Feb. 17, 1953 A. M. STARCK 2,628,390

WINDOW CONSTRUCTION

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Fig. 1.

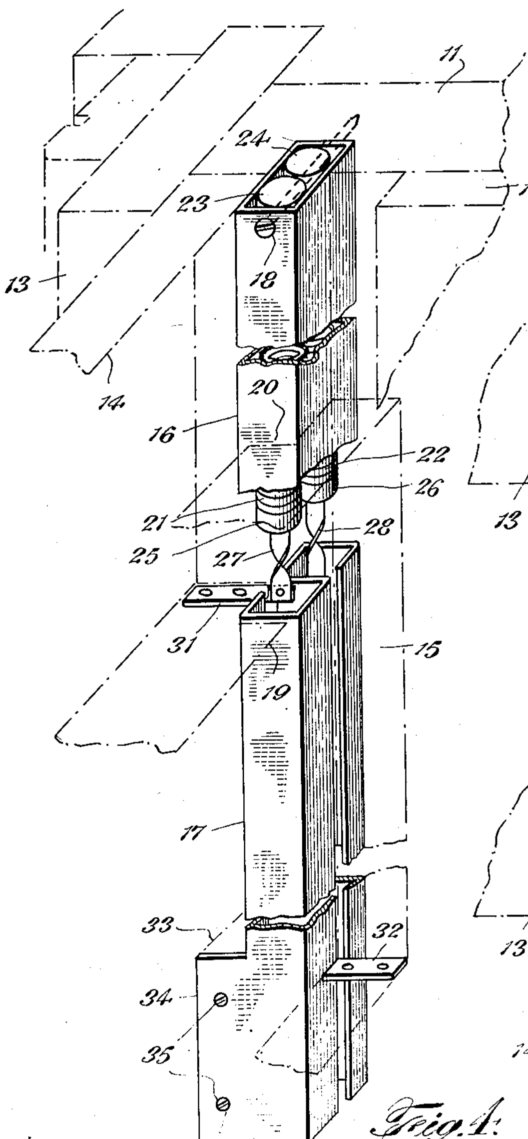


Fig. 2.

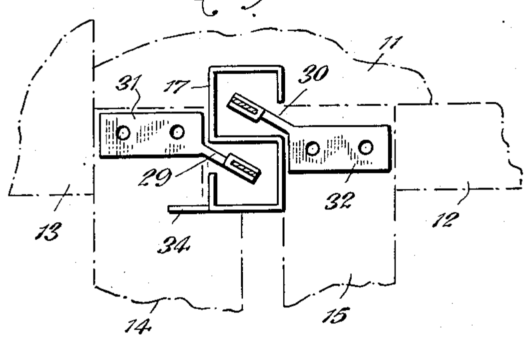


Fig. 3.

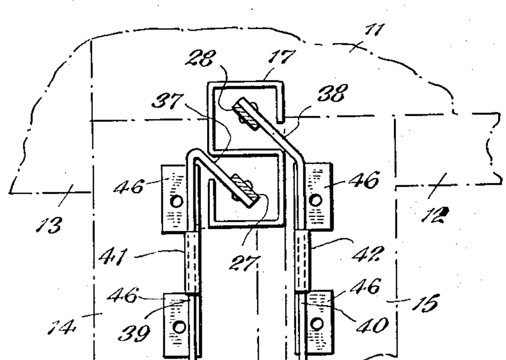


Fig. 4.

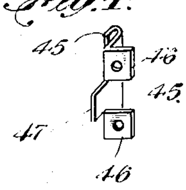
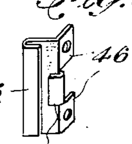


Fig. 5.



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WINDOW CONSTRUCTION

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7 Claims. (Cl. 20—52)

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This invention relates generally to improvements in window constructions, and pertains more particularly to windows of the sliding sash type wherein the sashes, mounted for vertical movement, are counterbalanced by coil springs.

When coil springs are used to balance window sashes, the balancing action may be the result either of turning the spring, or of stretching the spring. This invention will be described with particular reference to the former, but, as will be apparent, may be used with either type of coil spring balance.

