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F. S. METCALFE
AIR CONDITIONING APPARATUS

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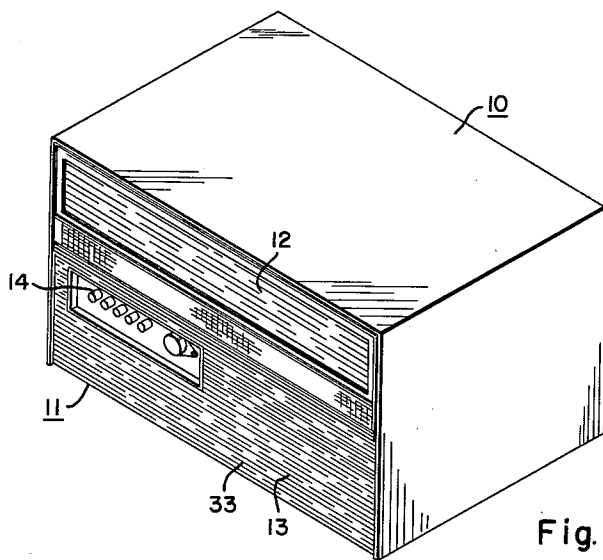


Fig. 1.

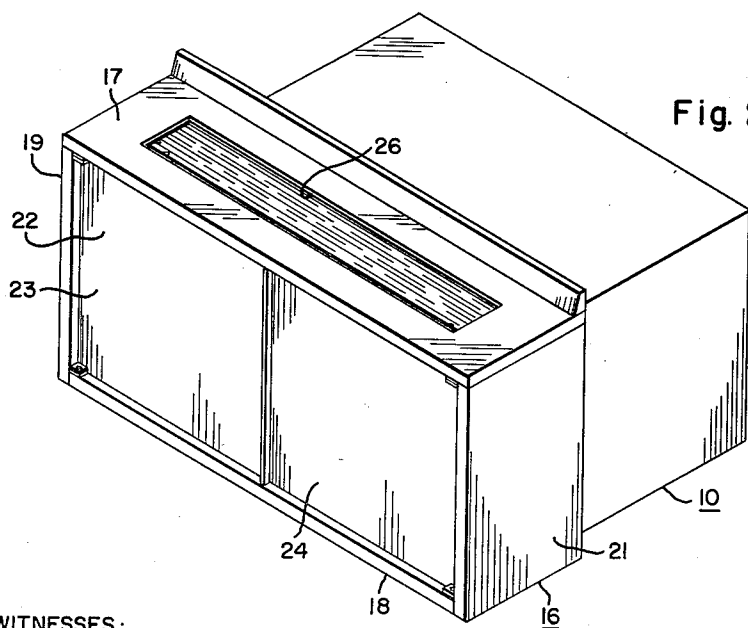


Fig. 2.

