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COOLER

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This invention relates to air conditioning apparatus and relates more particularly to devices or coolers for supplying cool air to rooms and other compartments. A general object of this invention is to provide an apparatus of the character referred to embodying a novel highly effective means for mounting the same in a window opening or similar aperture.

The present invention is primarily concerned with devices usually known as evaporative coolers which serve to supply cool air to rooms and other compartments of building structures and is particularly concerned with the type of cooler that is to be positioned in a window opening or similar aperture. Considerable difficulty has been encountered in providing a practical means for supporting or mounting such evaporative coolers in the window openings, etc.

An important object of this invention is to provide a positive dependable and universally adaptable means for mounting or supporting an air conditioning device or cooler in a window opening or similar aperture.

Another object of this invention is to provide an apparatus of the character referred to in which the weight of the device is transferred to the building structure at spaced points thereby relieving the cooler, window frame and building parts of concentrated loads.

Another object of this invention is to provide a cooler or air conditioning apparatus of the character referred to in which the cooler is engaged or hung in the window opening, or the like, in such a manner that it tends to swing downwardly and inwardly toward the external face of the building and adjustable means are provided for resisting such tendency. The adjustable means are carried by the cooler at spaced points and are engageable with the outer face of the building to transmit the load directly to the building. By adjusting these means the cooler may be brought to its correct upright position and may be maintained in the correct operating position throughout its period of use.

Another object of this invention is to provide an apparatus of the character referred to in which a simple rigid frame carries the heavy principal elements of the apparatus and the above mentioned adjustable support means are likewise carried by the rigid frame so that the loads transmitted by the adjustable means are transmitted directly to the frame and do not distort or strain the casing.

Another object of this invention is to provide an apparatus or cooler of the character men-

tioned that is simple and inexpensive to manufacture and that is very easy to install.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of my invention, throughout which description reference is made to the accompanying drawing, in which:

Fig. 1 is a perspective view showing the cooler of the present invention mounted in position at the window opening of a building structure. Fig. 2 is a perspective view at the inside of the window illustrating a portion of the mounting means or adaptor means. Fig. 3 is an enlarged vertical detailed sectional view showing the apparatus in position on the building with portions of the apparatus in side elevation. Fig. 4 is an enlarged fragmentary horizontal detailed sectional view illustrating the manner in which the side sealers fit the window opening. Fig. 5 is an enlarged fragmentary horizontal detailed sectional view illustrating one of the adjustable means for bearing on the outer face of the building and Fig. 6 is a vertical detailed sectional view taken as indicated by line 6—6 on Fig. 5.

The apparatus of the invention may be employed or installed in situations varying greatly in character. In the drawing I have shown a typical installation where the device is installed at the window opening of a building structure to deliver cool air to the interior of the structure. It is to be understood that the invention is not to be construed as limited or restricted to the specific embodiment of the invention illustrated or to the particular use or application.

The building structure illustrated comprises a wall 10 provided with a window opening. The window opening is equipped with the usual frame 11 and sill 12. A window 13 is movable vertically in the window frame and in the drawing is shown in a partially raised position.

The cooler or apparatus of the present invention may be said to comprise, generally, a housing or casing 14, a supporting frame 15 within the casing 14, air handling means 16 carried by the frame 15 and operable to create a movement of air, adaptor means 17 engageable in the window or frame 11 to support or partially support the cooler and to direct the moving air into the building, and adjustable means 18 carried by the frame 15 for bearing on the exterior of the wall 10 to maintain the cooler in the horizontal operative position and to assist in trans-

mitting the weight of the cooler to the building structure.

In the typical embodiment of the invention illustrated in the drawing the casing 14 is an upright generally rectangular structure and the casing is hollow to house and contain the working parts, etc. The top 19, bottom 20 and inner wall 21 of the casing 14 may be closed or imperforate. The forward wall and the two opposite side walls of the casing 14 are perforate to admit the outside air and, in the case illustrated, these walls of the casing have horizontal louvers 22. The particular casing 14 has a width somewhat less than that of the window opening and is of substantial vertical extent to project downwardly beyond the window sill 12 when in the operative position. Insofar as the present invention is concerned the casing 14 may be a simple sheet metal structure.

