

Dec. 1, 1953

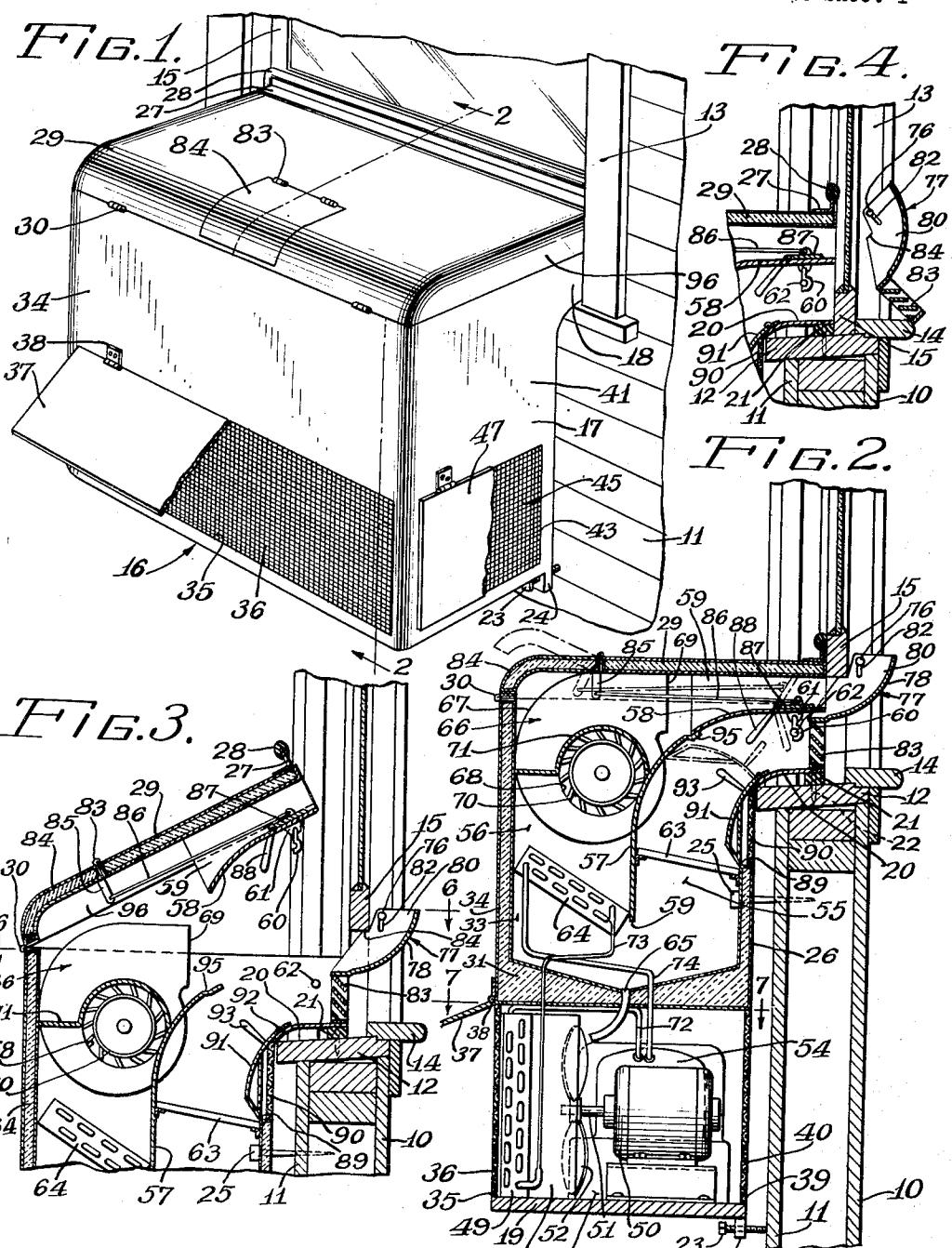
P. R. TIPTON ET AL.