Balancing action through turning the coil spring is accomplished by attaching one end of the coil spring to the window frame so that it cannot turn, and by causing the other end of the spring to turn as the sash is raised or lowered, as by means of a spiral rod which slidably engages a slot in the free end of the spring and is secured at one end to the sash. Such a balance is disclosed in the Larson Patent No. 1,864,745, June 28, 1932, wherein the spiral rod secured to the window sash is given an accelerated pitch so as to provide substantially equal balancing effect for all positions of the sash.

In the construction disclosed in the Larson patent, recesses are provided in the side edges of the sashes to receive the coil springs, which are secured at their upper ends to the side jambs of the frame. This is the usual arrangement for coil spring balances. The spring for the inner, or lower, sash will be visible when this sash is in its lowered, or closed, position, and the spring for the upper sash will become visible as this sash is lowered, or opened. While this location of the springs does not in any way interfere with the operation of the sash balances, or with raising and lowering the sashes, it may make the installation of certain types of weather stripping more difficult, and may be considered by some individuals to detract from the appearance of the window.

It is an object of the present invention to provide a window construction in which it will be unnecessary to groove the side edges of the sashes to receive the balancing springs, thus permitting use of any of the known types of weather stripping on the side edges. It is a further object of the invention to provide a window construction in which the spring balances are enclosed and concealed within the beads or strips forming the sash slides, thus simplifying and improving the appearance of the window. It is also an object of the invention to provide a window construction in which the balances for both

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the upper and lower sashes of a double-hung window may be located and concealed within the parting beads between the two sashes. Another object of the invention is to provide improved means for connecting a coil spring balance to a window sash. Further objects and advantages of the invention will appear as the description proceeds.

A preferred embodiment of the invention selected for purposes of illustration and description is shown in the accompanying drawings, wherein:

Figure 1 is a perspective view showing the combined parting bead and dual sash balance, fragmentary portions of the window frame and sashes being indicated to disclose the relation of the parts;

Figure 2 is a transverse sectional view through the structure of Figure 1, looking down on the top of the S-shaped member **17**;

Figure 3 is a view similar to Figure 2, but showing a modified arrangement for connecting the balances to the window sashes; and

Figures 4 and 5 are perspective views to somewhat smaller scale, and from different angles, of the sash attachment means shown in Figure 3.

Referring to Figure 1, **11** represents one side jamb of a window frame for double-hung sash, **12** represents the inner bead, and **13** the outer bead. The upper sash is indicated, in fully raised position, at **14**, and the lower sash, partially raised, at **15**. The construction thus far is conventional and further description thereof is believed unnecessary. The combined parting bead and sash balance illustrated in Figure 1 preferably will be duplicated on the opposite side of the window frame.

In place of the usual solid parting bead which separates the upper and lower sashes, and in place of the sash balances recessed in the side edges of the sashes, or in the side jambs of the frame, the present invention provides a combined parting bead and dual sash balance, the parting bead being made of sheet metal and enclosing and concealing coil spring balances for both the upper and lower sashes. This end may be attained with no increase in the size of the parting bead as compared to the solid parting bead of the prior constructions.

The combined parting bead and sash balance housing of the present invention has an elongated, channel-shaped upper member **16**, and aligned therewith an elongated S-shaped lower member **17**, the latter having relatively narrow openings so that it provides two parallel tubular chambers with the narrow openings therefrom facing in opposite directions. The channel members 16 and 17 ordinarily will be made of sheet metal and may be formed into shape in suitable manner, as by rolling.

In the illustrative embodiment, the upper channel member 16 is rectangular in shape and the edges of the metal strip from which the channel is made preferably extend in substantially abutting relation along the center of one of the narrow sides or edges of the member. Preferably the member 16 has the same dimensions as the solid wood parting bead which it replaces, so that one edge thereof, preferably the slotted edge, can be pressed into the groove in the side jamb 11, just as would the solid parting bead, and without the necessity of any change in the frame construction. This is shown in Figure 1.

