June 6, 1961 R. L. MARTIN 2,986,771

SASH BALANCE CONNECTOR

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Fig. 1.

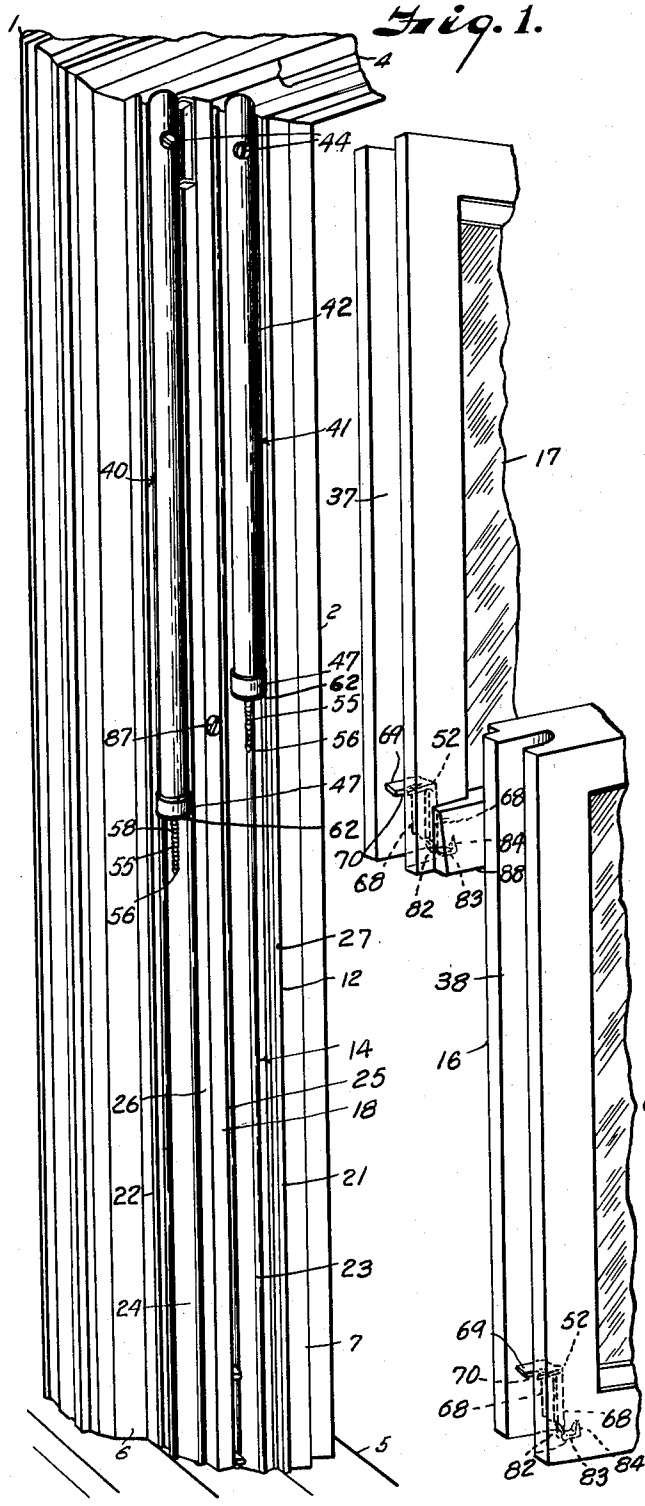
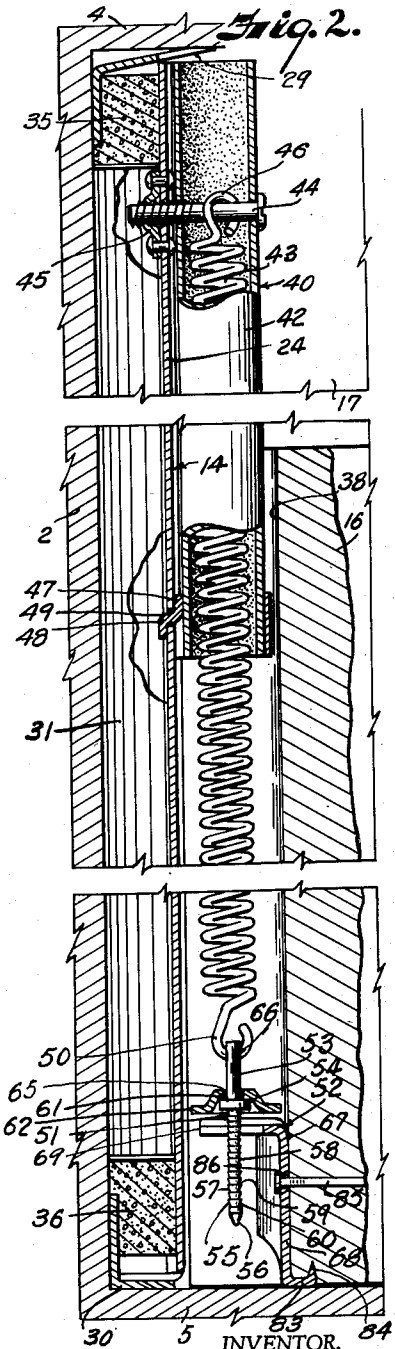