2,660,866

WINDOW MOUNTED AIR CONDITIONER

Filed May 5, 1951

2 Sheets-Sheet 1



53 32 24 Inventors:
Phillip R. Tipton
William F. Borgerd
Pamela Cipolla Atty.

Dec. 1, 1953

P. R. TIPTON ET AL.

2,660,866

WINDOW MOUNTED AIR CONDITIONER

Filed May 5, 1951

2 Sheets-Sheet 2

FIG. 5.

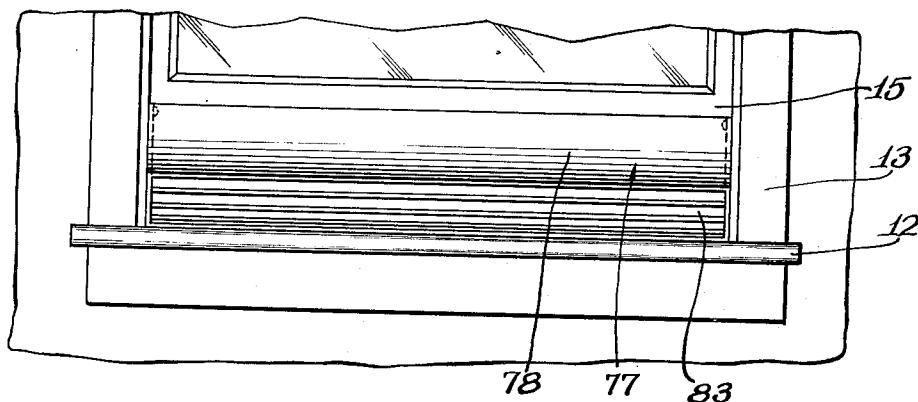


FIG. 6.

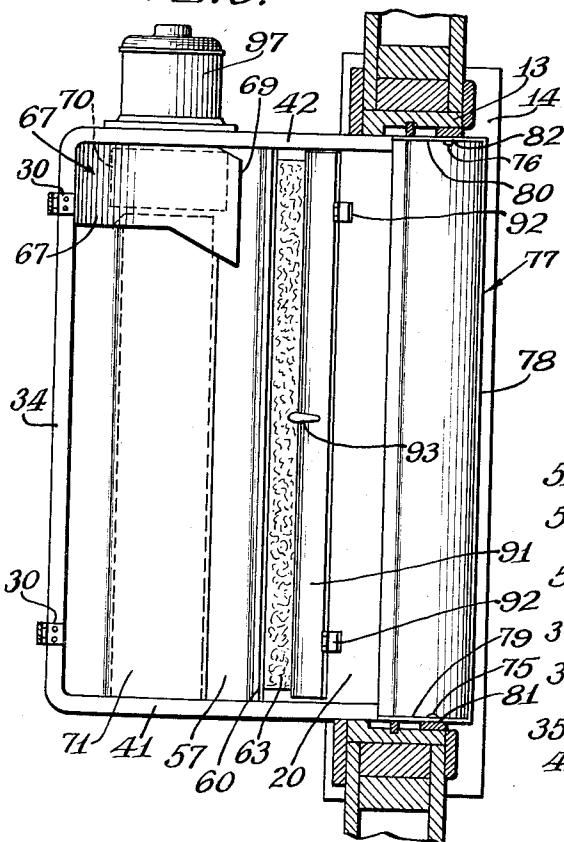
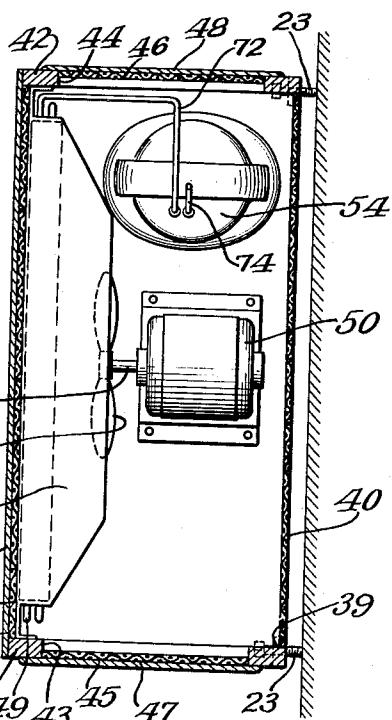


Fig. 7.



