

[54] ENCLOSURE FOR AIR-CONDITIONERS AND THE LIKE

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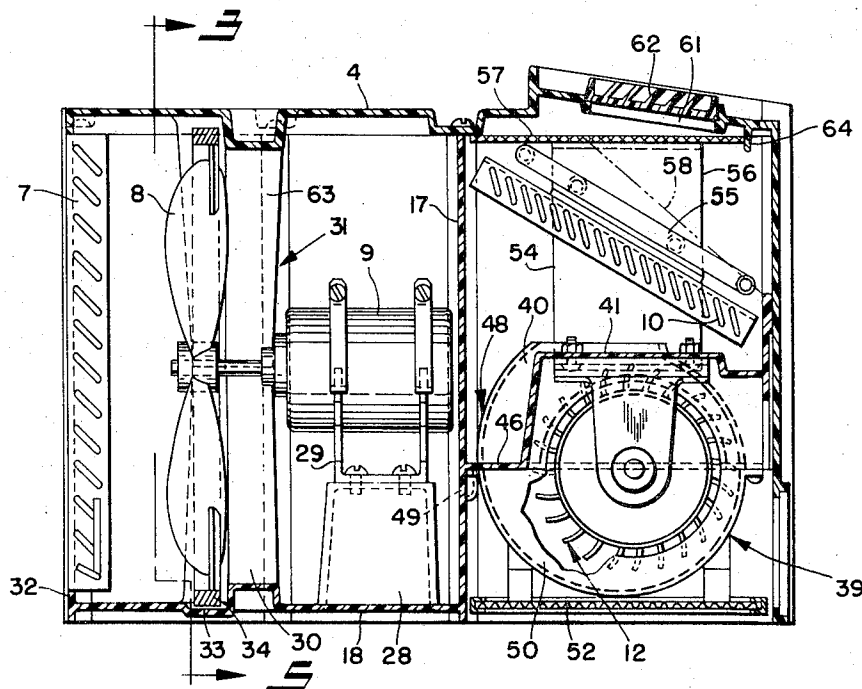
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[57] ABSTRACT

An enclosure for through-the-wall or window type air-conditioners which may include additional heating and/or humidifying means. The enclosure consists of a one-piece, molded housing or chassis for supporting the various functional elements of the unit and a top and front cover. Centrally of the chassis is a firewall which extends between a pair of laterally spaced side walls intermediate the ends thereof. Suitable mounts are provided on opposite sides of the firewall for the condenser, compressor, evaporator, and other components. Portions of the blower housings may be molded integral with or separate from the chassis and provided with suitable mounts for the evaporator fan motor. Evaporator drain pan areas molded as part of the blower housings provide fast runoff of the condensate from the evaporator. A fan motor support, channelled water pan and lower portion of the fan shroud may be molded integral with the floor member of the chassis. The upper portion of the fan shroud is molded integral with the top cover. Such an enclosure greatly reduces the number of elements heretofore required for window or through-the-wall air-conditioning housing, thus simplifying the manufacturing procedures and reducing the overall size of units of this type, and eliminating the need for decorative covers previously required.

