Aug. 5, 1952 A. LANG 2,605,828

BOTTOM HOLDING STRUCTURE FOR WIRE SCREENS

Original Filed April 26, 1948

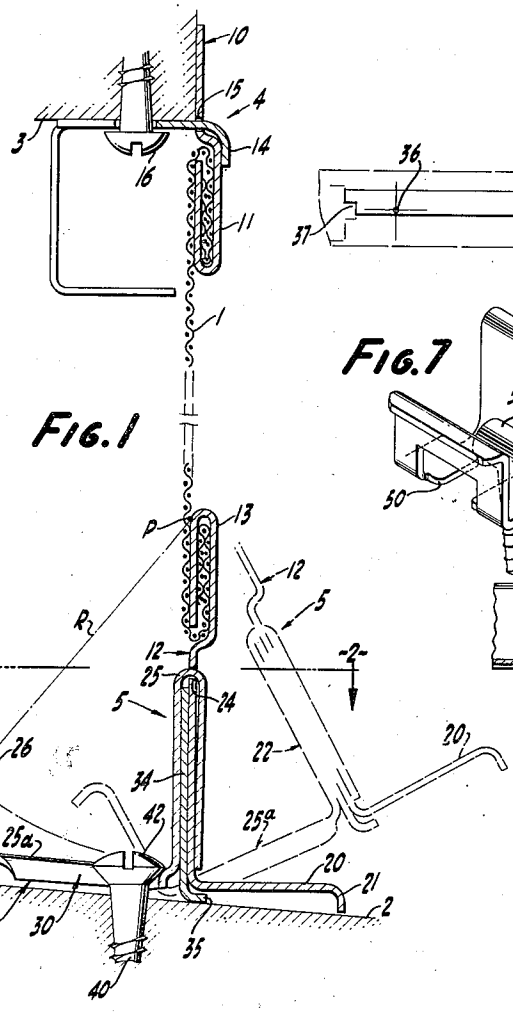


FIG. 1

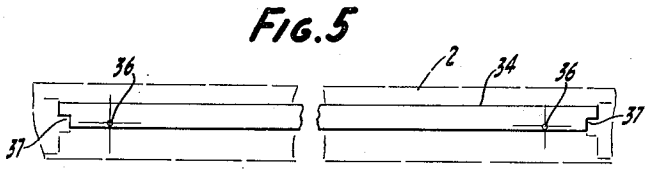


FIG. 5

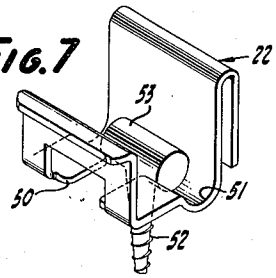


FIG. 7

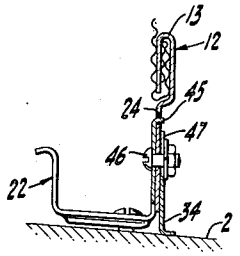


FIG. 6

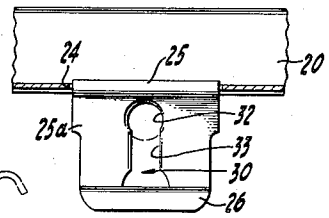


FIG. 2

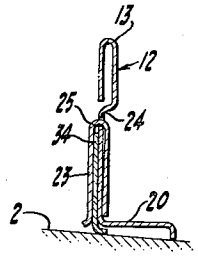


FIG. 4

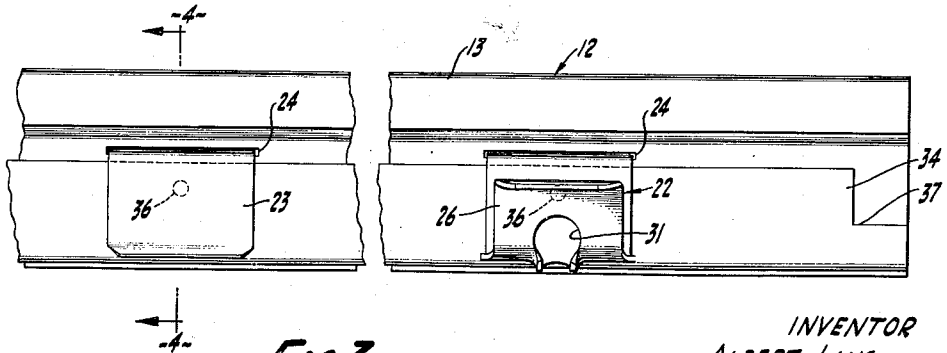


FIG. 3

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Patented Aug. 5, 1952

2,605,828

UNITED STATES PATENT OFFICE

2,605,828

BOTTOM HOLDING STRUCTURE FOR WIRE SCREENS

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Continuation of application Serial No. 23,347, April 26, 1948. This application July 23, 1951, Serial No. 238,141

8 Claims. (Cl. 160—328)

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This invention relates to frameless window screen structures and particularly to a bottom screen edge holding structure.

The present application is a continuation of my co-pending application entitled, "Bottom Holding Structure for Wire Screen," Serial Number 23,347, filed April 26, 1948, now abandoned.

Prior latch or lock type bottom holding structures for detachably connecting the bottom of a frameless window screen to a window frame have been expensive, complex in construction, and have required a relatively large number of parts.

A main object of the present invention is to provide a simple and inexpensive bottom holding structure for detachably connecting one end of a frameless window screen to a window frame, which bottom holding structure comprises only a few parts, yet, which structure is so designed as to be releasably latched in its fully operative position in a manner such that while it can be readily unlatched by a person within a room, it offers great resistance to unlatching by a person stationed outside the window.

More particularly, it is an object of the present invention to provide a bottom holding structure for a frameless window screen, which bottom holding structure has a slotted generally horizontal portion applicable to a fixed screw on a window frame to progressively draw the screen downwardly as the bottom holding structure is applied to the screw to place the screen under a tension greater than necessary to normally tension the screen, said bottom holding structure being specifically formed so that during the last increment of application thereof to the screen, there is permitted a slight upward movement of the bottom holding structure relative to the screw to relieve the excess tension on the screen and leave the screen taut under a normal tension whereby the bottom holding structure is yieldably latched in its fully operative position.