Fig. 2.



INVENTOR.
Robert L. Martin
BY Paul E. Mullendore
ATTORNEY

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Fig. 3.

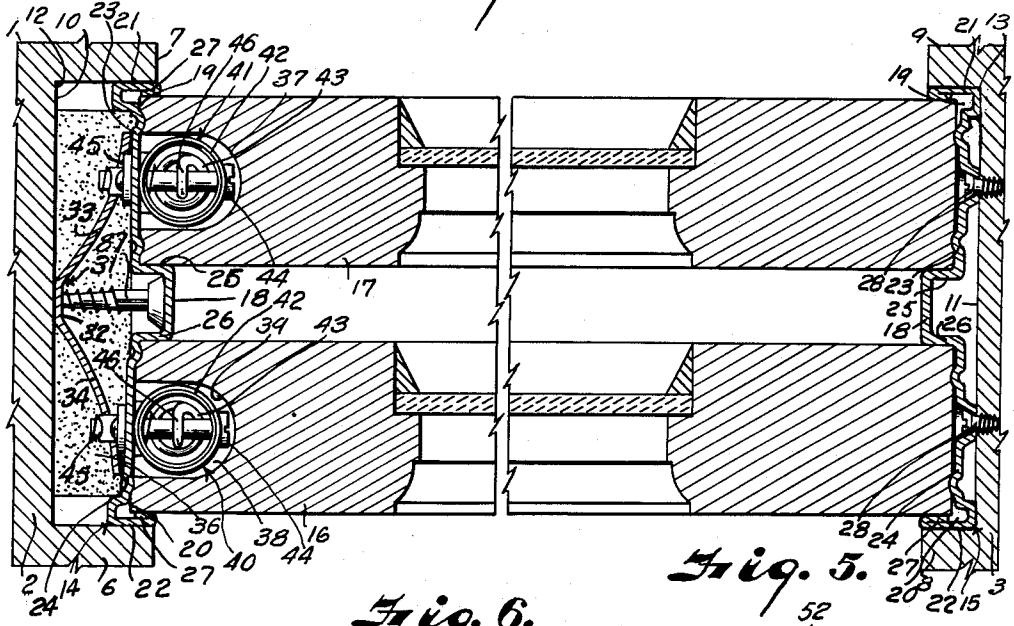


Fig. 5.

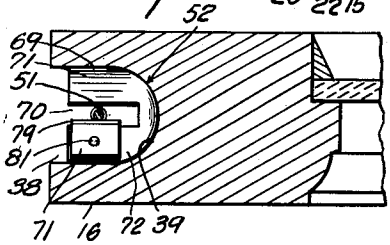


Fig. 6.

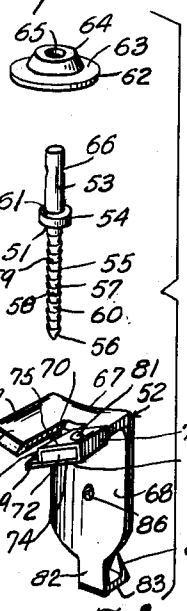


Fig. 4.

