April 23, 1957 A. D. GOETTL ET AL 2,789,494

EVAPORATIVE COOLERS AND MEANS FOR MOUNTING THE SAME

Filed Oct. 17, 1955 2 Sheets-Sheet 1

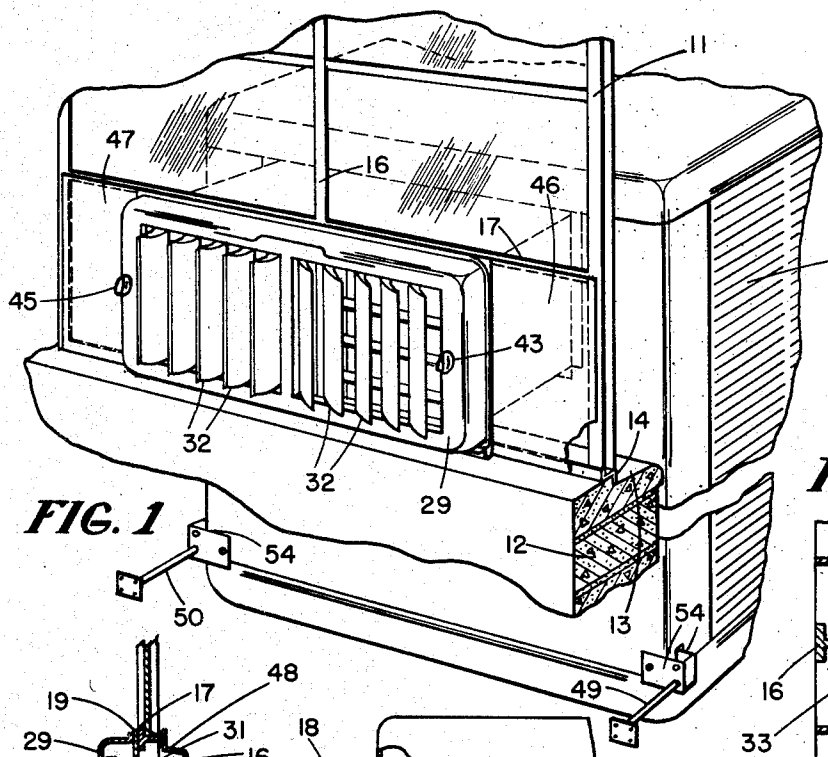

FIG. 1

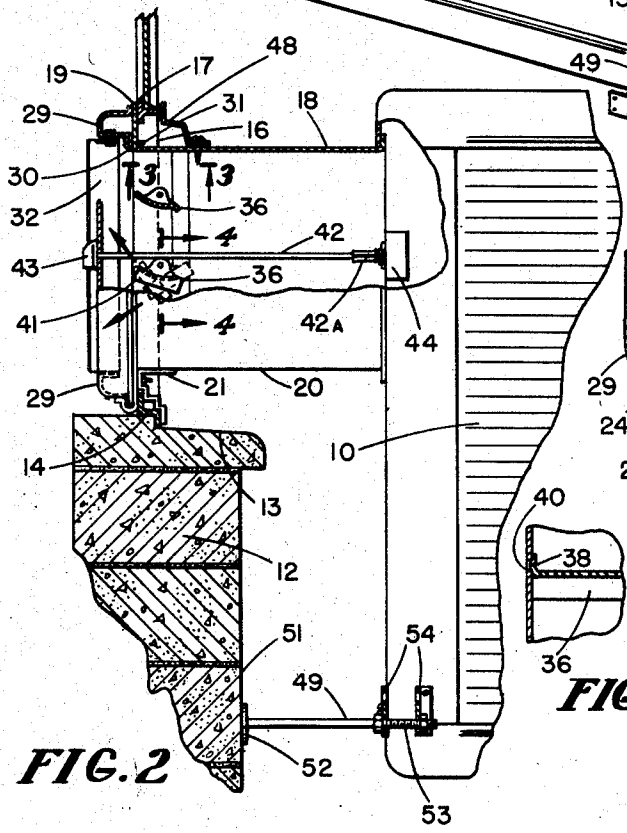

FIG. 2

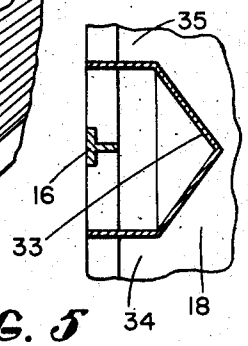