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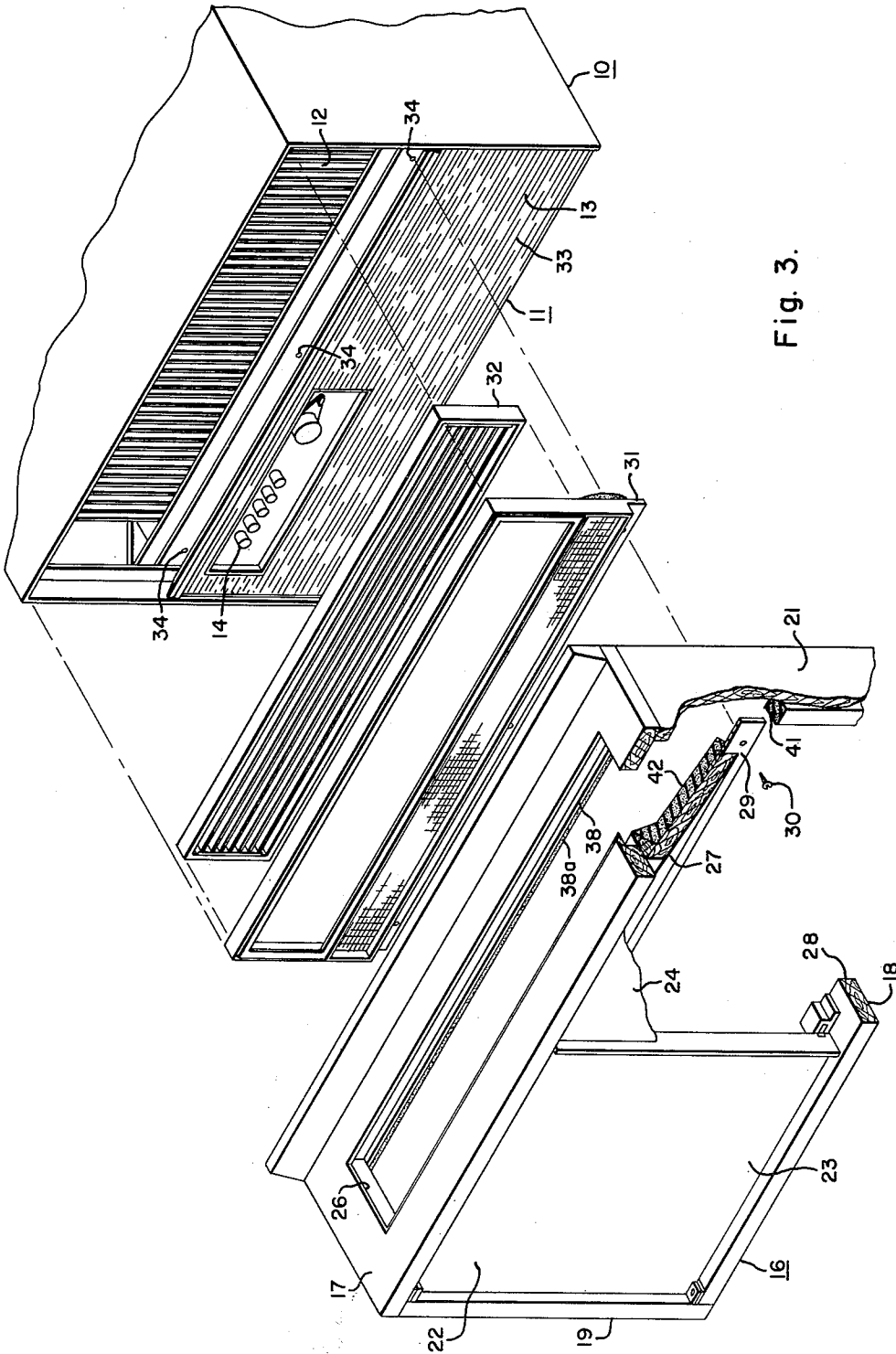
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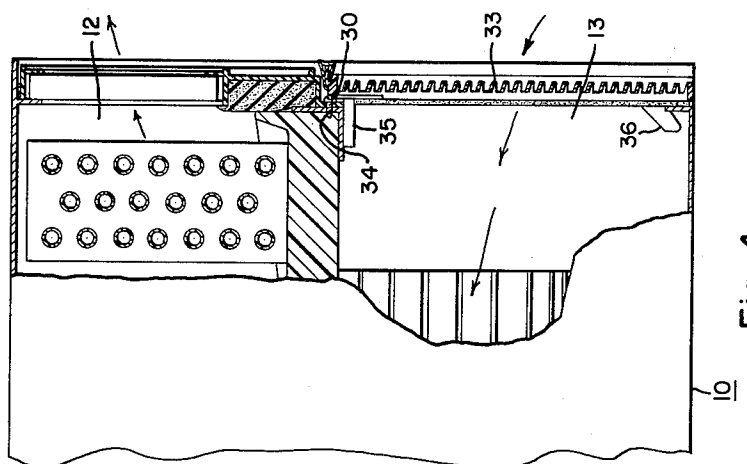
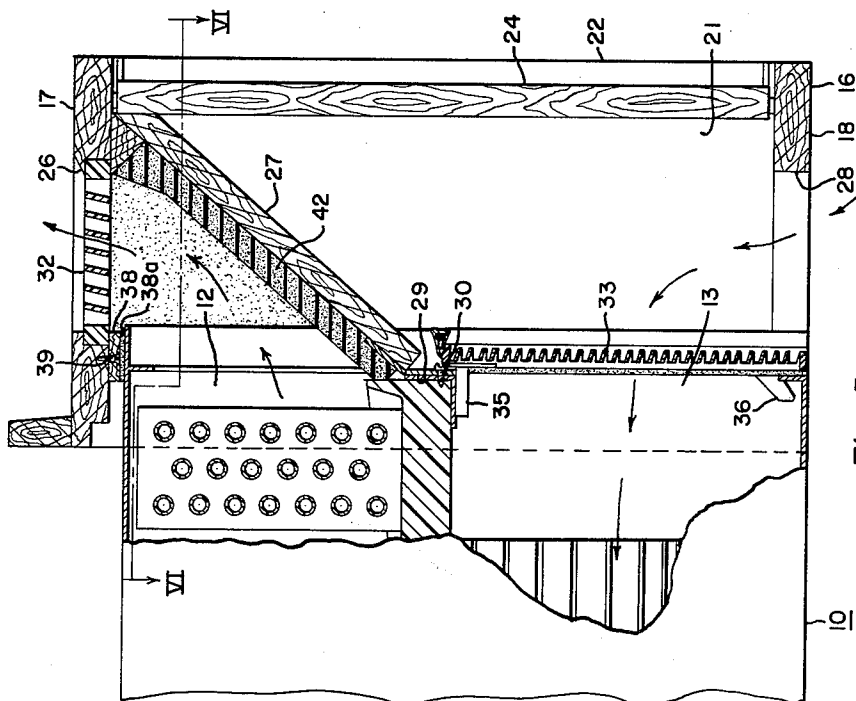
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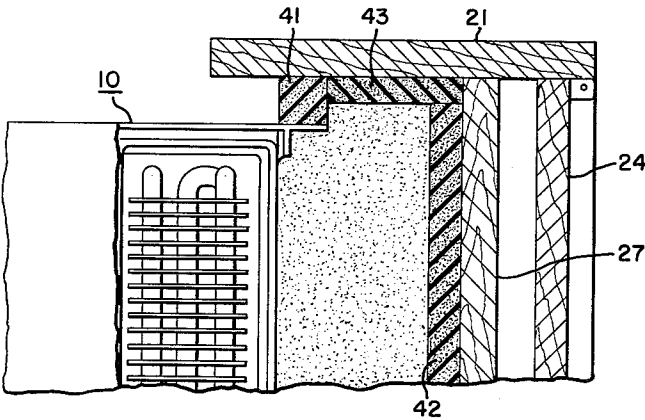