16 Claims, 6 Drawing Figures



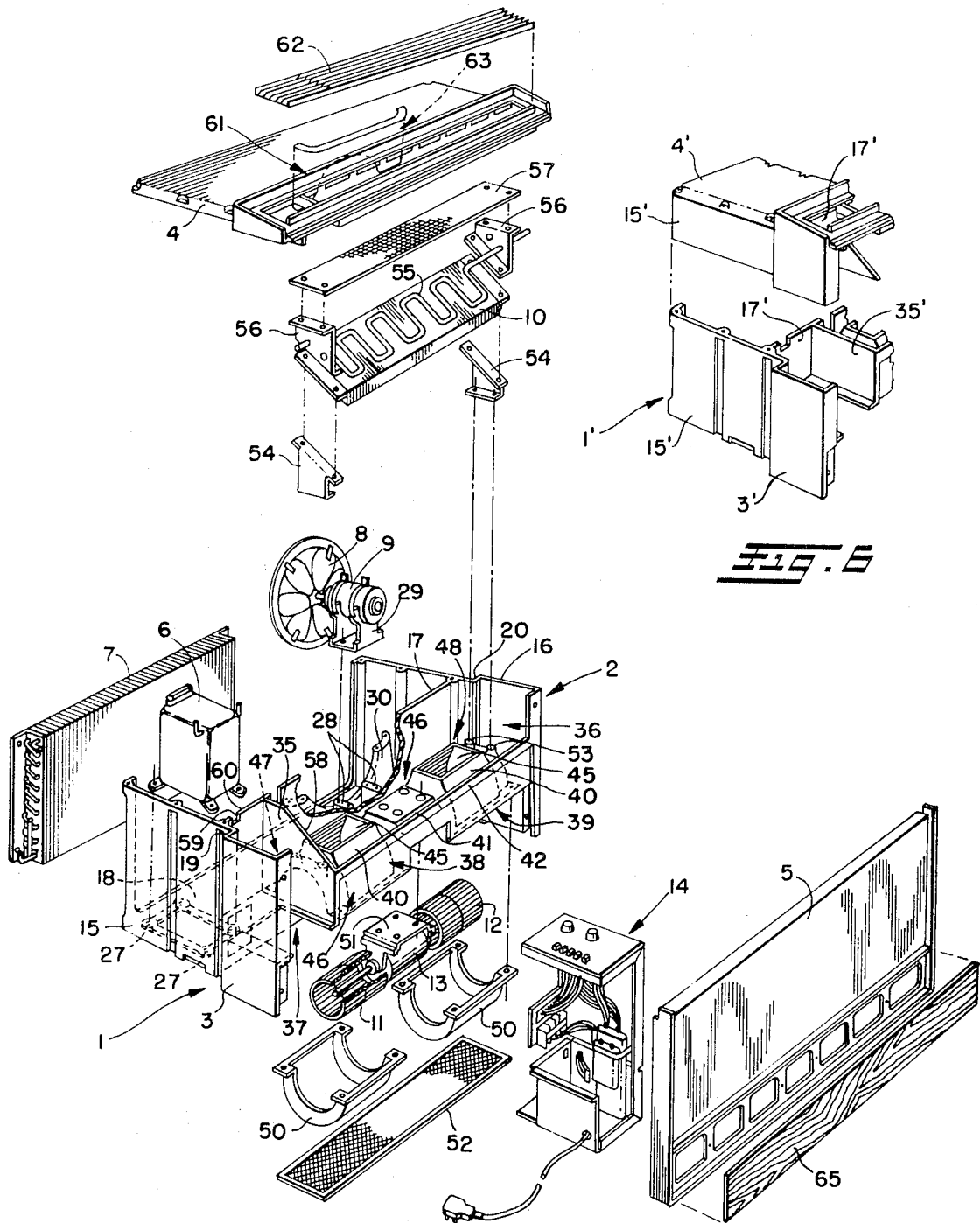
