sash carrier, said sash clip being adapted to engage said extension detachably to form an operative connection therebetween, and a sash guide fixed to said frame which positions said sash clip over said sash carrier for positive engagement of said clip guide and said carrier when said sash is inserted in said window.

5. A window including a frame, a removable sash slidable in said frame, a sash balance secured to the frame and adapted to counterbalance said sash, and a detachable connection between the sash and the sash balance comprising a sash carrier attached to the sash balance, said sash carrier including a pair of extensions formed outwardly from the body, a sash clip attached to the sash including a pair of opposing arms adapted to detachably engage said extensions, and a sash guide fixed to said frame which positions said sash clip over said sash carrier for positive engagement of said clip guide and said carrier when said sash is inserted in said window.

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16—197; 49—454