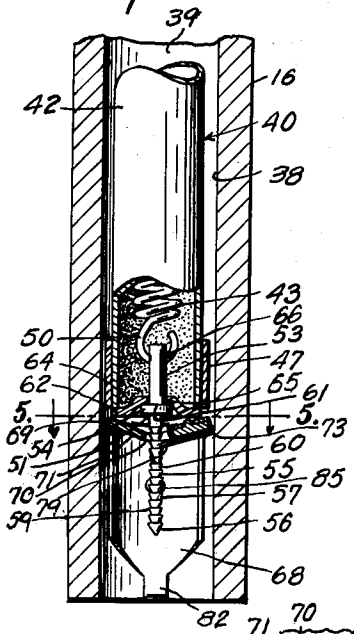


Fig. 7.

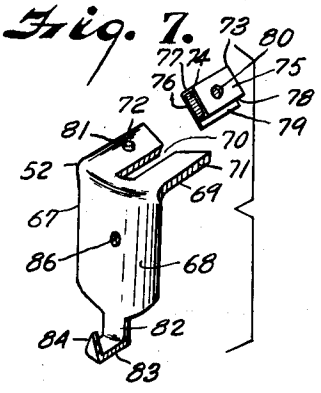


Fig. 8.

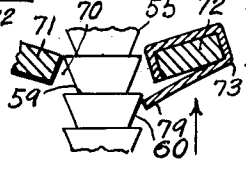
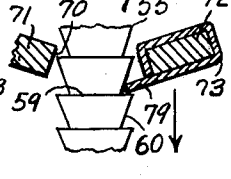


Fig. 9.



INVENTOR.
Robert L. Martin
BY
Paul E Mullendore
ATTORNEY

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2,986,771

SASH BALANCE CONNECTOR

Robert L. Martin, Kansas City, Mo., assignor to The Weatherproof Products Corporation, Holmes Park, Mo., a corporation of Missouri

Filed Aug. 4, 1958, Ser. No. 752,881
7 Claims. (Cl. 16—197)

This invention relates to a double hung window structure of the type disclosed in copending application for patent Serial No. 591,936, filed June 18, 1956, now Patent No. 2,848,760, issued August 26, 1958 and wherein the sash are removable from the frame of the window for cleaning, painting, and the like, the principal object of the present invention being to provide improved connecting elements between the sash and spring balances therefor.

Other objects of the invention are to provide connecting elements having fewer parts of simpler, stronger, and lasting construction; to provide connecting elements that are more positive in action and which effect a firmer hold without slipping; to provide connecting elements that are more easily engaged and disengaged when inserting and removing sash from the sash guides; to provide the connecting elements with guide portions that facilitate the connections thereof; and to provide connecting elements that effect a positive grip in any position and without the necessity of readjusting the sash to complete a secure coupling thereof.

It is also an object to provide connecting elements that are easily manufactured at low cost, and to maintain a constant uniform standardization in both materials and formation of the parts.

A further object is to provide a guide and balance assembly that is quickly and easily installed by any carpenter.

In accomplishing these and other objects of the invention, improved structure is provided, the preferred form of which is illustrated in the accompanying drawings, wherein:

FIG. 1 is a perspective view of one side of a window equipped with guide and spring balance assemblies and sash which are interconnected by connecting elements constructed in accordance with the present invention, the sash being shown removed from the balances to better illustrate the connecting elements.

FIG. 2 is a vertical section through the side of the window frame with the sash in place and in closed position to illustrate the connecting elements, parts being broken away to better illustrate parts that are concealed.

FIG. 3 is a horizontal section through the window frame, guides, and sash, with both sash in their uppermost positions in the frame.

FIG. 4 is a fragmentary section through one of the sash and the lower end of the spring balance, to better illustrate the connecting elements.

FIG. 5 is a cross section through the sash on the line 5—5 of FIG. 4.

FIG. 6 is a perspective view of the connecting elements, shown in disassembled, spaced apart relation.

FIG. 7 is a perspective view of the sash connecting element with the detent part removed and in spaced relation with the bracket part thereof.

FIGS. 8 and 9 are enlarged diagrammatic views showing action of the tongue of the connecting element on the sash when engaging the connecting element that is carried by the spring balance.