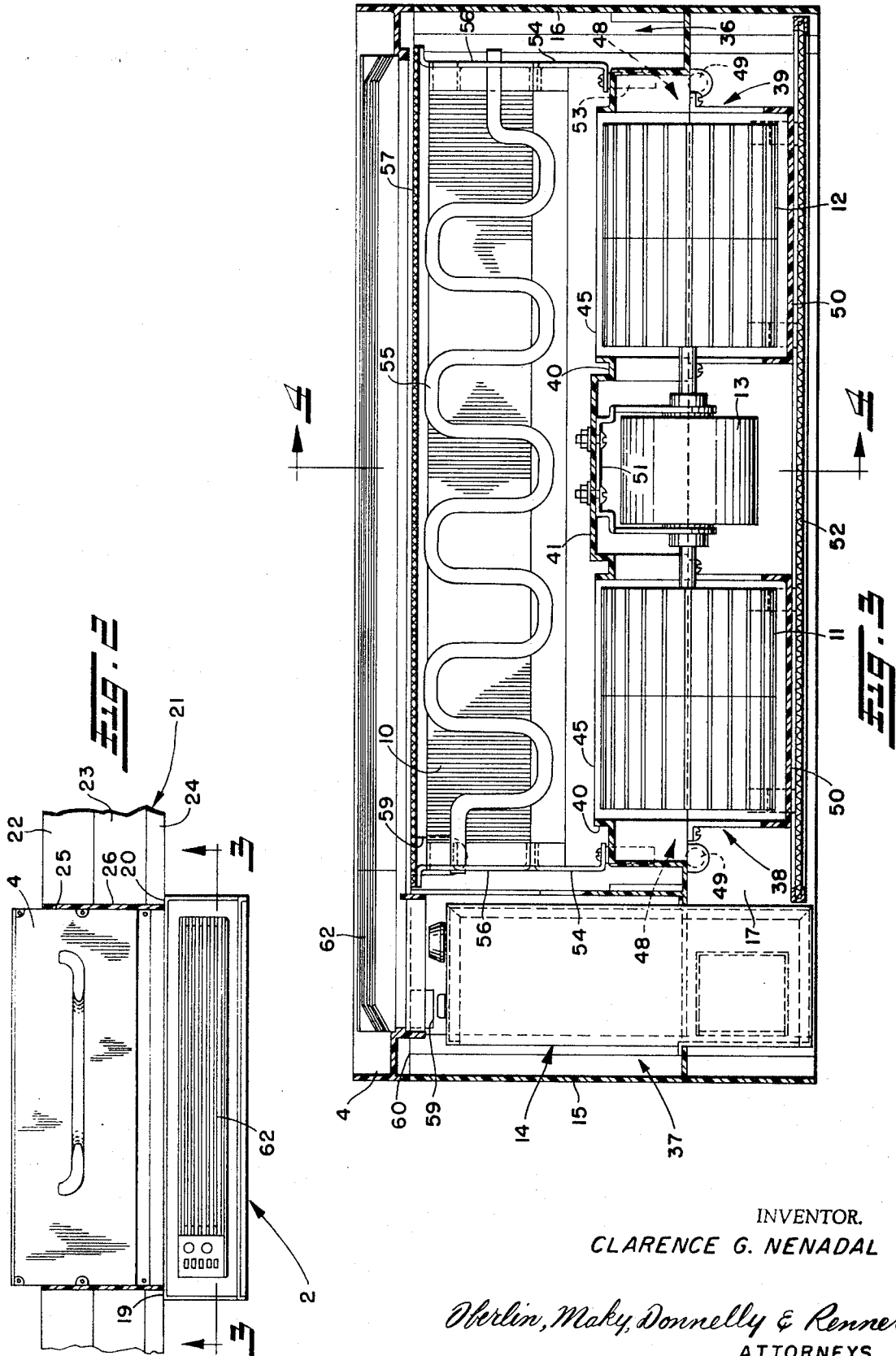