Inventors:
Phillip R. Tipton
William F. Börgerd
Paul O. Riegel

Atty.

UNITED STATES PATENT OFFICE

2,660,866

WINDOW MOUNTED AIR CONDITIONER

Phillip R. Tipton, Chandler, and William F. Borgerd, Evansville, Ind., assignors to International Harvester Company, a corporation of New Jersey

Application May 5, 1951, Serial No. 224,781

9 Claims. (Cl. 62—129)

1

This invention relates generally to a window mounted air conditioner, and more particularly to an air conditioner secured adjacent a window with the entire cabinet positioned outside the room to be cooled.

Heretofore, the window mounted room air conditioner has become increasingly popular and many manufacturers have produced such units. The most common design is one in which the cabinet fits on the window sill with the evaporator side of the cabinet extending into the room and the condenser side protruding on the outside of the window. In order to provide the cabinet with sufficient volume to house the refrigeration system, it has been necessary to construct a cabinet of such a height that it obstructs a considerable portion of the window. This is, of course, objectionable to the occupant since the view and light through the window are decreased. Therefore, most home owners will have the unit removed during the winter months, which adds the cost of seasonal removal and replacement to the operational cost of the unit. Other disadvantages of this type of unit are that the window cannot be closed unless the unit is removed and that the operating noise from the unit will be projected into the room. The present invention provides a window mounted unit which overcomes the above mentioned disadvantages and which offers many advantages as will be disclosed hereinafter.

One object of the invention is to provide an air conditioning unit which is mounted on a window sill with an air passageway of a minimum height opening into said room so that only a small portion of the window is obstructed by the unit.

Another object is to provide an air conditioning unit which is secured to a window sill of a room to be conditioned with the entire unit disposed exteriorly of the room.

Another object is to provide a room air conditioner having the condenser so located that outside air may be conveniently circulated thereover so as to provide excellent cooling thereof.

Another object is to provide a room air conditioner having a cabinet of such size that the refrigeration system and associated parts may be located therein without overcrowding.

Another object is to provide a window mounted air conditioner which may be completely serviced from outside the room being conditioned.

Another object is to provide a window air conditioner so located that a minimum amount of operating noise from the refrigeration system

2

and air circulating fans will be projected into the room being conditioned.

Another object is to provide a window mounted air conditioner with means for effectively removing evaporator condensate therefrom without the necessity of plumbing equipment.

Another object is to provide means for fastening an outside mounted air conditioner to a window sill in a manner which prevents unauthorized removal or tampering of the unit.

Another object is to provide an air conditioning unit with damper means which may be selectively set to either recirculate room air, or evacuate room air, or circulate fresh air into the room.

Another object is to provide an outside mounted air conditioner cabinet with a hinged lid, which can only be opened from within a room being conditioned, in order to provide access to the interior of the cabinet.

Another object is to provide a window mounted air conditioner unit so positioned in relation to the window that the window may be completely closed without removing any part of the unit.

Another object is to provide a splitter bar, for dividing the air passageway from the window mounted air conditioner to the room into an air inlet and air outlet, which is pivotally secured to the inner casing of the window so that it can be rotated from operating position to allow complete closing of the window.

Other objects and advantages of the invention will be apparent to those skilled in the art from the following description of the accompanying drawing in which:

Fig. 1 is a perspective view showing an air conditioner mounted on a window sill and the outside wall of a building.

Fig. 2 is a vertical cross sectional view of the air conditioner taken along line 2—2 of Fig. 1.

Fig. 3 is a cross sectional view of the top portion of the air conditioner showing the lid thereof partially raised.

Fig. 4 is a cross sectional view of a portion of the air conditioner and window showing the window in closed position.

Fig. 5 is an elevational view of the inner casing of the window showing the splitter bar secured thereto.