Referring more in detail to the drawings:

1 designates a window frame having side jambs 2 and 3, a header jamb 4, and a sill 5. The side jambs 2 and 3 have inner and outer stops 6 and 7 and 8 and 9. The stops 6 and 7 and 8 and 9 cooperate with inner faces

10 and 11 of the jambs to form vertical recesses 12 and 13, the recess 12 being of greater depth than the recess 13. Yieldingly mounted in the recess 12 is a movable sash guide 14 that cooperates with a fixed guide 15 (FIG. 3) in the opposite recess 13 to slidably contain therebetween lower and upper sash 16 and 17.

The guides 14 and 15 are formed of resilient sheet metal and extend from the head jamb 4 to the sill 5 of the window frame (FIG. 3). The sash guide has a central parting stop 18 positioned between the sash 16 and 17 and includes integral side channel portions 19 and 20. The channel portions 19 and 20 have side flanges 21 and 22, webs 23 and 24, and flanges 25 and 26, which latter flanges constitute the sides of the parting stop 18. The edges of the outer flanges 21 and 22 are turned inwardly as indicated at 27, to engage the outer side face of the upper sash, and the inner side face of the lower sash, respectively, while the inner side face of the upper sash and the outer side face of the lower sash engage the portions 25 and 26.

The web portions 23 and 24 of the channels of the fixed guide 15 engage the inner face 11 of the jamb 3 and are fixed thereto by fastening devices such as screws 28, as shown in FIG. 3. The movable guide 14 is loosely retained in the recess 12 by fasteners 29 and 30 that engage the ends thereof.

The movable guide member 14 is yieldingly retained in pressing contact with the lefthand side edges of the sash 16 and 17 and the opposite side edges of the sash in pressing contact with the fixed guide member 15 by means of a spring element 31. The spring element 31 is also formed of resilient sheet metal and has a central rib portion 32 adapted to engage the face 10 of the jamb 2 and extending laterally and outwardly therefrom are resilient wing portions 33 and 34 (FIG. 3) which engage the outer faces of the web portions of the movable guide 14, as best shown in FIG. 3. When the movable guide 14 is pressed into the recess 12 against action of the spring element 31, the wings 33 and 34 have room to slide on the outer face of the web portions 23 and 24 as the wings flatten under the pressure exerted on the guide 14. The spring element 31 is of shorter length than the guide 14, to accommodate resilient blocks 35 and 36 at the upper and lower ends thereof, as best shown in FIG. 2. The blocks 35 and 36 are preferably of sponge rubber and in normal position of the guide member 14 fill the space between the inner face 10 of the jamb 2 and the outer faces of the web portions 23 and 24.

The sash have grooves 37 and 38 in the left hand side edges thereof that extend the full height of the sash and have rounded bottoms 39 to accommodate the balancing elements 40 and 41 of the respective sash.

Each balance includes a tube 42 forming a housing for a coil spring 43. The tube for the balancing unit of the lower sash extends from a point slightly spaced below the header jamb into the upper end of the groove 38 when the lower sash is in lowermost position to protect and conceal the spring therein. The tube of the balancing element for the upper sash also extends from near the header jamb to a point spaced from the lower edge of the upper sash when the sash is closed. The upper end of each tube 42 is connected with the upper end of the respective web portions of the yieldable guide 14 by a fastening device, such as a screw 44, which extends through suitable openings in the tube and a registering nut 45 attached to the guide. The screws thus form pivots on which the tubes are adapted to swing in conformity with movement of the sash when the sash is raised and lowered in the guide or when it is removed and replaced, as later described. The screws also provide anchors for the coil springs 43 of the balancing units, the connection being made when the

springs are inserted in the tubes with the hooks 46 thereof registering with the openings so that when the screws are passed therethrough, they also pass through the hooks 46 to secure the ends of the coil springs (FIGS. 2 and 3). In the illustrated instance, the lower ends of the tubes are reinforced by collars 47 pressed thereon, and the collars have tongues 48 that pass through slots 49 in the web portions 23 and 24 of the guide member 14 and engage against the outer face of the web portions, as shown in FIG. 2. The slots 49 extend transversely of the web portions and are of slightly greater length than the width of the tongues 48 to allow the desired movement of the tubes 42 on the screws 44. The lower end of each coil spring 43 also has a hook 50 for connection with the sash.