FIG. 1

FIG. 6

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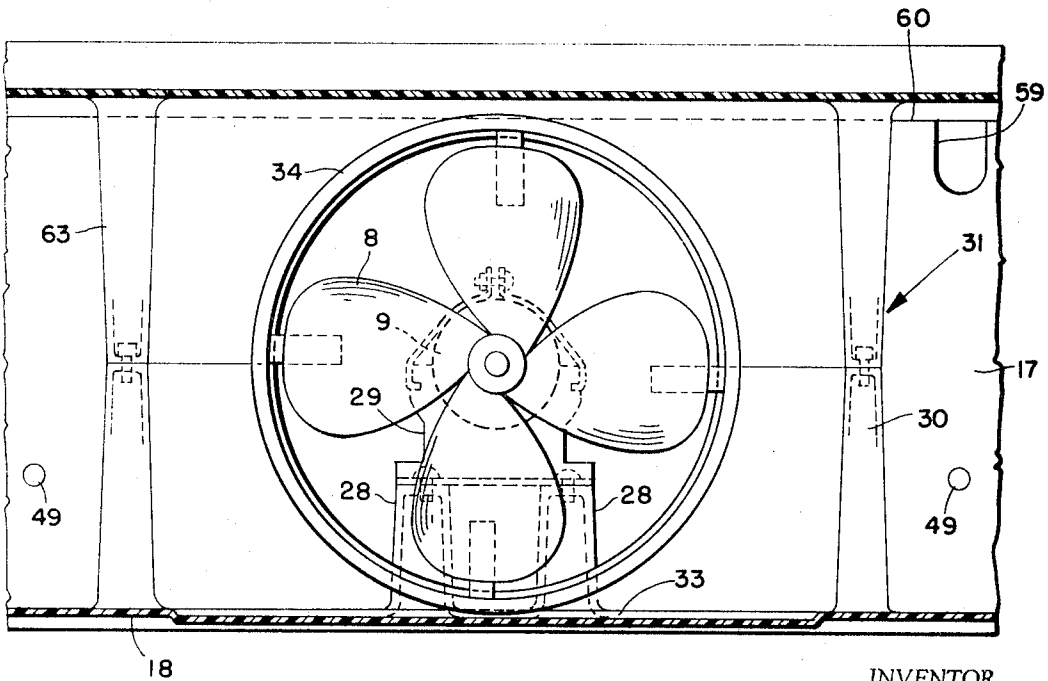
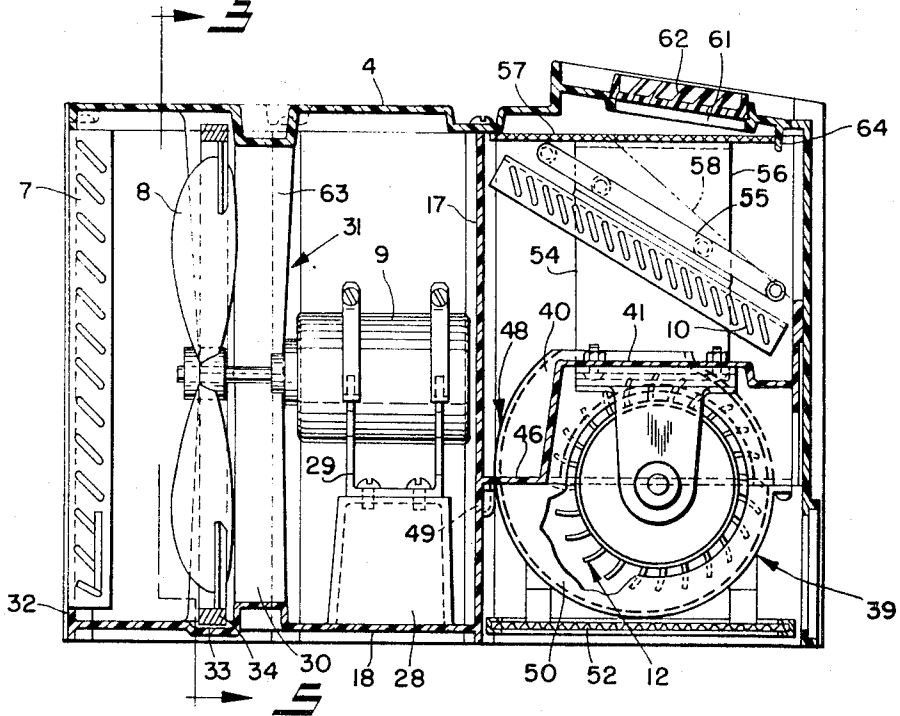
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**FIG. 4**



**FIG. 5**

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## ENCLOSURE FOR AIR-CONDITIONERS AND THE LIKE

### BACKGROUND OF THE INVENTION

This invention relates generally as indicated to enclosures, particularly for through-the-wall or window air-conditioners which may but need not necessarily include additional heating and/or humidifying means.

Through-the-wall and window air-conditioners and the like are widely used in residential and commercial buildings because of their flexibility in providing air-conditioning for individual rooms and also because they are easily installed and maintained. Such units usually include conventional air-conditioning components such as blowers for circulating air between the room and air-conditioner, a coolant evaporator for cooling the room air, a compressor and condenser, a cooling fan for the condenser, an electrical control console, a drain pan, and associated mechanical and electrical equipment including motors for the blower and fan.

Usually, the various components are supported on and within a sheet metal assembly or housing consisting of eight to 10 or more separate components, including a main chassis which essentially consists of a vertical wall, known generally as a firewall, and a horizontal base or floor. To the main chassis are affixed two side panels and a top and front panel which form an enclosure separated by the firewall providing a rear section for the compressor, condenser and fan units, and a forward section for the blowers, evaporator, and electrical components. The side panels and top panels usually have angle members affixed to their outer surfaces which present flat vertical faces between which polyfoam or other compressible materials may be disposed to provide a seal therebetween.

Supported within the enclosure defined by the sheet metal assembly are the various functional components of the unit including an enclosure for the electrical control box, housings for the blowers, a shroud for the fan, and a drip pan, all of which are either attached to the floor, to the firewall, or to the side panels by conventional connectors. In addition, the entire forward part of the air-conditioner unit which extends into the room is normally enclosed within a further sheet metal enclosure including front and side panels and a top panel having louvers or other means to control the flow of cooled air from the air-conditioner to the room.