A further main object of the present invention is to provide a screen edge holding structure including as a part thereof a frame engaging sealing strip, and having certain other parts of simple and inexpensive construction for adjustably frictionally supporting the sealing strip.

Another object of the present invention is to provide a structure as described in the immediately preceding paragraph having a U-shaped clip fitting through a slot in the structure for adjustably frictionally supporting the sealing

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strip, and which clip is provided with means for securing the structure to the adjacent end of the window frame.

Still another object of the present invention is to provide various improvements in frameless window screen structure.

These and other objects of the invention will be apparent from the ensuing description and the appended claims.

Several forms which the invention may assume are exemplified in the following description and illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a vertical cross-section through a window screen showing the preferred form of bottom holding and tensioning structure and also showing a top holding structure.

Fig. 2 is a fragmentary section taken along the line 2—2 of Fig. 1 but with the latching screw removed and showing the latching bracket in plan view.

Fig. 3 is a fragmentary front elevational view of the bottom holding structure.

Fig. 4 is a vertical mid-section taken along the line 4—4 of Fig. 3.

Fig. 5 is a plan view showing how the sealing strip may be used as a template.

Fig. 6 is a fragmentary section similar to that of Fig. 1 but showing an alternative structure.

Fig. 7 is a perspective view of a third modification.

Referring now to the drawings and more particularly to Figs. 1, 2 and 3, a screen 1 is held and properly tensioned between a window sill 2 and the top part 3 of a window frame, by means of a top holding structure 4 and a bottom holding structure 5. As is usual, the top and bottom holding structures are provided, respectively, with a top holding strip 10 having a U-bend 11 and a bottom holding strip 12 having a similar but inverted U-bend 13. The screen 1, suitably crimped as shown, is held in frictional engagement by the U-bends 11 and 13, the screen being readily engaged and disengaged from either holding strip by sliding it relatively to the holding strip and lengthwise thereof.