Fig. 6.

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3,159,983

AIR CONDITIONING APPARATUS

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10 Claims. (Cl. 62-262)

This invention relates to air conditioning apparatus, and more particularly to an air conditioner of the self-contained unit type.

In providing an air conditioning unit for a room such as an office, game room or other enclosure having a limited space, it is desirable that only a limited portion of the air conditioner housing extend into the enclosure. For this reason, most self-contained air conditioning units are provided with the air inlet from the enclosure, the air outlet to the enclosure, and the manual control elements all disposed on the front surface of the air conditioner housing. With the air inlet and air outlet both located in a relatively vertical plane, the optimum air flow to the enclosure cannot be attained.

It should be obvious that the optimum flow of cooled conditioned air, would be to exhaust the cool conditioned air upwardly into the enclosure in a vertical direction towards the ceiling, and to take air from the enclosure into the air conditioner housing in a vertical direction from adjacent the floor. Air flow as described would create the greatest divergence of air flow attainable with such a unit and in addition would effect minimum recirculation of conditioned air back into the air conditioner. Any recirculation reduces the cooling ability of the air conditioner. It should be evident, however, that to provide an air inlet through a bottom wall of the unit housing and an air outlet through a top wall of the housing would require extending the air conditioner housing a substantial distance into the room or enclosure.

Various attempts have been made to distribute the conditioned air by the use of adjustable louvers at the front wall of the housing. However, while these adjustable louvers are capable of producing a wide separation of air flow between the air inlet of the housing and the air outlet of the housing, it is impossible to create a vertical air flow when mounting the louvers in a substantially vertical surface.

Although it is desirable in most cases to have a relatively small portion of the air conditioner housing in the enclosure, it is permissible to extend the unit into the room or housing where space is not at a premium. It has further been found that extension of the air conditioner housing into the enclosure is not objectionable, and is often desirable, if the extended portion of the housing is made to correspond to the furnishings or decor of the room or enclosure.