The problems inherent in manufacturing through-the-wall air-conditioners of conventional design are numerous, not the least of which is the necessity of having to separately order and maintain inventories of the various sheet metal assembly or housing components. This places a heavy drain on working capital, and also requires additional storage space which could otherwise be used for manufacturing purposes. In addition, the several components of the conventional sheet metal assemblies or housings are oftentimes manufactured by different organizations with different delivery times and different product and finishing specifications and tolerances, resulting in many interruptions and delays. Moreover, because of the large number of components that make up conventional sheet metal assemblies, more labor is required to assemble the air-conditioners, and it is more difficult to maintain them. The many components of the assemblies also add to the weight of the units, increasing their shipping weight in cost, and

also usually detract from the aesthetics of the finished units.

### SUMMARY OF THE INVENTION

With the foregoing in mind, it is a principal object of this invention to provide a novel, more simplified enclosure both structurally and functionally for the various assembled components of through-the-wall or window air-conditioners.

It is another object to provide such an enclosure which includes less parts than conventional air-conditioner housings and is less expensive to manufacture.

Still another object is to provide an enclosure for air-conditioners and the like which requires less labor to assemble, is lighter in weight, and is more aesthetically attractive than the housings previously used.

Yet another object is to provide a completely corrosion resistant enclosure which eliminates the problems encountered in the field relative to disintegration, rusting, and stains created on buildings as a result of rust and the like of conventional metal air-conditioner housings.

Still another object is to provide such an enclosure which eliminates the need for additional drain pans and special finishes or coatings.

These and other objects of the present invention may be achieved by providing an enclosure for an air-conditioner or the like in the form of a one-piece molded chassis having a top cover and front cover attached to the top and forward edge, respectively, of the chassis providing a housing for the various components of the air-conditioner, including the blowers, fans, electrical control assembly, evaporator, condenser, motors, and other associated electrical and mechanical components. The chassis, which is desirably molded as one piece as aforesaid, includes a pair of side walls connected together by a firewall intermediate the ends thereof and a floor member on one side of the firewall. On the other side of the firewall there are blower housings and drain pans for the evaporator which may be integral with or separately attached to the chassis as desired. Such a one-piece chassis replaces the conventional multi-piece metal housings which include a separate firewall, base and side panels.

In addition to the foregoing, the side walls for the chassis of the present invention forwardly of the firewall are desirably stepped so that they extend laterally outwardly from and vertically along the sides of the chassis to permit abutting and sealed engagement of the chassis against a sleeve positioned within a wall opening. The stepped portions, which are integral with the chassis, replace the angle members of conventional units which run along the sides of the chassis.

The blower housings of the present invention desirably include upper and lower halves, of which the upper halves are desirably integral with the forward face of the firewall and one of the side walls and also with an interior wall which extends forwardly from the firewall spaced inwardly from and parallel to the other side wall. Formed in the upper surfaces of the upper blower housing halves are air discharge openings. A horizontal suspension platform for the blower motor integrally connects the upper blower housing halves together and cooperates with the upper blower housing halves to provide evaporator drain pan areas surrounding each of the air discharge openings. The motor for

driving the air blowers is suspended vertically beneath the suspension platform and is readily accessible from the front of the air-conditioner.

Suitable evaporator mounting brackets may be molded or attached to mounting bosses adjacent the ends of the upper blower housing halves for mounting the coolant evaporator above the blowers and drain pan area. Optionally, additional heating means in the form of electrical or steam heating coils and/or humidifying means may also be included in such units if desired. The upper edge of the interior wall is sloped at an angle to provide a clearance space beneath the evaporator for the wires for the various electrical components.

The floor member also includes raised bosses for mounting of the compressor motor, an elevated support station for the condenser fan motor, and channels which collect the evaporator and condenser water for easy pickup and distribution by the condenser fan to improve the operational efficiency of the unit. Rearwardly of the elevated support station is the lower half of a fan cowling which is also desirably integral with the floor member. The upper half of the fan cowling is integral with the top cover which is a one-piece, generally rectangular element, sized and adapted to lie upon and be affixed to the forward edge of the body.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail a certain illustrative embodiment of the invention, this being indicative, however, of but one of the various ways in which the principle of the invention may be employed.