The supporting frame 15 serves to mount the various working or operating parts within the casing 14 and carries the adjustable thrust transmitting means 18. While the supporting frame 15 may vary considerably in construction it preferably includes two spaced vertical members 23 carrying or secured to the rear wall 21 of the casing 14 and disposed within the hollow casing. The frame further includes horizontal members 24 projecting forwardly in the casing 14 from the lower ends of the members 23 and pitched or inclined members 25 extending upwardly and rearwardly from the forward ends of the members 24 to the vertical members 23. The members 23, 24 and 25 may be of channel stock or of angle stock, as illustrated, and occur in horizontally spaced sets or assemblies. The members 23, 24 and 25 of each frame unit are rigidly secured one to the other to constitute a strong unyielding triangular framework. The upper portions of the vertical members 23 may project upwardly beyond the members 25 and the horizontal frame members 24 are preferably spaced above the bottom 20 to leave a pan or a space for receiving a pan. As best illustrated in Fig. 1 of the drawing the triangular frame unit made up of the members 23, 24 and 25 are spaced inwardly from the adjacent side walls of the casing 14, although this is not always essential. It is to be understood that the rear casing wall 21 and other elements of the casing may be secured to and carried by the two frame assemblies or units.

The air handling means 16 may vary in nature with different sizes and uses of the apparatus. In the case illustrated the means 16 includes a centrifugal type blower having a volute case 26 and a centrifugal type blower wheel 27 within the case. The case 26 is housed within the casing 14 and has its discharge end or outlet facing inwardly and located at the inner wall 21 and adjacent the upper end of the casing. The side walls of the volute blower case 26 have air admission openings 28. The volute case 26 is disposed between the two triangular frame units made up of the members 23, 24 and 25 and may be secured to the frame units and to other parts of the casing such as the rear or inner wall 21. The centrifugal wheel 27 of the blower is carried by a shaft 29 which projects from the opposite ends of the volute case 26. The projecting end portions of the wheel shaft 29 are mounted in suitable bearings 30 fixed on the angular frame members 25. Any suitable power means and drive may be provided for operating the blower. In the case illustrated, an electric motor 31 is

mounted on one of the sloping frame members 25 to operate the blower. A suitable belt and pulley drive 32 having the desired speed reduction is provided between the motor 31 and the adjacent end portion of the shaft 29. Air filter packs 33 may be mounted in the casing 14 at its several louvered sides and where the apparatus is to serve as a cooler and humidifying device these packs are supplied with water to obtain the cooling and humidifying action by the evaporation of the water in the packs. I have shown a pipe or tube 38 leading into the casing 14 to deliver water to the packs 33. The present invention is not primarily concerned with the details of the packs 33 or of the water handling means and these elements are omitted from the present disclosure. It is to be understood, however, that the filter packs and water circulating elements may, if desired, be mounted on the two triangular units of the supporting frame 15.

The adaptor means 17 operates to mount the device at the window to deliver or direct the air from the blower into the building structure. The adaptor means 17 includes a tubular adaptor 34 leading from the outlet of the blower case 26. The outlet of the blower case 26 may be square or rectangular and the adaptor 34 may be of the same shape. The adaptor 34 is secured to the blower case 26 and may be secured to the casing 14 and projects horizontally from the rear or inner wall 21 of the casing 14. The adaptor 34 is of sufficient length to project completely through the window frame 11 with the casing 14 spaced away from the external face of the wall 10, as illustrated in the drawing. A vertical or down turned flange 35 extends along the lower side of the adaptor 34 at its inner extremity to engage with the inner face or edge of the sill 12. The lower side of the adaptor 34 may rest on the sill 12. The inner end of the adaptor 34 may be equipped with a suitable grill 36.

The adaptor means 17 further includes closures or seals for closing those portions of the window opening at opposite sides of the adaptor 34 and which occur by reason of the window 13 being raised to a position above the adaptor. In some installations the seals may consist of simple plates or sheets secured to the opposite sides of the adaptor 34 and cut to size at the job to close the opening. In the construction illustrated there are adjustable seal assemblies for closing the opening. There is a closure or seal assembly at each side of the adaptor 34. Each of these assemblies includes a stationary closure section 37 secured to a side of the adaptor 34. Angle irons 39 may secure the sections 37 to the sides of the adaptor 34. The closure sections 37 are of the same vertical extent as the adaptor 34 and are vertically disposed in or adjacent the plane of the window 13. The stationary sections are U-shaped or channel shaped having channels 41. Each assembly of the closure means further includes a shiftable or adjustable section 40. The sections 40 are vertically disposed plate-like members of the same vertical extent as the sections 37 and arranged to ride or shift in the channels 41 of the sections 37. The sections 40 are adjustably connected or associated with the sections 37 so that they may be moved in and out as occasion may require. It will be seen that when the adaptor 34 is engaged through the window opening to have its flange 35 cooperate with the inner edge of the sill 12 that the shiftable closure sections 40 may be moved in or out to bring their

outer edges into cooperation with the side parts of the window frame 11.