Fig. 6 is a plan view of the air conditioner taken along line 6—6 of Fig. 3.

Fig. 7 is a horizontal cross sectional view taken along line 7—7 of Fig. 2.

Referring to the drawings for a more detailed description of the invention, a portion of the

wall of a building is shown comprising spaced apart inner wall 10 and outer wall 11 between which any suitable material may be disposed. A double hung window is provided in the wall comprising outer sill 12, casing 13, inner sill 14, and lower sash 15. Although the present invention is illustrated in connection with this double hung window, it is to be understood that it is adapted for use in other types of windows such as a metal casement window.

The air conditioner unit which embodies the present invention is illustrated generally by reference numeral 16 and as seen in the drawing is enclosed by a rectangular shaped cabinet 17 having an elbow or horizontal portion 18 which fits over the outer window sill 12. A suitable frame 19, shown in part, is provided for strengthening the cabinet. The bottom wall 20 of elbow portion 18 rests upon a rubber gasket 21 and lag screws 22 secure the wall 20 and gasket 21 to the sill 12 in sealed relationship. Adjusting bolts 23 are threaded through brackets 24 and are used to adjust cabinet 17 to a vertical position. Lag screws 25 extend through a central portion of back wall 26 of cabinet 17 and are secured into outer wall 11 in order to provide additional support means for the cabinet. Channel members 27 are secured to the top and side walls of elbow portion 18 and a rubber gasket 28 is secured to the channels which contacts window casing 13 and sash 15 when the lower sash is raised, thus providing a seal around the elbow portion. The top of the cabinet 17 is provided with a lid 29 pivotally secured thereto by hinges 30 so that the lid may be raised as shown in Fig. 3 in order to provide access to the inner portion of the cabinet.

A horizontal insulated partition 31 divides the cabinet 17 into a high side compartment 32 and a low side compartment 33. The front wall 34 of cabinet 17 is provided with an outlet opening 35 in which a screen 36 is secured. A door 37 is hingedly connected to the wall 34 by hinges 38 and is adapted to cover opening 35 when in closed position. When the air conditioner is being used, it is contemplated that the door 37 be swung open approximately 80° and secured by hooks (not shown) or other suitable means. The back wall 26 of cabinet 17 is provided with an air inlet opening 39 closed by stationary screen 40, and the end walls 41 and 42 of the cabinet are also provided with air inlet openings 43 and 44 and screens 45 and 46, respectively. Secured to cabinet 17 by hinges are doors 47 and 48 which cover openings 43 and 44, respectively, when in closed position and are adapted to be rotated approximately 80° and secured by suitable means (not shown) when the air conditioner is operating. The doors 37, 47 and 48 also prevent rain from entering the compartment 32 when the doors are in open position.

Secured in the condenser compartment 32 adjacent air outlet opening 35 is a condenser 49 which extends across the width of the cabinet. Secured in compartment 32 is an electric motor 50 having a shaft 51 on which a propeller type fan 52 is mounted. Enclosing the fan 52 is a shroud 53 which tapers outwardly and fits over the edges of condenser 49 so that when the motor 50 is running and doors 37, 47 and 48 are open, the fan will draw outside air through inlet openings 35, 43 and 44 and force it over the tube surfaces of the condenser. Located adjacent opening 44 is a motor-compressor unit 54 which will also be

cooled by the air which is circulated thereover by fan 52.

All the walls of low side compartment 33 are insulated and the compartment is divided into an inlet passageway 55 and outlet passageway 56 by dividing walls 57 and 58. Wall 57 is secured to the end walls 41 and 42 with the lower edge 59 spaced from partition 31 and the upper edge provided with an offset portion 60 which is overlapped by wall 58 in air sealing relationship. Wall 58 is secured to vertical plates 59 which are mounted on the down-turned ends 60 of lid 29. Hooks 61 are pivotally connected to brackets 62 which are mounted on the wall 58. Fastened to end walls of cabinet 17 are pins 62 which are engaged by hooks 60 in order to lock the lid 29 in closed position. A filter element 63 is positioned across inlet passageway 55 so that air passing therethrough will be filtered. An evaporator 64 is disposed in outlet passageway 56 in a slightly inclined position so that any water condensing from the air onto the evaporator will drain down and drip from the lower edge of the evaporator onto the partition 31. The top surface of partition 31 slopes toward a center opening through which a tube 65 extends and terminates adjacent the condenser fan 52. The water will flow by gravity through tube 65 and will then be picked up by condenser fan 52 and sprayed in the form of a fine mist over the hot surface of the condenser 49 where it will be vaporized and then passed to the outside air.