The structure thus far described substantially conforms to the corresponding parts in the above mentioned application, and are here illustrated and described to give a better understanding of the connecting elements of the present invention and the operation thereof when effecting connection and disconnection of the sash with the spring balances.

The connecting elements of the present invention include an element 51 to be carried by the springs of the balancing units and an element 52 to be attached to the sash units, as now to be described.

The element 51 comprises an elongated, generally cylindrical, member having a head 53, a collar 54, and a shank-like body 55 terminating in a conical point 56. The body 55 between the case of the point 56 and the collar 54 has a series of circumferential grooves 57 that provide intermediate annular ribs or teeth 58, the grooves being shaped so that the ribs have substantially flat annular shoulders 59 on the sides in the direction of the head 53 and inwardly and downwardly tapering sides 60 in the direction of the point 56. The collar 54 is of larger diameter than the head 53 to provide an annular shoulder or seat 61 for a washer 62. The washer 62 has a flat peripheral portion 63 having an outer diameter substantially corresponding to the outer diameter of the tubes 52. The washer 26 also has a central truncated dome portion 64 (FIG. 6) of a size to enter the end of the tube, and which is provided with an opening 65 for passing the washer over the head 53 of the connecting element 51. The head 53 has an opening 66 extending diametrically therethrough for securing the connecting element with the hook 50 of the balancing springs 43.

The element 52 includes a bracket member 67 having a concave plate portion 68 and a laterally extending arm portion 69. The plate portion 68 has a curvature to fit snugly within the bottom of the groove of the window sash. The arm portion 69 has a slot 70 opening inwardly from the outer end thereof and which is of a width to pass the body portion 55 freely therethrough when the elements are interconnected, as later described. The slot 70 thus divides the arm 69 into spaced apart fingers 71 and 72 that are preferably inclined downwardly so as to deflect the pointed end 56 of the element 51 into the slot.

In order to effect a grip with the body portion 55 of the element 51, the finger 72 carries a detent 73. The detent 73 is preferably formed of a strip of spring material that is bent transversely to form a loop 74 having upper and lower sides 75—76 and ends 77—78 adapted to closely engage the finger 72 when the loop portion of the detent is pressed thereon.

The side 76 projects beyond the end 78 to form a projecting tongue 79 that extends into the slot 70 to engage the body portion of the element 59. The detent 73 is preferably secured on the finger 72 of the bracket member by providing the upper side thereof with an aperture 80 that is adapted to accommodate a boss 81 on the finger 72. In this way, the detent is securely retained on the finger while the portion thereof carrying the tongue 79 is adapted to flex into and out of the grooves 57 of the body portion 55 of the member 51 when the connecting elements 51 and 52 are to be interconnected.

It is obvious that the tongue 79 cooperates with the side of the finger 71 to grip the body portion of the element 51 therebetween and retain the gripping contact of the tongue 79 with one of the shoulder portions 59. It is also obvious that when the sash is to be disengaged, the open end of the slot 70 allows the bracket member 67 to pull away from the body portion of the element 51. In order to retain the bracket member 67 in proper position in the groove of the sash, the lower end of the plate portion 68 has an extension 82 having a lateral tongue 83 adapted to engage the other side edge of the sash and which may terminate in a prong 84 that is driven into the sash to cooperate with a nail 85 that is driven through an opening 86 in the plate portion and into the sash, as best shown in FIG. 2.

The balances are assembled as units, with the coil springs 43 placed within the tubes 42 and the hooks 46 thereof anchored by the screws 44, and the hooks 50 connected with the connecting elements 51 so that they seat the washers 61 against the ends of the tubes. Thus, the springs are held in initial tension to hold the parts in assembly. The spring balance assemblies are then applied to the movable guide 14 by passing the tongues 48 through the slots 49 and threading the screws 44 into the fasteners 45. The movable unit is backed by the spring element 31 and the resilient blocks 35 and 36 attached to the rear ends of the guides to complete the assembly at the factory, substantially as disclosed in the above mentioned application. The guide and balance assembly, together with the fixed guide, are packaged with the fasteners 29 and 30, connecting elements 52, nails 85, screws 28, and a screw 87.