The means 18 are features of the invention. The means 18 are such that the casing 14 may be supported in the correct horizontal position for the most efficient operation and are such that the casing may be readily adjusted to maintain this position. The hanging or mounting of the cooler on the sill 12 by the engagement of the flange 35 with the sill is such that there is a tendency for the cooler to swing downwardly and inwardly toward the external surface of the wall 10. It is to be observed that the principal elements of the apparatus are spaced some distance outwardly from the wall 10 and the center of gravity of the cooler is quite remote from the mounting flange 35. Accordingly, there is a distinct tendency for the cooler to swing inwardly toward a non-horizontal position. The means 18 serve to support the casing 14 against this tendency.

There is one or more adjustable bearing or supporting means 18 engaged between the wall 10 and the cooler structure. In the preferred construction illustrated there is a means 18 associated with each rigid unit of the frame 15. Each means 18 includes a screw 44 passed through a horizontal opening in the lower portion of a frame member 23 and extending through a registering opening in the wall 21 of the casing 14. The screws 44 are of substantial length to project beyond the wall 21 and to project into the casing 14. A pad or foot 45 is secured on the outer end of each screw 44. The feet 45 are adapted to flatly bear against the wall 10 for the transmission of the load or forces to the wall. The feet 45 may have openings 46 for passing screws or other attaching elements so that they may be secured to the wall 10. Two adjusting nuts 47 are provided on each screw 44. One nut 47 engages against the frame member 23, while the other nut 47 is cooperable with the outer face of the casing wall 21. It will be seen that by threading the nuts 47 along the screw 44 that the screw may be adjusted with respect to the casing 14. The screws 44 with their pads 45 may be individually adjusted so that they may both bear on the wall 10 to sustain or support the cooler in the position where the casing 14 is upright with its bottom 20 horizontal. The individual adjustment of the screws 44 adapts the cooler for installation in practically any situation and provides for the uniform dependable mounting of the cooler where the wall 10 is of different thicknesses or is irregular. The pads or feet 45 of the screws 44 may be secured to the wall 10 to prevent movement and vibration of the cooler. It is to be observed that the feet 45 are positioned adjacent the lower portion of the cooler to bear on the wall 10 at points a substantial distance from the axis about which the cooler tends to pivot to be particularly effective in sustaining the cooler. The screws 44 are directly secured to the rigid triangular frame units of the frame 15 to directly transmit the forces or loads from the frame to the wall 10 thus relieving the casing 14 of all loads and strains which might tend to distort it.

It is believed that the utility and practicability of the cooler provided by this invention will be readily apparent from the foregoing detailed description. In mounting the cooler the adaptor 34 is entered in the window opening so that

its flange 35 engages against the inner edge or sill 12. The outer sealing sections 40 are then adjusted outwardly to engage with the sides of the window frame 11. The window 13 may then be lowered to the position where its lower edge engages the adaptor 34 and engages the sealing sections 37 and 40. The screws 44 are adjusted so that their feet 45 bear on the wall 10 to sustain or support the cooler in the correct upright position for operation. The nuts 47 may be employed to adjust the screws 44 and when the cooler has been adjusted to the correct position the nuts are employed to set or lock the screws in the adjusted positions. The feet 45 may be secured to the wall 10 by screws or the like passed through the openings 46. It will be seen that the cooler may be very easily and quickly mounted in its correct operative position at window openings of various sizes and on wall structures of different kinds.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art or fall within the scope of the following claims:

Having described my invention, I claim:

1. In a cooler for installation at an opening in a building, a housing, a blower in the housing including a casing having as a rigid continuation thereof a discharge duct which projects from the housing adjacent the upper end of the housing and which bears in said opening to suspend the cooler so that the housing depends from the opening, a flange on the duct to engage the building and hold the duct in the opening, the duct further serving to convey air from the blower casing to the interior of the building, and means projecting from the side of the housing which opposes the building for bearing against the building to hold the cooler level in the operative position, said means including an adjustable screw and a part on the screw for engaging the building.
2. In a cooler for installation at an opening in a building wall, a blower including a casing having as a rigid continuation thereof a projecting discharge duct adapted to project inwardly through the opening to rest in the opening to form a support for the cooler and serving to support the casing at the exterior of the wall and to conduct the air from the blower to the interior of the building, a horizontally adjustable support on the casing spaced below said continuation and adapted to bear against the outer surface of the wall and a part on the discharge duct for engaging the internal surface of the building to prevent outward displacement of the cooler.
3. In a cooler for installation at an opening in a building wall, a blower including a casing having as a rigid continuation thereof a projecting discharge duct adapted to rest in the opening to form the primary support for the cooler and serving to conduct the air from the blower to the interior of the building, a part on the under side of the discharge duct for engaging an internal surface of the building to hold the cooler against outward displacement, frame means attached to the blower, and horizontally adjustable parts on the frame means at a point spaced below the said continuation of the casing for engaging the external surface of the building wall to hold the cooler in the upright operative position.

4. A device for installation at an opening in a wall comprising a casing, frame means in the casing including two rigid triangular units each comprising a vertical member, a horizontal member secured to the lower end of the vertical member, and a sloping member connecting the outer end of the horizontal member with the upper portion of the vertical member, blower means positioned between and secured to the frame units for producing a movement of air, the blower means including a blower wheel, a shaft for the wheel and bearing means for the shaft carried by said sloping members, a conduit rigid with the blower means and projecting from the upper portion of the casing to engage in said opening to suspend the device from the opening and conducting the air put into motion by the blower means, and means on the conduit for engaging the inner side of the wall to hold the device against outward movement.

5. A device for installation at an opening in a wall comprising a casing, frame means in the casing including two rigid triangular units each comprising a vertical member, a horizontal member secured to the lower end of the vertical member, and a sloping member connecting the outer end of the horizontal member with the upper portion of the vertical member, a blower means positioned between and secured to the frame units for producing a movement of air, the blower means including a blower wheel, a shaft for the wheel and bearing means for the shaft carried by said sloping members, a conduit rigid with the blower means projecting from the casing to rest in said opening to suspend the device from the opening and conducting the air put into motion by the last named means, means on the conduit for engaging the inner side of the wall to hold the device against outward movement, and means on said vertical members engageable with the other side of the wall to hold the casing upright.

6. In a cooler for installation at an opening in a building wall, a housing to be disposed at the exterior of the wall to have a side oppose the wall, duct means projecting from said side of the housing at a point spaced between the upper and lower ends of the housing for engaging in the opening to suspend the housing therefrom, the duct means

including a depending flange for retaining it in place, blower means in the housing discharging through the opening, a part projecting from said side of the housing at a point below the first named means for bearing against the wall to hold the cooler in the level operative position and means for adjusting said part horizontally.

7. In a cooler for installation at an opening in a building, a blower including a casing having as a rigid continuation thereof at its upper end portion a projecting discharge duct adapted to rest in the opening to form the primary support for the cooler with the casing depending at the exterior of the building, the projection serving to conduct the air from the blower to the interior of the building, a projection on the duct to engage the building and retain the duct in the opening, rigid frame means attached to the casing and extending between the upper and lower end portions thereof, and a horizontally projecting part secured on the exterior of the casing spaced below said continuation of the casing to be at the lower end portion of the casing for engaging the outer face of the exterior wall of the building at a point spaced below the opening to hold the cooler in the vertical operative position.

8. In a cooler for installation at an opening in a building wall, a blower including a casing having a rigid continuation thereof projecting from its inner side and confined to the upper end portion of the casing, the continuation forming a projecting discharge duct adapted to rest in the opening to form the primary support for the cooler so the casing depends below the opening at the exterior of the building, the continuation serving to conduct the air from the blower to the interior of the building, a flange on said duct to engage the building and hold the said duct in the opening, a blower wheel in the casing, a secondary supporting means including a frame attached to the casing and extending between the upper and lower end portions thereof, and a part carried by the frame at the lower end portion thereof for engaging the exterior of the building wall at a point spaced below the opening to hold the cooler in the upright position, and bearing means for the wheel mounted directly on the frame.

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