FIG. 3

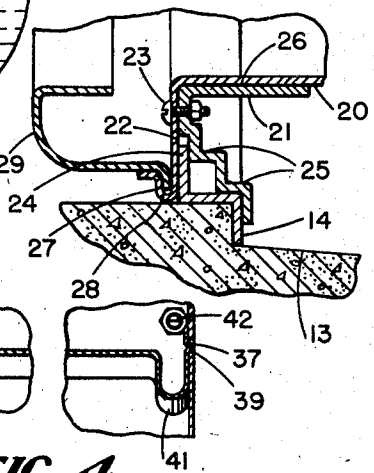

FIG. 4

FIG. 5

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EVAPORATIVE COOLERS AND MEANS FOR MOUNTING THE SAME

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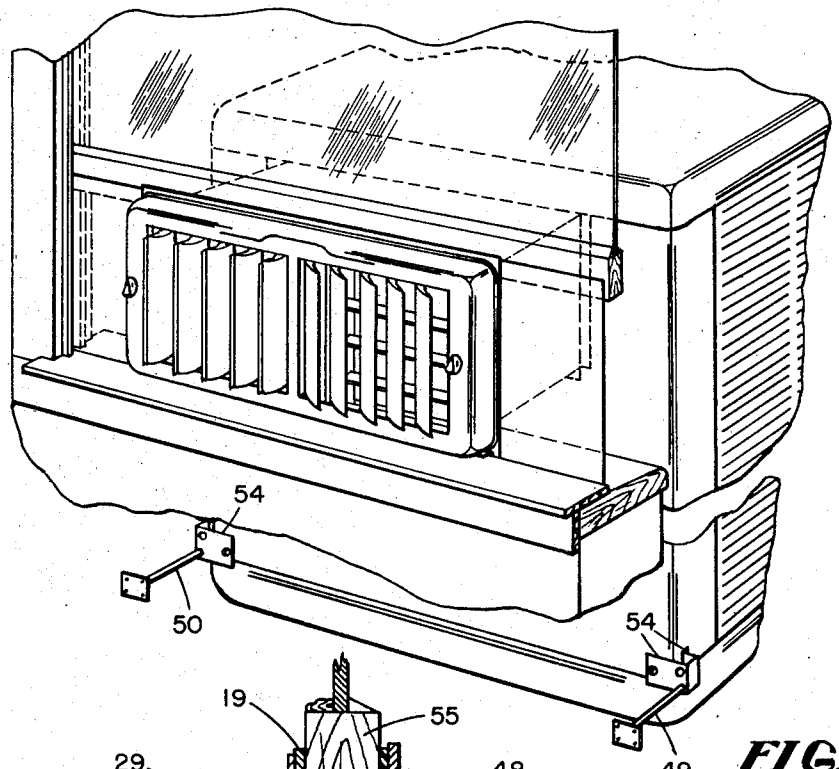