A blower 66 is secured in outlet passageway 56 adjacent the end wall 42 with a driving motor 67 mounted on the exterior surface of the end wall. In the illustration the motor is mounted on the outside of the cabinet for easy cooling thereof and to provide additional space within the cabinet, but the motor could be mounted within the cabinet if desired. The blower 66 comprises a casing 68, having an inlet opening 69 and an outlet opening 70, and a circular rotor 71 having blades mounted thereon which will be rotated by motor 67. Extending from casing 68 to end wall 41 is a fan wall 72 having a semi-circular portion which fits around the top portion of inlet opening 69. The edges of the fan wall 72 fit against adjacent parts in sealed relationship so that all the air coming up through the evaporator will be drawn through fan inlet 69 and expelled by blower 66 through fan outlet 70.

The refrigeration system is charged with a suitable refrigerant and operates in a normal manner. After the refrigerant is compressed by the motor-compressor unit 54, it is forwarded through tube 72 into condenser 49 where it is cooled and then passed through capillary tube 73 into evaporator 64. After passing through the evaporator, the refrigerant is returned to motor-compressor unit 54 through suction tube 74 to repeat the cycle. Electrical controls for the motor-compressor 54, fan motor 50 and blower motor 67 are not shown but it is contemplated that they be mounted on the inside window casing where access thereto by an operator is conveniently available.

Pivotedly secured to pins 75 and 76, which are mounted in window casing 13, is a splitter bar 77 comprising a curved body portion 78 and end portions 79 and 80. The end portions are provided with slots 81 and 82 which engage pins 75 and 76 respectively, and each end portion has a downwardly extending section to which louvers 83 are secured. When the window is open the splitter bar is in normal position as shown in

Fig. 2 with shoulders 34 provided in the end portions for engaging window frame 15 and positioning the frame correctly with the outlet passageway 56. When the window is to be closed, splitter bar 77 is rotated to the closed position shown in Fig. 4 so that the window frame 15 has a free sliding path. It is contemplated that a motor shut off switch (not shown) be provided which will be depressed by the splitter bar when in normal position but which will be disengaged when splitter bar is in closed position. When so disengaged, the switch will break the circuit to the electric motors to prevent operation of the machinery when the window is closed.

Pivotedly secured to the lid 29 by hinges 83 is an evacuation damper 84 having a fixed lever 85 projecting downwardly therefrom to which a rod 86 is pivotally connected. The other end of rod 86 is pivotally connected to cold air damper 87 which extends across the width of passageway 56 and is pivotally secured to dividing wall 58. Fixed to damper 87 is a lever 88 which extends into inlet passageway 55 and may be grasped by an operator by swinging splitter bar 77 out of the way and reaching into the inlet passageway. The linkage between the dampers is such that when damper 87 is opened, evacuation damper 84 will be closed, and when damper 87 is closed, evacuation damper 84 will be opened. On the back wall 26 of the cabinet an opening 89 is provided in which a fixed screen 90 is secured. A fresh air damper 91 is hinged to the cabinet by hinges 92 and is adapted to close the opening 89 when in the position as shown by solid lines in Fig. 2. The damper 91 extends the full width of inlet passageway 55 and is provided with a handle 93 which may be grasped and pulled upwardly to rotate the damper to the position shown by dotted lines in Fig. 2. With the damper in this position, the blower 66 will pull fresh air through opening 89 and circulate it into the room. Any suitable means may be provided for holding damper 91 in any desired position in order to mix returning room air with outside air.