The present invention therefore has as an object to provide an auxiliary cabinet for an air conditioning unit which cabinet optimizes the air flow to and from the unit, and in addition presents an attractive appearance.

A further object of the invention is to provide an auxiliary cabinet which produces optimum air flow to and from an air conditioning unit which cabinet provides access to the manual controls and provides for ease of servicing the unit.

Another object of the invention is to provide an air conditioning unit having an optimum air flow to and from the room or enclosure.

Still another object of the invention is to provide air conditioning apparatus having optimum air flow to and from the enclosure, while presenting a pleasing appearance to the enclosure or room to be conditioned.

Yet another object of the invention is to baffle and reduce the level of noise of an operating air conditioner.

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The foregoing objects, and other objects, are effected by the invention as will be apparent from the following description taken in connection with the accompanying drawings forming a part of this application, in which:

FIGURE 1 is a perspective elevational view showing a unit air conditioner as may be employed in the present invention;

FIG. 2 is a perspective elevational view showing the air conditioning unit of FIG. 1 employed in the invention;

FIG. 3 is an exploded perspective view showing the structure of FIG. 2 and having portions broken away to show details of the invention;

FIG. 4 is a fragmentary side elevational view of the structure of FIG. 1, taken on a larger scale for clarity;

FIG. 5 is a fragmentary side elevational view similar to FIG. 4, but showing a portion of the structure of FIG. 2 in detail; and

FIG. 6 is a horizontal sectional view, taken along the line VI-VI of FIG. 5, looking in the direction indicated by the arrows.

Referring now to the figures, especially FIG. 1, there is shown a room air conditioner of the self-contained unit type having a housing 10 suitable for installation in a window, or wall structure, of an enclosure or room to be air conditioned. The housing 10 has contained therein the various elements of a refrigerating system as is generally employed in an air conditioning device of this type, such as evaporator, condenser, blower, etc. Such elements are well known to those familiar with the art, and have not been herein described in detail as they form no part of the present invention.

When installed in a room or enclosure, the housing 10 is disposed with a front wall 11 and a minimum portion of the housing 10 extending into the enclosure. The front wall 11 has an outlet 12 for conditioned air in the upper portion thereof, an inlet 13 for air to be conditioned in the lower portion thereof, and a plurality of manually operable controls 14 all readily accessible to the enclosure. In operation, air flows from the enclosure through the opening 13 into the housing where it is cooled and returned from the housing 10 through the opening 12 to the enclosure. The temperature and velocity of the air discharging from the unit are controlled by manual controls 14. The above-described structure and operation are conventional.

Referring now to FIG. 2, the present invention provides an auxiliary cabinet structure 16 mounted adjacent the front wall 11 of the enclosure 10. The cabinet 16 may be manufactured of wood or any other suitable material and is generally of a decor suitable to the room in which it is to be installed.

The cabinet 16 has a top wall 17, a bottom wall 18, and a pair of opposed side walls 19 and 21. The cabinet 16 is also provided with a front wall generally designated by the numeral 22 and is shown having an opening provided with a pair of movable closure members 23 and 24 shown in the closed position in FIG. 2. The closure member 23, when in the open position, provides access to the manual controls 14 while the closure 24, when opened, provides access to the air inlet 13. An opening 26 is provided in the top wall 17 for discharge of air exhausting from the outlet 12.

For a further detailed description of the structure and its operation, reference should now be had to FIGS. 3, 4 and 5.

With reference to FIGS. 3 and 5, the cabinet 16 is shown to have a forwardly upwardly sloping baffle member 27 disposed between the side walls 19 and 21 and having its edges in sealing engagement therewith. Further, the bottom wall 18 of the cabinet 16 has an opening 28 therein for air flow into the cabinet. The baffle member 27, when positioned as shown in FIG. 5 with a

rearwardly disposed vertical flange 29 adjacent and in sealing engagement with the front wall 11, provides separation of air flow between the openings 26 and 28 thus eliminating any recirculation which would adversely affect the cooling ability of the air conditioner.