FIG. 6

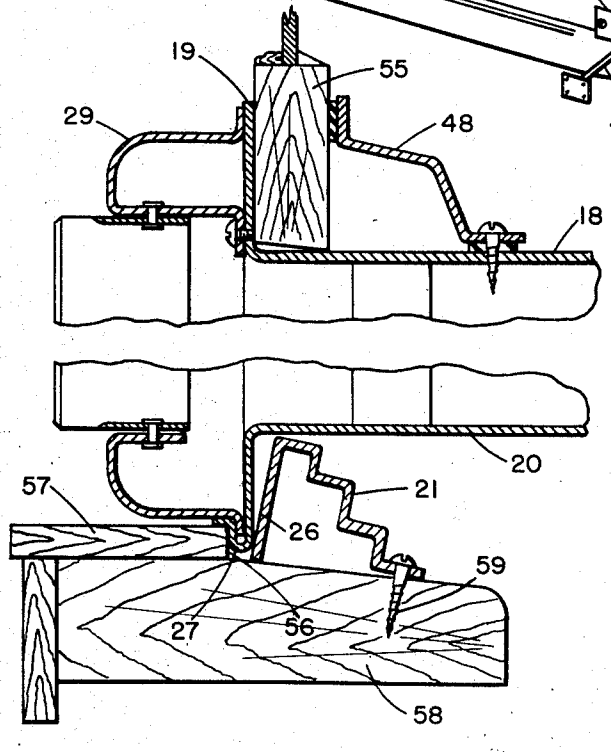

FIG. 7

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EVAPORATIVE COOLERS AND MEANS FOR MOUNTING THE SAME

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14 Claims. (Cl. 62—139)

This invention relates to an evaporative cooler and means for mounting the same in window openings.

The installation of evaporative coolers in window openings poses many mechanical considerations; particularly when a given unit must be installed in window openings having a great variety of sash and sill structures constructed of various materials.

In window openings having metal sash, vertical mullion structures are present, and in window opening having wooden sash, cooler mounting problems are quite different. Heretofore it has been very difficult to adapt a single installation kit to a great variety of structures in window openings, whereby an evaporative cooler may be easily and readily installed in any one of them without making major alterations in such structures. Window openings having steel sash, for example, contain vertical mullion structures which have heretofore been cut away in order to provide a sufficient opening to receive the cool air delivery duct of an evaporative cooler. In addition, it has heretofore been difficult to attain proper installation of a cooler in connection with both the wooden and steel structures in a window opening without altering either the window structures or features of the evaporative cooler and/or its supporting fixtures.

Accordingly, it is an object of the present invention to provide an evaporative cooler having means for readily installing it in window openings having a variety of window supporting structures therein.

Another object of the invention is to provide an evaporative cooler having means which provide secure support of an evaporative cooler in a window opening which is equipped with either metal or wooden sash structures.

Another object of the invention is to provide a clip means for securing and supporting an evaporative cooler duct in a window opening in connection with either wooden or metal window sash.

Another object of the invention is to provide an evaporative cooler having a very simple mullion straddling duct which is provided with an external weather proof shield.

Another object of the invention is to provide novel remote means for an evaporative cooler which is mounted in a window opening, whereby a motor switch and water valve in the evaporative cooler may be readily and easily controlled from the inside of the window opening in which the cooler is installed.

Another object of the invention is to provide a novel louver structure which is provided with an off-set portion adapted to straddle a cooler control rod when the louver structure is pivoted, for directing the air passing thereover at various angles as desired.

Another object of the invention is to provide an evaporative cooler output duct structure which serves as a means for mounting the cooler within a window opening and also serves as a mounting for a louver grill, on the inside of the room inwardly of window supporting structure in the window opening.

Another object of the invention is to provide an evaporative cooler and means for installing the same in window openings which provides for very neat and simple cooler installations in window openings having various window supporting structures, whereby the economy of installing coolers therein is reduced to a minimum.

A further object of the invention is to provide an evaporative cooler and means for installing the same in window openings having various window supporting structure, whereby the simplicity of the cooler installation features permits the average layman to readily install the cooler in his home with a minimum of tools.

A still further object of the invention is to provide a louver structure having a resilient portion which exerts force longitudinally of the louver, whereby it may be installed between two wall structures so that the resilient structure tends to extend the length of the louver between the walls thereby holding it securely in any of several angularly adjusted positions as desired.

Further objects and advantages of the invention may be apparent from the following specification, appended claims and accompanying drawings in which:

Fig. 1 is a fragmentary perspective view showing an evaporative cooler and means for installing the same in a window opening having steel sash and vertical mullion structures therein.

Fig. 2 is a vertical sectional view of a building wall and steel window frame structure showing an evaporative cooler installed therein according to the present invention and showing portions thereof broken away and in section to amplify the illustration.

Fig. 3 is an enlarged fragmentary sectional view taken from the line 3—3 of Fig. 2 showing a vertical mullion of the window frame structure and a mullion straddling branch feature of the evaporative cooler duct which delivers cool air through the window opening.

Fig. 4 is an enlarged fragmentary sectional view taken from the line 4—4 of Fig. 2 showing a horizontal louver having a section thereof arranged to straddle a control rod extending from the interior of the window opening to a control element in the cooler outside the building in which the window opening exists.