If a slight spacing is left between the edges of the metal strip when the rectangular channel is formed, then when the channel member is pressed into the groove in the side jamb 11, the springiness of the metal will cause the edges of the channel member to be pressed firmly against the side walls of the groove and will hold the member securely in place in the groove in the side jamb.

The upper end of the channel member 16 may be secured in place also by means of a screw or nail 18 extending through the walls of the channel into the side jamb 11. Ordinarily it will not be necessary to further anchor the lower end of the channel member 16, because this will be prevented from leaving the groove by the screw or nail 18, and also by the customary interlocking relation of the bottom rail of the upper sash and the top rail of the lower sash against the parting bead, as indicated at 19 and 20, respectively.

Located within the channel member 16 are two parallel coil springs 21 and 22, preferably approximately co-extensive in length with the member 16. These are the springs for balancing the upper and lower sashes respectively. The upper ends of these coil springs are secured against rotation within the channel member 16 and conveniently this may be done by applying bushings or caps 23, 24 to the upper ends of the springs, and by providing these bushings or caps with transverse openings through which the screw or nail 18 passes.

The lower ends of the coil springs also are provided with bushings 25 and 26, each having a center slot to receive the twisted or spiral rods 27 and 28, respectively. As will appear hereinafter, the lower ends of the spiral rods are connected to the lower portions of the upper and lower sashes respectively, so that as a sash is raised or lowered, the spiral rod, moving with the sash, will rotate the lower end of the associated coil spring. The coil spring will be twisted tighter as the sash is lowered, thus tending to lift the sash, and the tension in the spring will be relieved as the sash is raised.

The lower ends of the spiral rods 27, 28 are located within the lower, or S-shaped, member 17. The over-all dimensions of the member 17, in a transverse section, preferably are the same as those of the channel member 16, so that one edge of the member 17 will fit snugly in the groove in the side jamb 11 of the window frame. This means that, in the illustrative embodiment, a transverse section through the member 17 will be approximately rectangular in shape, and that the S-shaped member 17 will have two similar, parallel tubular chambers into which the spiral rods 27 and 28 can move as their respective sashes are lowered.

The upper part of the S-shaped member 17 will be held in position in the groove by the interlocking action of the sash rails in the same manner that the lower part of the channel-shaped member 16 is held in the groove. If the S-shaped member 17 has a reasonably close fit in the groove, little more will be required to hold the member in place. However, the lower end of the S-shaped channel may be secured firmly in the groove by screw or nail extending directly through the walls of the member into the side jamb, or through a block or bracket secured on one side of the S-shaped member.

In double-hung windows, that is windows in which there are two sashes mounted for sliding movement vertically past each other, the vertical dimension of the upper sash often is less than that of the lower sash. In that event the downward movement of the upper sash must be limited in order to prevent pulling the spiral rod 27 out of the end of the coil spring 21. Conveniently this will be done by fastening a block or other stop in the lower part of the sash slide. In Figure 1, such a block is shown at 33.

A lip or flange 34 may be turned out from the lower end of the S-shaped member 17, as shown in Figures 1 and 2, to lie against the block 33 when the member 17 is pressed into place in its groove. Screws or nails 35 can be used to secure the flange 24 to the block, or to secure both the flange and the block to the side jamb.

Secured to the lower end of each of the spiral rods 27, 28, as by means of a rivet, is one end of a connecting link which extends outwardly through the narrow opening in the side wall of the S-shaped member 17. In Figure 2 of the application drawings, these connecting links are designated 29 and 30, and are to be connected to lower portions of the upper and lower sashes, respectively.

The connecting links 29, 30 may be secured directly to the sashes. For that purpose, the exposed portions of the links may be made in the form of small plates which are pierced with holes to receive screws. The plate 31, on the outer end of link 29, is secured against the bottom of the upper sash 14 by screws, and the plate 32, on the outer end of link 30, is similarly secured against the bottom of the lower sash 15. Shallow recesses may be cut in the sash rails to receive these plates for flush mounting.