As is apparent from FIGS. 3 and 4, the cabinet 16 is easily adaptable to the housing 10 with but minor modification to the housing. The front wall 11 of the housing 10 includes: an upper louver construction including a frame 31 and an adjustable louver assembly 32, and a lower grill member 33. The frame 31 is attached to the front wall 11 by three screws 30 which are received in holes 34 in the front wall. When the frame 31 is removed from the housing 10, the adjustable louver assembly 32 is readily removable from the frame to which it is removably attached by spring clips (not shown) or other suitable means.

To remove the frame 31, it is first necessary to remove the lower grill member 33. This is easily accomplished by pulling the top portion of the grill member 33 away from a plurality of magnets 35 provided in the housing 10, and tilting the member forward to disengage a pair of feet 36 from an upturned flange 37.

With grill member 33 and frame 31 removed, the cabinet 16 may be mounted on the housing 10 with the vertical flange 29 abutting the housing front wall 11. The flange 29 has holes which are aligned with the holes 34, and the cabinet 16 is screwed to the housing 10 in a similar manner as was the frame 31 prior to its removal. With the cabinet 16 in place, the grill 33 is replaced by hooking the feet 36 over the flange 37 and positioning the upper edge against the magnets 35.

In the embodiment shown, the opening 26 in the top of the cabinet is provided with a removable flange member 38 which is easily attached by means of a pair of screws 29. When the flange 38 is removed, the opening 26 is so constructed as to receive the louver assembly 32, and the flange member 38 is replaced to retain the louver assembly in the opening 26. Preferably the lower surface of strip 38 carries compressible material 38a to provide a seal between the top wall 17 of the cabinet and the top of the housing 10. The transversely extending louvers of the louver assembly 32 preferably are adjustable as a group about their longitudinal axes. Consequently with the louver assembly 32 in the cabinet top opening 26 (FIG. 5), the louvers can be adjusted to discharge the cooled air vertically towards the ceiling of the room or enclosure, or forwardly from the vertical up to as much as 45 degrees therefrom.

In addition to the sealing surfaces at 29 and 38a, the opposed side walls 19 and 21 of the cabinet each has a vertically extending sealing member 41 on the inner surface thereof for sealing against the outer sides of the housing 10 (FIG. 6).

As is best shown by the arrows in FIG. 5, with the auxiliary cabinet mounted adjacent the front wall 11, air flowing from the housing 10 through the air outlet 12 is deflected upwardly by the inclined baffle 27 to discharge generally vertically through the louver assembly 32 therein. The upper surface of the baffle 27 has a layer 42 of foam rubber, or other sound absorbing material, thereon. Similar sound absorbing material 43 covers the inner surfaces of the cabinet side walls 19 and 21, above the baffle 27. Thus much of the blower noise and other air flow noises generated within the casing 10, and normally carried to the room, are absorbed between the openings 12 and 26. In addition, fabrication of the cabinet from wood tends to lessen the noise of air flow through the cabinet due to the sound absorbing quality of wood. Further, even if the cabinet were not constructed of sound absorbing material, noise reaching the ears of occupants of the room is lessened due to the discharge of conditioned air upwardly towards the ceiling rather than horizontally towards the occupants.

The opening in the front wall 22, in addition to pro-

viding access to the manual controls 14, provides access to the lower grill member 33 which may be easily removed to service air filters or other elements located therebehind.

From the foregoing, it should be evident that the invention provides a novel air flow arrangement approaching the optimum in air circulation through an enclosure. In addition, the structure provided may be made pleasing in appearance to overcome the objection of extending an air conditioning unit into the enclosure.

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.

I claim as my invention:

1. An auxiliary cabinet for modifying a room air conditioner or the like having a lower front inlet for air to be conditioned and an upper front outlet for conditioned air; said cabinet comprising wall structure cooperable with the front of the air conditioner to define an air inlet chamber having a bottom air inlet and communicating with the air conditioner lower front inlet, and an air outlet chamber having a top air outlet and communicating with the air conditioner upper front outlet, whereby air to be conditioned enters the modified air conditioner in an upward direction and conditioned air discharges from the modified air conditioner in an upward direction.

2. Structures as specified in claim 1, wherein the wall structure includes a baffle extending from the front of the air conditioner between the inlet and outlet thereof forwardly and upwardly to prevent mixing of air entering and air leaving the air conditioner.