Briefly, the top holding structure 4 comprises, besides the above-mentioned holding strip 10, a plurality of spaced, slotted brackets 14 engaging slots 15 formed in the holding strip 10 and supported by screws 16 mounted in the window frame. Further details as to the construction, assembly and manipulation of the top holding structure will be found in my copending application, Serial No. 23,348, entitled Top Holding De-

vice for Wiren Screen, filed April 26, 1948, now abandoned, and executed concurrently herewith.

As shown, the bottom holding strip 12, which runs the full width of the screen, is provided at its bottom with a horizontal flange 20 bent downwardly at its outer edge at 21, thus providing maximum rigidity. The bottom holding structure 5 also comprises, besides the holding strip 12, a pair of spaced, horizontally aligned latching brackets 22 and a clip 23 disposed midway between the brackets 22. Each of the elements 22 and 23 is held and retained in a slot 24 formed in the holding strip 12. The clip 23, as shown more clearly in Fig. 4, is in the form of a simple U-bend and serves as a retaining member for a purpose hereinafter explained. For convenience of illustration, only one latching bracket 22 is shown, but it will be understood that any desired number may be used. Ordinarily, for a window screen of ordinary width, two such brackets will be used, disposed adjacent the opposite ends of the holding structure 5.

Each latching bracket 22 is provided with an inverted U-bend 25, a base 25a having a slight incline upwardly and outwardly from the U-bend, and a vertical handle 26. A countersunk slot 30 is formed in each base 25a comprising an enlarged, rounded end portion 31, a somewhat smaller enlarged or expanded end portion 32 and a relatively narrow connecting portion or channel 33. As will be seen from Fig. 3 the enlarged end portion 31 is formed largely in the vertical handle 26.

A sealing strip 34 is also provided having a lower, outwardly turned flange portion 35 and being slidably received between the holding strip 12 and the inner leg of the U-bend 25 and frictionally held in place. The sealing strip 34 is also provided with spaced holes 36 and recessed ends 37 (see Fig. 5) for a purpose explained hereinafter.

In assembling the structure, the latching bracket 22 and clip 23 are inserted through the slots 24 in the holding strip 12 before forming their U-bends, and the U-bends are then formed in a manner such that sealing strip 34 can be inserted in place only by springing the inner legs of member 22 and 23 away from strip 12 to thereby frictionally hold the strip in place and prevent it dropping out accidentally. It is the sole purpose and function of clip 23 to assist brackets 22 in frictionally engaging and supporting sealing strip 34.

Screws 40 are provided, being mounted in the window sill 2 to register with the slots 30 in the latching brackets 22. Screw holes for the screws 40 can be readily and accurately located by means of the sealing strip 34 which, as shown in Fig. 5, is provided with holes 36 spaced apart the desired distance and with recessed corners 37 to register with the abutment strips 41 of the window frame. The sealing strip 34 thus serves as a template to locate the screw holes.

The heads 42 of the screws 40 are such as to clear the enlarged openings 31 formed in the latching brackets 22, whereas the countersunk channel 33 and end portion 32 will not clear but will seat the screw head 42 as shown in Fig. 1.

Assuming that it is desired to latch the screen, the handles 26 of the latching brackets 22 are grasped and the holding strip 12 is pivoted outwardly about the pivot point or fulcrum P, as shown in broken lines, until the enlarged openings 31 of the brackets 22 are in registration with the heads 42 of the screws 40. As will be apparent from Fig. 1 of the drawings, the radius R of the arc passing through the head of the screw 40 and having its center at the pivot point P, that is, the distance from the point P to the point of final seating of the screw 40 in the end portion 32, is less than the distance from P to the point of entry S of the screw into the bracket. Accordingly, relatively little tension need be exerted on the screen I to effect the initial engagement and entry of the screw into the bracket, but as the bracket is pivoted back toward the final seating position as shown in Fig. 1, greater tension must be exerted upon the screen to seat the head 42 of the screw 40 in the channel 33.

Just prior to its seating in the expanded or enlarged area 32 at the end of slot 30, the screen is put under a tension greater than normally required to tension the screen. When the screw head 42 registers with the end of the slot, the screen tension will cause the bracket to snap upwardly to seat screw head 42 while simultaneously relieving the excess tension on the screen, the upward movement of bracket 12 being limited to an amount such that the screen will then be under a normal tension which is adequate to hold the screen taut and bracket securely latched in place.