Fig. 5 is an enlarged fragmentary sectional view of the cooler installation means and louver grill support structure adjacent to the window sill wherein steel sash is installed.

Fig. 6 is a perspective view of an evaporative cooler and means for installing the same in connection with wooden sash and sill structures within a window opening; and

Fig. 7 is an enlarged fragmentary vertical sectional view through the wooden sash and sill structure as shown in Fig. 6 of the drawings and illustrating the details of the cooler installation means.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawing.

With reference to Fig. 1 of the drawing, it will be seen that the present invention relates to the installation of an evaporative cooler 10 within a window opening wherein steel sash 11 is present. The steel sash 11 is quite often installed in window openings within concrete block wall structures. For purposes of illustration a concrete block wall 12 is illustrated in Fig. 1 of the drawings. This wall 12 at the lowermost portion of the window opening is provided with a sill 13 on which a Z section frame element 14 is positioned as shown best in Fig. 5 of the drawings. The steel sash or window frame structure as shown in Fig. 1 of the drawing is also provided with a vertical mullion element 16 which is shown in section in Fig. 3 of the drawing. It will be noted that this mullion element 16 interconnects the horizontally disposed sash frame element 14 and a horizontal sash frame element

17. The space between these horizontal frame elements directly above the sill 13 varies in accordance with the number of lights or window panes within a standard sized window opening. Thus, a variety of steel sash exists in various building structures whereby different spacing of the horizontal frame elements 15 and 17 poses a problem of installation which has been readily met by the present means for installing evaporative coolers in window openings. As shown in Fig. 2 of the drawing it will be seen that the evaporative cooler 10 is provided with an output duct 18 which is adapted to deliver cool air to the interior of the room inwardly of the frame elements 14 and 17. The duct 18 is provided with an upwardly directed flange 19 which extends a considerable distance above the upper horizontal surface thereof. This flange 19 engages the inner side of the horizontal frame element 17 of the steel sash and due to the generous extension of the flange 19 above the upper wall of the duct 18 it is capable of engaging the horizontal frame element 17 even though its vertical spacing from the sill frame element 14 may vary an inch or two. The duct 18 is provided with a lower wall 20 which is supported by stepped clips 21 engaging the outer surfaces of the Z-shaped window frame element 14. This stepped clip 21 is bolted to a downwardly extending flange portion 22 which is integral with the lower wall 20 of the duct 18. The stepped clip 21 and flange 22 are clamped together by bolts 23 which cause the upwardly extending leg 24 of the Z-shaped window element 14 to be firmly clamped between a step portion of the clip 21 and the outer side of the flange 22. The stepped clips are provided with a plurality of stepped portions 25 which provide for horizontal and vertical engagement of the Z-shaped window frame element 14 at its outer surfaces and upper side. The upper horizontal portion 26 of this stepped clip engages the lower wall 20 of the duct 18 and provides a secure support therefor. The lowermost edge portion of the flange 22 is provided with a channel portion 27 in which a flange 28 of the grill frame 29 is supported. This grill frame 29 as shown in Fig. 2 of the drawings is provided with a tab 30 near its upper portion which is fixed by means of a screw 31 to the upwardly extending flange 19 which is integral with the upper wall of the duct 18. The grill frame 29 is provided with axially vertically mounted louvers 32 which are adjustable as desired for directing air delivered by the cooler to accommodate certain cooling requirements within a room inwardly of the grill frame 29. As shown in Fig. 1 of the drawings, the axially vertical louvers 32 are slightly curved in cross-section and are arranged to direct air in a slightly diverging relation at opposite sides of the mullion 16 which, as shown in Fig. 3 of the drawings, is straddled by a bifurcated portion 33 of the duct 18. Bifurcation of the duct 18 to permit straddling of the mullion 16 provides two separate duct portions 34 and 35 which deliver air through the axially vertical louvers 32. Rearwardly of these louvers 32 are horizontal louvers 36 which are disposed in each of the duct branch portions 34 and 35 of the main duct 18. The louvers 36 are axially horizontally adjustable and as shown in Fig. 4 of the drawings are provided with integral projecting bearing portions 37 and 38 at their opposite ends. These projections engage openings 39 and 40, respectively, in the walls of the branch duct portions 34 and 35. These louvers 36 are each provided with a resilient U-shaped section 41 near one end thereof which is stressed when the bearing portions 37 and 38 at opposite ends of the louver are positioned between the confining duct walls which are normally closer together than the free length of the louver. Thus, the resilient tendency of the U-shaped portion 41 of each of the louvers 36 is to extend the over-all length of the louver whereby it, when confined between the walls of the duct, securely holds itself in certain adjusted position as desired. In addition, the U-shaped portion 41 is arranged to bypass or extend around a control rod 42 even though the plane of the louver adjacent thereto may be adjusted at various angles as indicated by dash lines in Fig. 2 of the drawings. The resilient structure in these louvers 36 provides for a very simple means for maintaining them in certain adjusted position and for preventing the louvers from rattling or fluttering when subjected to flow thereabout.