An air conditioning unit constructed in the manner explained heretofore can be completely assembled before being shipped to a home and can be easily mounted in a window. In mounting the unit, gasket 21 is first laid on window sill 12 and the unit is lifted in place so as to rest on the gasket. After bolts 23 have been adjusted to bring the cabinet plumb, lag screws 25 are screwed into the building wall tight enough to hold the cabinet with gasket 21 making leak-proof contact with window sill 12. Lag screws 22 are then screwed through bottom 20 of elbow section 18 and gasket 21 into window sill 12 to complete the mounting of the cabinet. Pins 75 and 76 are next secured in window casing 13 and splitter bar 77 is secured thereto so that it is free to be rotated in the manner explained heretofore.

After the unit 16 and splitter bar 77 are installed, proper electrical connections are made and the unit is ready for operation. For normal cooling of the room, window sash 15 is raised so that shoulder 84 of the splitter bar engages the sash, doors 37, 47 and 48 are opened, cold air damper 87 is rotated to open position with evacuation damper 84 in closed position, and fresh air damper 91 is swung downwardly to close opening 89. The machinery will be automatically controlled by suitable controls, and with the machinery operating, air from the low-

er portion of the room will be drawn through louvers 83 by blower 66 and circulated through filter 63 and evaporator 64. As the air is discharged from the blower 66 it will travel over splitter bar 77 and be directed by the curved surface 78 into the upper portion of the room from where it will drop downwardly across the entire room. Condenser fan 52 will circulate outside air through inlet openings 39, 43 and 44 over both the condenser 49 and motor-compressor unit 54 with effective cooling of both. Any water which collects on evaporator 64 will drip therefrom onto partition 31 and be drained into the air stream of fan 52 through drain tube 65. The air within the room will be cooled to a predetermined temperature and good air circulation therein will result from the manner in which the splitter bar directs the air entering and leaving the air conditioning unit.

If the air within the room is to be evacuated, splitter bar 77 is rotated to allow entrance into inlet passageway 55 so that lever 88 may be reached in order to close cold air damper 87 with the resultant opening of evacuation damper 84 by connecting rod 86. The controls are now set to operate only blower 66 and the air from the room will be discharged through damper 84.

By fully opening cold air damper 87 and partially opening fresh air damper 91, the air being cooled by evaporator 64 will be a mixture of return room air and fresh air from outside. If fresh air damper 91 is completely opened, it closes inlet passageway 55 and only fresh air will then be circulated into the room to effect a supercharging thereof. With a damper arrangement as provided in this invention, the condition of the room air can be easily controlled.

Filter 63 can be conveniently changed through inlet passageway 55 or by raising lid 29. As seen in Fig. 3 of the drawings, wall 58 is raised with lid 29 so that access is furnished into the interior of the cabinet. Dividing wall 57 and fan wall 71 may be detachably secured to the cabinet so that they can be quickly removed if servicing of the evaporator 64 is required. Servicing of the members in condenser compartment 32 may be performed through openings 35, 43 and 44.

As will be apparent from the preceding description, a compact air conditioning unit is provided which contains many novel features and advantages. While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof. Therefore, it is desired that only such limitations be placed thereon as are specifically set forth in the appended claims.

What is claimed is:

1. The combination of an air conditioning unit comprising a cabinet positioned outside a building adjacent a window which opens into a room; said cabinet provided with a duct which projects into said window and terminates adjacent a sash so that the sash can be opened and closed; means for drawing room air through said duct into said cabinet, cooling the air therein and returning it to the room through said openings; and a splitter bar which directs warm air from the lower portion of the room into the duct and cold air from the duct into the upper portion of the room.

2. The combination of an air conditioning unit comprising a cabinet positioned outside a building adjacent a window which opens into a room; said cabinet projecting into said window and ter-

minating adjacent a sash of said window so that said sash may be opened and closed; an opening provided in said cabinet which communicates with said room when the sash is opened; means for drawing room air through said opening into said cabinet, cooling the air therein and returning it through said opening to the room; and a splitter bar pivotally secured within said room which cooperates with said opening when the window is open to direct air entering said opening from one portion of the room and air leaving said opening to another portion of the room; said splitter bar adapted to be rotated away from said opening when the window is closed.