It is apparent from Fig. 1 that while brackets 42 may readily be unlatched by a combined downward and outward force on handle 26, it is practically impossible for a person stationed outside the window to unlatch the bracket since externally applied forces only cause a firmer engagement between the brackets and their respective screws.

It was previously mentioned that the inwardly extending base 45a is slightly inclined. Although the base could be disposed perfectly horizontal, such a construction would have the disadvantage that as the brackets were applied to the screws, tension would be imposed on the screen more suddenly than when the base is inclined, therefore producing a construction not as easily operated as a construction having an inclined base.

It will thus be seen that, not only is proper tension put upon the screen, but even greater tension must be exerted during latching and unlatching, such that it is practically impossible, short of breakage of the parts, for the latching brackets 22 to become unlatched accidentally.

Referring now to Fig. 6, there is here shown a somewhat different embodiment of the invention in which each latching bracket 22, instead of being provided with a U-bend 25 as in the modification described above, is provided at its outer and upper end with an ear 45 engaging a slot 24 formed in the bottom holding strip 12, and the latching bracket and holding strip are secured together by means of a nut and bolt 46. The sealing strip 34 is provided with open-ended slots 47 to receive the bolts and thus is capable of sliding into and out of engagement with the holding strip, as shown.

In the modification shown in Fig. 7, the latching bracket 22 is shown as having a T-slot 50 and as being bent downwardly adjacent the U-bend to provide a groove or expanded portion 51. A T-shaped screw 52 having a head 53 is mounted in the window sill as shown. In latching and unlatching the screen, the same pivoting and tensioning procedure is employed as described above, the head 53 of the screw making its entry at the bar of the T. In latched posiiton, the head 53 of the screw seats in the groove 51, thus relieving some of the tension but leaving suffi-

cient residual tension in the screen to hold the screen taut.

It will thus be seen that a bottom holding device is provided for latching and unlatching frameless window screens to a window sill, which embodies numerous advantages. Among these advantages are ease of fabrication; thus, each of the parts except the screws and bolts (which are few in number and are standard items) can be fabricated from sheet metal, such as aluminum or an aluminum alloy, by simple, standard operations such as cutting, stamping, bending and punching. The parts are few in number, they are easily assembled, and very little work is required on installation. The structure is easy to manipulate and provides secure and dependable latching.

By the present invention, a bottom holding structure has been provided having only a few simple parts, yet which bottom holding structure is latched in its fully operative position in a manner as to effectively prevent unlatching by externally applied forces. Also, the present invention provides a bottom holding structure including a sealing strip adjustably frictionally held in place by a novel clip member. Furthermore, the present invention provides such a clip member having, broadly speaking, means for attachment to a window frame, which means may take the form of the novel bracket provided by the present invention.

While I have shown the preferred forms of my invention, it is to be understood that various changes may be made in its construction by those skilled in the art without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A bottom holding structure of the character described comprising a holding strip for holding one edge of a wire screen and means for latching the strip to a window sill, said latching means comprising a bracket mounted on and projecting from the holding strip and having an upwardly extending end, said bracket having a slot formed therein, said upwardly extending end having an opening therein larger than and communicating with the slot to freely receive the head of a fixed headed retainer mounted on the said window sill.

2. A frameless window screen construction comprising a sheet of screen material adapted to be secured at one end to one end of a window frame, a holding strip connected to the other end of said sheet of material for securing it to the opposite end of the window frame, said holding strip having a portion extending toward said opposite end of the window frame, said portion having a horizontal slot formed therein, a U-shaped clip member having one leg thereof disposed on one side of said portion of the holding strip and the other leg thereof disposed on the other side of said portion of the holding strip and having the part thereof joining the legs extending through said slot, and a sealing strip interposed between one leg and said portion of the holding strip and springing said one leg away from said portion of the holding strip whereby the sealing strip is frictionally retained in place between said leg and said portion of the holding strip.