The carpenter, when installing the various parts in a window frame, may first apply the fasteners 29 and 30 at the respective upper and lower ends of the recess 12 on the lefthand side of the window frame, the assembly being snapped into position and held from displacement by the fasteners 29 and 30 and with the spring element seated against the face 10 of the jamb to resiliently support the guide with the flanges 21 and 22 substantially in registry with the stops 6 and 7 of the window frame. The screw 87 is inserted through an opening in the parting stop portion and threaded into the jamb in alignment with the check rails 88 of the sash. The fixed guide 15 is placed in the recess 13 at the opposite side of the window frame and secured by the screws 28. The carpenter will apply the connecting elements 52 in the bottom of the grooves 37 and 38 of the respective sash 16 and 17. These elements are readily placed in proper position by placing the curved plate portions 68 thereof in contact with the rounded bottoms of the grooves and with the prongs 84 engaging the bottom edges of the sash. The prongs are pressed into the wood of the sash with sufficient force to bed the tongues 83. The nails 85 are then applied by driving them through the openings 86 and into the sash.

The sash are then installed by first applying the upper sash in the outermost grooves of the guides. This is readily effected by first applying the grooved side of the upper sash in the bottom of the outer groove in the yieldable guide 14 and pressing the guide inwardly until the opposite side of the sash passes the stops at that side of the window to register with the outer groove in the fixed guide 15. On release of the pressure, the spring element 31 shifts the sash so that the righthand side enters the outer groove of the fixed guide. The sash can then be moved upwardly in the window frame until the pointed end 56 of the connecting element 51 passes through the slot 70 of the connecting element 52. Further upward movement of the sash causes the tongue 79 to ride upwardly over the tapered faces 60 of the ribs or teeth 58 of the connecting element 51 (FIG. 8) until the top edge

of the sash engages in the groove of the header jamb. In this position, the tongue **79** is engaging one of the annular shoulders **59**, as shown in FIG. 9, to complete the connection of the sash with the spring balance. Then when the sash is moved downwardly within the window frame, the coil spring **42** for that sash is tensioned so that the stored up action will balance the sash in various positions in the window frame and facilitate raising thereof when the sash is moved to closed position. The inner sash may then be applied and automatically connected with its spring balance, in like manner.

When it is desired to remove the sash, pressure may be applied in a lateral direction against action of the spring **31** to move the righthand side of the sash out of the grooves of the fixed guide, whereupon the sash may be readily withdrawn from the window frame, since the connecting elements **52** withdraw from engagement with the connecting elements **51** by reason of the open end slots **70**.

From the foregoing, it is obvious that I have provided connecting elements that are of simple, strong, and lasting construction, and which, when interconnected, provide for a more positive action with a firmer hold without slipping. It is also obvious that the connecting elements of the present invention are more easily engaged and disengaged when inserting and removing the sash from the guides. It is also obvious that a positive connection is effected instantly upon engaging of the resilient tongues of the sash element with the annular shoulders **54** of the connecting elements **52**, thereby eliminating the necessity of readjusting the sash, as is required with the connectors disclosed in the above described application. It is further obvious that the sash may be easily removed when desired, because the elements **52** slide off the annular shoulder of the elements **51** by reason of the open end slots **70**.

With the balances constructed and attached as described, they are readily replaced with new units when required, it only being necessary to remove the sash carried by the defective unit, remove the screw **44**, and withdraw the tongue **48** from the slot **49**. The new unit may be applied by engaging the tongue **48** in the slot and turning the screw **44** into the fastener **45**.

What I claim and desire to secure by Letters Patent is:

1. A connector for removably connecting two elements, one being a sash and the other being a spring balance therefor, said connector including a part having coaxial head and shank portions, said shank portion having a series of circumferential ribs extending completely around the shank portion and each providing an annular shoulder in the direction of the head portion of said shank, said head being for attachment of said part to the spring balance, a complementary part having a plate portion for attachment to the sash and said complementary part having an arm portion extending laterally from the plate portion and providing spaced guide fingers spaced apart at outer ends thereof for passing the shank portion therebetween when the complementary part is moved axially of the shank portion upon connecting said parts and laterally from between said fingers when disconnecting said parts, and a detent on one guide finger to engage with one of said shoulders during said axial movement to interconnect said parts when the sash is to be connected with the spring balance and said detent being slidable laterally from off said annular shoulder to disconnect said parts when the sash is to be removed from the spring balance when the connector is in use.