By the construction hereinabove described, applicant has provided a combined parting bead and dual sash balance for double-hung windows, the sash balances for both the upper and lower sashes being contained and concealed within the parting bead. The side edges of the sashes and the opposed surfaces of the side jambs are left free for the application of weather stripping.

The combined parting bead and sash balance housing as described may be used also with balances which depend on the stretching of a coil spring. In such a construction there will be no spiral rods 27 and 28, and the connecting links 29 and 30 will be secured directly to the lower ends of the coil springs 21 and 22, respectively.

If the connecting links 29, 30 are secured rigidly to the sashes in the manner shown in Figures 1 and 2, slight movement of the sashes horizontally, in the planes thereof, may result in a binding of the connecting links against the walls of the

S-shaped member 17. In fitting a sash in a frame, a certain amount of play is allowed to prevent binding of the sash in the slides as the sash is raised or lowered. If there is subsequent shrinkage, the possibility of horizontal movement of the sash while being raised or lowered is increased. The longitudinally extending openings on opposite sides of the S-shaped member 17 can be kept narrow, and at the same time the danger of binding of the connecting links can be eliminated by attaching the connecting links to the sashes in such a manner that the sashes have a limited freedom of movement relative to the connecting links, horizontally in the planes of the sashes.

Figures 3 through 5 illustrate connecting means which permits such movement of the sashes relative to the connecting links. Figure 3 is a view similar to Figure 2, except for the modified connecting means, and similar parts bear the same reference numbers.

The connecting links 37 and 38 may be made from relatively narrow strips of metal. The outer end 39 of the connecting link 37 is bent back to form an angle of about 45° with that portion of the link which is connected to the spiral rod 27. The outer end 40 of the connecting link 38 is bent to an angle of about 135° with that portion of the link which is connected to the spiral rod 28. As may be seen in Figure 3, these portions 39 and 40 of the connecting links lie parallel to the planes of the window sashes.

Mounted in small recesses cut in the bottom edges of the lower rails of the sashes 14 and 15 are sockets 41 and 42 for slidably engaging the portions 39 and 40 of the connecting links. These sockets may be similar for both sashes, and may be made from sheet metal.

As may be seen from Figures 4 and 5, a socket such as is illustrated can be made from a rectangular piece of sheet metal. One edge of the metal is folded over as shown at 45, thus providing an open slot to receive an end portion 39, 40 of one of the connecting links. One or more flanges 46 are turned in the opposite direction from the opposite edge of the metal piece for securing the socket in its recess in the bottom edge of the sash rail. These flanges 46 have holes therethrough to receive screws or nails for securing the sockets to the rails.

Another portion 47 of the edge from which the flanges 46 are formed may be folded over, after the end 39 or 40 of a connecting link has been laid in the slot under the edge 45, to hold the end of the connecting link in the socket. While this edge portion 47 holds the connecting link end firmly in the socket as far as vertical movement of the sash is concerned, it is not folded down tightly on the link end so as to prevent sliding movement of the link horizontally relative to the socket.

Thus the sash is free to move horizontally, in the plane of the sash, and the socket slides on the connecting link end without interfering in any way with the operation of the sash balance, and without danger that the connecting link will bind in the narrow opening of the S-shaped member 17.

The invention herein disclosed may be variously modified and embodied within the scope of the subjoined claims.

I claim:

1. In a window structure comprising a frame and two sashes mounted therein for sliding movement vertically past each other, in combination, a combined sash balance and parting bead comprising aligned, elongated upper and lower members separating side edges of the two sashes, the upper member being channel-shaped and containing two elongated coil springs arranged side by side, means extending transversely through the channel-shaped member and the upper ends of the coil springs to secure the channel-shaped member to the frame and to secure the upper ends of the coil springs against rotation within the channel-shaped member, the said lower member having similar over-all dimensions to the upper member and being S-shaped in transverse section with relatively narrow, longitudinally extending openings into the two tubular chambers thus formed, each such chamber containing a spiral rod which slidably engages a slot in the lower end of one of the aforesaid coil springs to turn the end of the spring as the spiral rod is moved into or out of the spring, a connecting link attached to the lower end of each spiral rod and extending laterally outwardly through the narrow opening in the S-shaped member, and means connecting each said link to the lower portion of one of the sashes.