3. A frameless window screen construction comprising a sheet of screen material adapted to be secured at one end to one end of a window

frame, a holding strip connected to the other end of said sheet of material for securing it to the opposite end of the window frame, said holding strip having a portion extending toward said opposite end of the window frame, said portion having a horizontal slot formed therein, a U-shaped clip member having one leg thereof disposed on one side of said portion of the holding strip and the other leg thereof disposed on the other side of said portion of the holding strip and having the part thereof joining the legs extending through said slot, a sealing strip interposed between one leg and said portion of the holding strip and springing said one leg away from said portion of the holding strip whereby the sealing strip is frictionally retained in place between said leg and said portion of the holding strip, and means for connecting said clip member to the adjacent end of the window frame.

4. A bottom holding structure for a wire screen, comprising a bottom holding strip provided with means on the upper part thereof for engaging and holding the bottom edge of said wire screen, said strip having formed therein below the screen a horizontal slot, a latching bracket engageable with a fixed securing member on the window frame and having an inverted U-bend seated in the horizontal slot, said horizontal slot being disposed a substantial distance above the bottom of the strip so that the U-bend portion of the bracket embraces a vertical portion of the strip to prevent rocking or pivoting of the latching bracket relative to the strip, and a sealing strip slidably and frictionally held between said U-bend and said holding strip.

5. A bottom holding structure of the character described, comprising a holding strip for holding one edge of a wire screen and means for latching the strip to a window sill, said latching means comprising a generally horizontal lip connected to said strip and extending inwardly therefrom and having a retainer shank receiving slot formed therein extending inwardly from said strip, the inner end of the lip being bent upwardly to form a handle by which the lip may be manipulated, said upwardly bent end having a retainer head receiving opening formed therein communicating with the slot to permit the lip to be passed onto a fixed headed retainer with the head of such retainer passing through the opening to ride on the margins of the lip defining the slot to progressively tension the wire screen as the retainer approaches the end of the slot, the margins of said lip defining the end of the slot being depressed to enable the retainer head to snap thereinto to partially relieve the screen tension and latch the strip in place.

6. A bottom holding structure of the character described, comprising a holding strip for holding one edge of a wire screen and means for latching the strip to a window sill, said latching means comprising a generally horizontal lip connected to said strip and extending inwardly therefrom and having a retainer shank receiving slot formed therein extending inwardly from said strip, the inner end of the lip being bent upwardly to form a handle by which the lip may be manipulated, said upwardly bent end having a retainer head receiving opening formed therein communicating with the slot to permit the lip to be passed onto a fixed headed retainer with the head of such retainer passing through the opening to ride on the margins of the lip defining the slot to progressively tension the wire screen as the retainer approaches the end of the slot,

the margins of said lip defining the end of the slot being enlarged to enable the retainer head to snap thereinto to partially relieve the screen tension and latch the strip in place.

7. A bottom holding structure of the character described, comprising a holding strip for holding one edge of a wire screen and means for latching the strip to a window sill, said latching means comprising a generally horizontal lip connected to said strip and extending inwardly therefrom and having a retainer shank receiving slot formed therein extending inwardly from said strip, the inner end of the lip being bent upwardly to form a handle by which the lip may be manipulated, said lip having a retainer head receiving opening formed therein communicating with the inner end of the slot to permit the lip to be passed onto a fixed headed retainer with the head of such retainer passing through the opening to ride on the margins of the lip defining the slot to progressively tension the wire screen as the retainer approaches the end of the slot, the margins of said lip defining the end of the slot being expanded to enable the retainer head to snap thereinto to partially relieve the screen tension and latch the strip in place.

8. A screen-holding strip for frameless window screens comprising a bottom screen edge holding member, means connected to the bottom holding member for securing the same to a sill of a window frame, said means including a laterally extending upwardly inclined portion having an upwardly bent portion in the form of a handle extending therefrom, the laterally extending portion and the upwardly extending portion having a keyhole slot formed therein with the narrow portion of the slot being located in the laterally extending portion of the means and the enlarged portion of the slot being located in the upwardly extending portion of the means, thereby permitting the head of a securing screw to pass through the upwardly extending portion of the strip and transversely of the laterally extending portion.

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The following references are of record in the file of this patent:

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