3. The combination of an air conditioning unit comprising a cabinet which projects into a window of a room; an opening provided in said cabinet which communicates with said room; means for drawing room air through said opening into said cabinet, cooling the air therein and returning it through said opening to the room; a splitter bar positioned across said window having a curved front portion, which directs air leaving said opening toward the ceiling of said room, and louvers which direct air from the floor of said room into said opening.

4. The combination of an air conditioning unit comprising a cabinet positioned outside a room window and having a portion which projects into said window and terminates adjacent a window sash so that said sash can be opened and closed; an opening provided in said portion which communicates with said room when the sash is open; means for drawing room air through said opening into said cabinet, cooling the air therein and returning it through said opening to the room; and a splitter bar disposed across said opening and pivotally secured to said window; said splitter bar having a curved front portion, which directs air discharging from said opening toward the ceiling of said room, and louvers which direct air from the floor of said room into said opening; said splitter having means for holding the sash open when in operating position and which is adapted to be rotated from operating position in order to close said sash.

5. An air conditioning unit comprising a cabinet positioned outside a room adjacent a window; said cabinet provided with an elbow portion which projects into said window and terminates adjacent a window sash in a manner to allow opening and closing of the sash; an inlet passageway and outlet passageway provided through said elbow portion and cabinet; a cooling element disposed within said cabinet over which room air is circulated by way of said passageways; an evacuation damper which is adapted to open and close an opening provided in said cabinet between the outlet passageway and the outside atmosphere; a cold air damper which is positioned between said evacuation damper and said room and is adapted to open and close said outlet passageway; and a linkage between said dampers which will close one damper when the other damper is opened.

6. An air conditioning unit comprising a cabinet positioned outside a room adjacent a window;

said cabinet provided with an elbow portion which projects into said window and terminates adjacent a window sash in a manner to allow opening and closing of the sash; an inlet passageway and an outlet passageway provided through said elbow portion and cabinet; a cooling element disposed within said cabinet over which room air is circulated by way of said passageways; an opening provided in said inlet passageway which communicates with outside air; and a damper for controlling the amount of outside air flowing through said opening.

7. An air conditioning unit comprising a cabinet positioned outside a room adjacent a window; said cabinet provided with an elbow portion which projects into said window and terminates adjacent a window sash in such a manner to allow opening and closing of the sash; an inlet passageway and outlet passageway provided through said cabinet and elbow portion; a cooling element disposed within said outlet passageway and fan means for circulating room air over the cooling element by way of said passageways; an evacuation damper which is adapted to open and close an opening provided in said cabinet between the outlet passageway and outside air; a cold air damper which is adapted to open and close said outlet passageway; and a fresh air damper which is adapted to open and close an opening between said inlet passageway and outside air.

8. An air conditioning unit, comprising: a cabinet having means for securing it to an exterior wall surface of a room; said cabinet being adapted to project into a room window and terminate adjacent a sash of the window so that the sash may be opened and closed; said cabinet having an opening therein which is arranged to communicate with the room when the sash is open; an insulated partition which divides said cabinet into a high side compartment and a low side compartment; said low side compartment having a refrigerant evaporator disposed therein; and air circulating means, including a splitter bar pivotally secured within the room for directing warm air from the lower portion of the room through said cabinet room opening, over said evaporator for cooling, and back through said opening to the upper portion of the room.

9. The combination described in claim 8 and further characterized by having a fresh air damper in said low side compartment for admitting outside air thereinto, and an evacuation damper in said low side compartment for discharging room air outside the room.

PHILLIP R. TIPTON.
WILLIAM F. BORGERD.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,268,451	Hull	Dec. 30, 1941
2,283,928	Huggins	May 26, 1942
2,333,374	Guthrie	Nov. 2, 1943
2,480,510	Roper	Aug. 30, 1949