It will be noted that the rod 42 is provided with a control knob 43 adapted for manual adjustment or rotation of the rod 42 which is connected to a switch or a valve 44 which is part of the evaporative cooler control equipment. Evaporative coolers require water and electrical power to operate them, therefore the manual control knob 43 in connection with the rod 42 may be connected to either a switch or valve while another control knob 45 is connected to a rod similar to the rod 42 and may also be connected to either a switch or valve as desired. Thus, the two rods in connection with the knobs 43 and 45 provide for control of the electrical motor which drives the fan of the evaporative cooler and also provide for control of the valve which conducts water to the pads of the cooler. These rods are provided with axially removable couplings 42*a* located between the control knobs and the cooler. These couplings facilitate installation of the rods 42.

In order to render the window opening weather proof around the duct 18 at the location wherein it projects through the window frame, plates 46 and 47 are secured between the frame elements 14 and 17 adjacent opposite ends of the grill frame 29. An external rain shield 48 is secured to the upper side of the duct 18 to cover the opening at the transition of the duct portions 34 and 35 which straddle the mullion 16. The shield 48 is provided with rubber gaskets which engage the duct 18 and the horizontal window frame element 17. Thus, rain cannot reach the inside of the window opening between the duct portions 34 and 35 which straddle the mullion 16.

Installation of the evaporative cooler in accordance with the present invention in a window opening containing steel sash is substantially as follows:

It is necessary to tilt the cooler 10 outwardly from the wall 12 at its lower portion whereupon the duct 18 is declined downwardly from the cooler 10 which permits the upper edge of the flange 19 to first be inserted beneath the sash frame element 17. The flange 19 is then moved upwardly on the inside of the sash frame 17 until the channel portion 27 integral with the lower wall 20 of the duct 18 may be moved inwardly over the upper edge of the Z-shaped frame 14. The stepped clips are then installed by inserting the bolts 23 which clamp the same into engagement with the frame member 14, as hereinbefore described. It will be noted that the weight of the cooler then tends to exert an inward force on the stepped clips 21 and an outward force on the flange 19 which bears on the inner side of the sash frame element 17. The cooler 10 near its lower corners is provided with bearing arms 49 and 50 which engage the outer side 51 of the wall 12. These arms 49 are constructed of rods and have enlarged portions 52 which bear against the outer side 51 of the wall 12 providing a very secure support for the lower end of the cooler 10 which tends to pivot inwardly toward the wall 12 when supported in the window frame structure as shown in Fig. 2 of the drawings. The arms 49 and 50 are provided with screw-threaded portions 53 mounted in brackets 54 which are fixed to the cooler near its lower corners. The screw-threaded portion of the arms 49 and 50 are engaged by nuts which abut the brackets 54 and permit spacing adjustment of the cooler 10 relative to the wall 12.