3. An auxiliary cabinet for modifying a room air conditioner or the like having a lower front inlet for air to be conditioned and an upper front outlet for conditioned air; and said cabinet comprising wall structure adapted to cooperate with the front of the air conditioner to define a lower air inlet chamber communicating with the air conditioner air inlet and an upper air outlet chamber communicating with the air conditioner air outlet, said lower air inlet chamber having an opening through a wall thereof for entry thereto of air to be conditioned, said upper air outlet chamber having an opening through the top thereof for discharge therefrom of conditioned air, at least one wall of the last-mentioned chamber having its inner surface covered with sound-absorbing material.

4. Structure as specified in claim 3, wherein said one wall of the upper air outlet chamber is so disposed that conditioned air discharging through the air conditioner upper front outlet impinges on, and is deflected upwardly by, the sound absorbing material thereon.

5. An auxiliary cabinet for modifying a room air conditioner or the like having a lower front inlet for air to be conditioned and an upper front outlet for conditioned air; said cabinet comprising a top wall, a front wall and a pair of side walls, with the space defined by said walls open to the rear, a partition bridging the space between said side walls and extending rearwardly from said front wall and separating the space defined by the walls into a lower air inlet chamber for air to be conditioned and an upper air outlet chamber for conditioned air, and means for so mounting the cabinet relative to the air conditioner that the latter receives air to be conditioned from the lower air inlet chamber and discharges conditioned air to the upper air outlet chamber, the top wall of said cabinet having an opening therethrough for upward discharge of conditioned air from the upper air outlet chamber.

6. Structure as specified in claim 5, wherein, when the cabinet is mounted relative to the air conditioner, the rearwardly extending partition abuts the front of the air conditioner above its lower front inlet and below its upper front outlet.

7. An auxiliary cabinet for modifying a room air conditioner or the like having a lower front inlet for air to be

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conditioned, an upper front outlet for conditioned air, and front mounted controls; said cabinet comprising a top wall, a front wall and a pair of side walls with the space defined by said walls open to the rear, a partition extending rearwardly from said front wall and separating the space defined by the walls into a lower inlet chamber for air to be conditioned and an upper air outlet chamber for conditioned air, means for mounting the cabinet with the major portion thereof disposed forwardly of the front of the air conditioner so that the front of the latter closes the rear opening interior of the cabinet, said lower air inlet chamber having an opening thereto for admission of air to be conditioned, the top wall of said cabinet having an opening therethrough for discharge of conditioned air from the upper air outlet chamber, said front wall having an opening therethrough aligned with the front mounted controls for access thereto, and closure means for said access opening in the front wall.

8. Structure as specified in claim 7, wherein the lower front inlet of the air conditioner is partially closed by a removable grid, and wherein the grid and the front mounted controls are disposed side by side, and wherein the cabinet front wall has a first opening therethrough providing access to the controls and a second opening therethrough providing access to the removable grid, and closure means for each of said access openings.

9. An auxiliary cabinet for modifying a room air conditioner or the like having a lower front inlet for air to be conditioned and an upper front outlet for conditioned

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air; said cabinet comprising wall structure adapted to cooperate with the front of the air conditioner to define an air inlet chamber having a bottom air inlet and communicating with the air conditioner lower front inlet, and an air outlet chamber having a top air outlet and communicating with the air conditioner upper front outlet, whereby air to be conditioned enters the modified air conditioner in an upward direction and conditioned air discharges from the modified air conditioner in an upward direction, said wall structure including a baffle extending rearwardly from the front wall of the cabinet to the front of the air conditioner, said baffle preventing mixing of air entering and air leaving the air conditioner, and means carried by the rearward end of the partition for securing the auxiliary cabinet in modifying relation to the room air conditioner, said cabinet, when so secured with respect to the air conditioner, having its side and top walls overlapping the side and top of the air conditioner.

10. The structure as specified in claim 9, including sealing means between the baffle rear edge and the air conditioner and between the cabinet side and top walls and the air conditioner.

References Cited in the file of this patent

UNITED STATES PATENTS

2,817,958	Beckett	Dec. 31, 1957
2,920,460	Atchison	Jan. 12, 1960
3,035,422	Halbeisen	May 22, 1962
3,084,612	Holmes	Apr. 9, 1963