2. A connector as described in claim 1, wherein the plate portion of the complementary part has a tongue projecting from the plate and terminating in a prong for supplementing the attachment of the plate to the sash.

3. A connector for removably connecting two elements, one being a sash and the other being a spring balance therefor, said connector including a part having coaxial head, collar and shank portions, said shank portion having a series of circumferential ribs extending completely around the shank portion and each providing an annular shoulder in the direction of the head portion of said shank, said head being for attachment of said part to the spring balance, a washer having a centrally apertured dome portion seated upon said collar for engaging a part of the spring balance, a complementary part having a plate portion for attachment to the sash and said complementary part having an arm portion extending laterally from the plate portion and providing spaced guide fingers spaced apart at outer ends thereof for passing the shank portion therebetween when the complementary part is moved axially of the shank portion upon connecting said parts and laterally from between said fingers when disconnecting said parts, and a detent on one guide finger to engage with one of said shoulders during said axial movement to interconnect said parts when the sash is to be connected with the spring balance, said detent being slidable laterally from off said annular shoulder to disconnect said parts when the sash is to be removed from the spring balance when the connector is in use.

4. A connector for removably connecting two elements, one being a sash and the other being a spring balance therefor, said connector including a part having coaxial head and shank portions, said shank portion having a series of circumferential ribs extending completely around the shank portion each providing an annular shoulder in the direction of the head portion of said shank, said head being for attachment of said part to the spring balance, a complementary part having a plate portion for attachment to the sash and said complementary part having an arm portion provided with an open end slot extending laterally from the plate portion and providing spaced apart guide fingers guiding the shank portion into said slot when the complementary part is moved axially of the shank portion, and a resilient tongue on one guide finger and projecting into the slot toward the other guide finger to engage with one of said shoulders for interconnecting said parts when the sash is to be connected with the spring balance, and said projecting portion of the tongue being slidable laterally from off said annular shoulder with the shank passing through the open end of said slot to disconnect said parts when the sash is to be removed from the spring balance when the connector is in use.

5. A connector as described in claim 4, wherein the resilient tongue comprises a spring loop sleeved over the guide finger and having a projecting portion for engaging one of said annular shoulders.

6. A connector as described in claim 4, wherein the resilient tongue comprises a spring loop sleeved over the guide finger and having a projecting portion for engaging said shoulders and said spring loop having an aperture and the finger having a boss engaging in said aperture to retain the spring loop on said finger.

7. A connector for removably connecting two elements, one being a sash and the other being a spring balance therefor, said connector including a part having coaxial head, collar and shank portions, said shank portion having a series of circumferential ribs extending completely around the shank portion each providing an annular shoulder and an annular tapering face extending from the inner periphery of one shoulder to the outer periphery of the next shoulder in the direction of the head portion of said shank, said head being for attachment of said part to the spring balance, a washer seated on the collar portion for engaging a part of the spring balance, a complementary part having a plate portion for attachment to the sash and said complementary part having an arm portion provided with an open end slot extending laterally from the plate portion and providing spaced apart guide fingers sloping to said slot for guiding the shank portion when the complementary part is moved axially of the shank into said slot, and a resilient tongue on one guide finger and projecting into the slot to slide upon said tapering faces into

engagement with one of said shoulders to interconnect said parts when the sash is to be connected with the spring balance, and said projecting portion of the tongue being slidable laterally from off said annular shoulder with the shank portion passing through the open end of said slot to disconnect said parts when the sash is to be removed from the spring balance when the connector is in use.

References Cited in the file of this patent

UNITED STATES PATENTS

29,461 Burchell ---------- Aug. 7, 1860
1,849,604 Weatherhead ---------- Mar. 15, 1932
2,747,219 Haas ---------- May 29, 1956
2,846,212 Morneau ---------- Aug. 15, 1958
2,848,760 Hettinger et al. ---------- Aug. 26, 1958
2,862,258 Oehmig ---------- Dec. 2, 1958

FOREIGN PATENTS

891,079 Germany ---------- Sept. 24, 1953