2. In a window structure having a frame, beads forming sash slides therein, sashes mounted for vertical movement past each other in said sash slides, and sash balancing means for supporting the sashes in adjusted positions in said sash slides, in combination, a combined parting bead and sash balance housing comprising an elongated channel-shaped member which serves as the upper part of the parting bead and as a common enclosure for the upper portions of sash balances for both the upper and lower sashes, an elongated S-shaped member of similar over-all dimensions which serves as the lower part of the parting bead and provides individual tubular enclosures for the lower portions of the sash balances, and connecting links extending laterally from the sash balances outwardly of the S-shaped member for connections to the upper and lower sashes, respectively.

3. The combination with a window frame having side jambs and two sashes mounted therein for sliding movement past each other, of hollow parting beads secured to the side jambs between the side edges of said sashes, each parting bead comprising an elongated channel-shaped upper member containing the upper ends of two coil spring sash balances, and an elongated S-shaped lower member aligned with the channel-shaped member and having two narrow vertical openings facing in opposite directions, one toward each sash, connecting links extending from the sash balances outwardly through said narrow vertical openings in the parting bead and slidable vertically therein, and socket means secured on said sashes which slidably engage the connecting links, permitting limited movement of the sashes relative to the sash balances, horizontally in the planes of the sashes.

4. A combined parting bead and sash balance housing for a window having two sashes mounted for sliding movement vertically past each other, comprising, in combination, aligned upper and lower elongated members which together form a parting bead separating side edges of the upper and lower sashes, the upper member being channel-shaped and containing two elongated coil springs arranged side by side and secured at their upper ends against rotation within the channel-shaped member, the lower member having similar over-all dimensions to the upper member and

being S-shaped in section, each of the two elongated tubular chambers formed within the S-shaped section containing a spiral rod which slidably engages a slot in the lower end of one of the aforesaid coil springs, and a connecting link attached to the lower end of each spiral rod and extending laterally outwardly from the S-shaped channel for connection to a window sash.

5. A combined parting bead and sash balance housing for a window having two sashes mounted for sliding movement vertically past each other, comprising, in combination, aligned upper and lower elongated members which together form a parting bead separating side edges of the upper and lower sashes, the upper member being channel-shaped to provide a common enclosure for the upper portions of the balances for both sashes, the lower member having similar over-all dimensions to the upper member and being S-shaped in section to provide individual elongated enclosures having relatively narrow, longitudinally extending openings for the lower portions of the sash balances, and individual balances for the sashes comprising two elongated coil springs arranged side by side and secured at their upper ends against rotation within the channel-shaped member, slotted bushings secured on the lower ends of the coil springs, spiral rods slidably engaging the slots in the bushings and extending into the enclosures formed within the S-shaped members, and a connecting link attached to each sash balance and extending laterally outwardly through the narrow longitudinally extending opening in the S-shaped member for connection to a window sash.

6. A combined parting bead and sash balance housing for a window frame having double hung sash comprising, in combination, an elongated

channel-shaped upper member and an elongated S-shaped lower member of similar transverse dimensions aligned with the upper member, the S-shaped member having relatively narrow, longitudinally extending openings on opposite sides thereof.

7. A combined parting bead and sash balance housing for a window frame having double hung sash comprising, in combination, an elongated channel-shaped upper member and an elongated S-shaped lower member of similar transverse dimensions aligned with the upper member, the S-shaped member having relatively narrow, longitudinally extending openings on opposite sides thereof, two coil spring sash balances secured at their upper ends within the said channel-shaped member and extending downwardly into the individual chambers formed by the S-shaped member, and a connecting link extending laterally from each sash balance outwardly through the longitudinally extending opening in the S-shaped member for connection to a window sash.

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