Attention is called to Figs. 6 and 7 of the drawings, which illustrate the present evaporative cooler and means for mounting the same in a window opening wherein wooden sash is provided. A wooden window sash 55 is

engaged by the flange 29 of the duct 18; however, during installation of the cooler the conventional wooden sash 55 may be raised which permits the cooler to be inserted directly into the window opening. The channel 27 is abutted to the edge 56 of the sash stop plates 57 and the step clips are fixed to the wooden sill 58 by means of screws 59. The portions 26 of the step clips 21 engage the outer portion of the channel 27 and hold the same securely in engagement with the edge of the plate 57 while these step clips 21 also engage the lower wall 20 of the duct 18 for vertically supporting the same in the window opening. According to the present invention, the kit for installing the evaporative cooler including the clips 21 is readily useful and very simply applied to the structures of both steel and wooden sash in conventional window openings without making alterations in any of the window pane supporting structures.

Though we have shown and described an evaporative cooler and means for installing the same in window openings, we do not wish to be limited to the particular construction disclosed but desire to emphasize the fact that the invention may be limited only by a just interpretation of the following claims.

We claim:

1. In an evaporative cooler and means for installing the same in window opening, an evaporative cooler, a duct extending therefrom, flange means at the end of the duct engageable with frame structure, clip means supportable on window sill structure for supporting the lowermost portion of said duct, the flange structure at the upper portion of said duct engageable with the inner side of window sash structures, and the lower portion of said evaporative cooler having arms engageable with the outer side of a wall below a window opening through which said duct extends.

2. In an evaporative cooler and means for installing the same in window openings, an evaporative cooler, a duct extending therefrom, flange means at the end of the duct engageable with window frame structure, clip means supportable on window sill structure for supporting the lowermost portion of said duct, the flange structure at the upper portion of said duct engageable with the inner side of window sash structures, and the lower portion of said evaporative cooler having arms engageable with the outer side of a wall below a window opening through which said duct extends, said duct bifurcated and adapted to extend around a vertically disposed mullion structure in said window opening.

3. In an evaporative cooler and means for installing the same in window openings, an evaporative cooler, a duct extending therefrom, flange means at the end of the duct engageable with window frame structure, clip means engageable with window sill structure for supporting the lowermost portion of said duct, the flange structure at the upper portion of said duct engageable with the inner side of window sash structures, the lower portion of said evaporative cooler having arms engageable with the outer side of a wall below a window opening through which said duct extends, said duct bifurcated and adapted to extend through a vertically disposed mullion structure in said window opening, said flange structure on said duct having a channel portion near the lower wall of said duct and a louver grill frame having a portion retained in said channel portion, said louver grill frame disposed at the end of said duct projecting through the window opening and the upper portion of said louver grill frame removably secured to said flange.

4. In an evaporative cooler and means for installing the same in a window opening, an evaporative cooler, a duct extending therefrom and projectable through a window opening, said duct at its lower wall portion having a downwardly extending flange adapted to be positioned inwardly of a window sill supported frame element and a clip means bolted to said flange and clamped against the bottom of said duct and engageable with the outer side of said sill supported frame element for clamping said duct securely in connection therewith.

5. In an evaporative cooler and means for installing the same in a window opening, an evaporative cooler, a duct extending therefrom and projectable through a window opening, said duct at its lower wall portion having a downwardly extending flange adapted to be positioned inwardly of a window sill supported frame element and a clip means bolted to said flange and clamped against the bottom of said duct and engageable with the outer side of said sill supported frame element for clamping said duct securely in connection therewith, said duct having a flange element extending upwardly from its upper wall portion and adapted to engage the inner side of a horizontally disposed window frame element.

6. In an evaporative cooler and means for installing the same in a window opening, an evaporative cooler, a duct extending therefrom and projectable through a window opening, said duct at its lower wall portion having a downwardly extending flange adapted to be positioned inwardly of a window sill supported frame element and a clip means bolted to said flange and clamped against the bottom of said duct and engageable with the outer side of said sill supported frame element for clamping said duct securely in connection therewith, said duct having a flange element extending upwardly from its upper wall portion and adapted to engage the inner side of a horizontally disposed window sash frame element, said duct bifurcated and adapted to straddle a vertical mullion extending between said sill supported frame element and said horizontally disposed window sash frame element.

7. In an evaporative cooler and means for installing the same in a window opening, an evaporative cooler, a duct extending therefrom and projectable through a window opening, said duct at its lower wall portion having a downwardly extending flange adapted to be positioned inwardly of a window sill supported frame element and a clip means bolted to said flange and clamped against the bottom of said duct and engageable with the outer side of said sill supported frame element for clamping said duct securely in connection therewith, said duct having a flange element extending upwardly from its upper wall portion and adapted to engage the inner side of a horizontally disposed window sash frame element, said duct bifurcated and adapted to straddle a vertical mullion extending between said sill supported frame element and said horizontally disposed window sash frame element, said flanges of said duct having means for supporting a grill frame inwardly of the window opening and a louver supporting grill frame fixed to said flange elements and abridging the bifurcated portions of said duct.

8. In an evaporative cooler and means for installing the same in a window opening, an evaporative cooler, a duct extending therefrom and projectable through a window opening, said duct at its lower wall portion having a downwardly extending flange adapted to be positioned inwardly of a window sill supported frame element and a clip means bolted to said flange and clamped against the bottom of said duct and engageable with the outer side of said sill supported frame element for clamping said duct securely in connection therewith, said duct having a flange element extending upwardly from its upper wall portion and adapted to engage the inner side of a horizontally disposed window sash frame element, said duct bifurcated and adapted to straddle a vertical mullion extending between said sill supported frame element and said horizontally disposed window sash frame element, said flange of said duct having means for supporting a grill frame inwardly of the window opening and a louver supporting grill frame fixed to said flange elements and abridging the bifurcated portions of said duct, a shield positioned over the transition of said bifurcated portion of said duct and disposed outwardly of said horizontally disposed sash element and having gasket means engaging the same and the upper side of said duct

to prevent elements from entering the transition of the duct bifurcation.

9. In a evaporative cooler and means for installing the same in a window opening, an evaporative cooler having a duct extendable into a window opening, axially horizontal louver means adjustably mounted in said duct, said louver means having a U-shaped offset portion of resilient character tending to force opposite ends of said louver means into frictional engagement with the walls of said duct and control rod means extending from the inner end portions of said duct into said cooler in alignment with said offset portions of said louvers, whereby said louvers may be angularly adjustable about said rod means without interfering with the same.

10. In a louver structure, a pair of spaced walls, a louver pivoted therebetween and having a resilient U-shaped portion intermediate its ends tending to extend the length thereof, whereby opposite ends of the louver are frictionally engaged with said walls for holding the louver in any one of a plurality of pivotally adjusted positions with respect to said walls.

11. In an evaporative cooler, and means for installing the same in a window opening, an evaporative cooler, a duct extending therefrom and projectable through a window opening, a louver grill on the inner end of said duct and a pair of remote control rod means extending from said grill through said duct and into said cooler a fan switch operable by one of said rods, and a water valve operable by the other of said rods whereby said rods may be manually adjusted for remotely controlling said cooler.

12. In an evaporative cooler, and means for installing the same in a window opening, an evaporative cooler, a duct extending therefrom and projectable through a window opening, a louver grill on the inner end of said duct and a pair of remote control rod means extending from said grill through said duct and into said cooler a fan switch operable by one of said rods, and a water valve operable by the other of said rods whereby said rods may be manually adjusted for remotely controlling said cooler, said rods having axially removable connectors between said louver grill and said cooler control means.

13. In a cooler and means for installing the same, the combination of; a wall having a window opening therein; a cooler disposed to be installed outside a window opening; a window frame in said window opening and having a horizontal element therein; a duct connected to said cooler and extending therefrom, said duct connected to said horizontal element of said window frame and disposed to deliver cool air from said cooler into a room inwardly of said window opening; a vertical mullion in said window frame, said duct bifurcated into spaced portions and thereby disposed to straddle said vertical mullion in said window frame; and a louver grill frame secured to and interconnecting said spaced duct portions and located at the inner side of said vertical window frame mullion and within a room inwardly of the window frame.

14. In a cooler and means for installing the same in a window opening, the combination of; a cooler; an air delivery duct extending therefrom, said duct, at its opposite end from said cooler, bifurcated to form an open vertically disposed space straddled by separate duct portions, said vertically disposed space adapted to receive a vertical mullion of a window frame when said duct is projected, from the outside of a building, into a window opening therein; and a grill frame connected to said separate duct portions and abridging said open space at the normally inner side of a mullion when received in said open space.

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