#### BRIEF DESCRIPTION OF THE DRAWINGS

In the annexed drawings:

FIG. 1 is an exploded perspective view showing the various parts of the air-conditioner enclosure of the subject invention and the major functional components of the air-conditioner in disassembled form;

FIG. 2 is a top plan view of the assembled unit of the subject invention shown installed within a wall opening;

FIG. 3 is an enlarged vertical transverse section through the assembled unit of FIG. 2, taken on the plane of the line 3—3 thereof;

FIG. 4 is a longitudinal section through the assembled unit of FIG. 3, taken on the plane of the line 4—4 thereof;

FIG. 5 is a fragmentary transverse section through the assembled unit of FIG. 4, taken on the plane of the line 5—5; and

FIG. 6 is a fragmentary exploded perspective view of a modified form of air-conditioner enclosure in accordance with this invention.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawing and initially to FIG. 1 thereof, there is shown a preferred form of enclosure 1 in accordance with the present invention for a through-the-wall or window air-conditioner 2 and the like including a main housing or chassis 3 to which is attached a top cover 4 and front cover 5 for housing the various functional components of the air-conditioner, including among other things, a compressor 6, condenser 7, condenser fan 8, condenser fan motor 9,

evaporator 10, blowers 11 and 12, blower drive motor 13, and electrical control assembly 14. The chassis 3 is a one-piece molded structure of fiberglass reinforced plastic or other suitable plastic having a pair of laterally spaced side walls 15 and 16 with a firewall 17 extending therebetween intermediate the ends of the side walls, and a floor member 18 which also acts as a corrosion resistant water pan extending rearwardly from the firewall 17 between the side walls 15 and 16. Intermediate the ends of the side walls 15 and 16 forwardly of the firewall 17, there are integral vertical steps 19 and 20 which are abutted against the wall of a building when the assembled unit is placed within an opening therein.

In FIG. 2 there is shown a typical installation of the air-conditioning unit 2 in the outer wall 21 of a building which may consist of an outer facing material 22, an inner masonry material 23 and an interior facing material 24. The opening 25 in the outer wall 21 is desirably lined with a plastic or metal sleeve 26 which receives the air-conditioning unit 2 except for the portion forwardly of the steps 19 and 20 which contact the interior facing material 24 and determine the extent to which the forward part of the air-conditioner unit extends into the room. The stepped surfaces 19 and 20 may be provided with a sealing material such as styrofoam or other polyfoam material to provide a good seal around the periphery of the opening. Because the steps 19 and 20 are integral with the chassis 3, they provide a strong and aesthetically attractive design which greatly simplifies the assembly of the air-conditioning unit within the wall opening by eliminating the angle members of conventional air-conditioner housing ordinarily used for that purpose.

The floor member 18 in the rear portion of the chassis 3 has integral mounting bosses 27 adjacent one side wall 15 for supporting and attaching the compressor motor 6 thereto (see FIG. 1). Also integral with the floor member 18 adjacent the rear face of the firewall 17 intermediate the side walls 16 and 17 are a pair of raised pedestals 28 which provide an elevated support station for supporting the condenser fan motor cradle 29 as shown in FIGS. 1, 4 and 5. Rearwardly of the raised pedestals is the lower half 30 of a fan cowling 31 which is also desirably integral with the floor member 18.

Integral with the rear edge of the floor member 18 is an upwardly projecting flange 32 (see FIG. 4) which permits the floor member to be used as a water pan and also provides a mounting surface for attachment of the condenser 7 to the rear end of the chassis 3. As clearly shown in FIGS. 4 and 5, the floor member 18 has a channel or groove 33 to collect the evaporator and condenser water for easy pickup by a slinger ring 34 mounted on the condenser fan 8 and extending into the groove 33. As the water is lifted out of the groove 33 by the slinger ring 34, it is blown across the condenser coils to improve the operational efficiency of the unit.

Integral with the firewall 17 and extending forwardly therefrom between the side walls 15 and 16 is an interior wall 35 which defines with the firewall and spaced apart side walls two compartments 36 and 37, the largest of which (compartment 36) receives the blowers 11 and 12 and blower drive motor 13 as well as the evaporator 10, and the smallest of which (compartment 37) receives the electrical control assembly 14 thus isolat-

ing and insulating the electrical controls from the rest of the unit for safety purposes.

Within the larger compartment 36 are the blower housings 38 and 39, the upper halves 40 of which are desirably molded integral with the chassis 3. The back edges of the upper blower housing halves 40 are both integral with the firewall 17 and one end of one upper blower housing half is also integral with the interior wall 35 and the other end of the other upper blower housing half is integral with the side wall 16. The upper blower housing halves 40 are also desirably connected together at the middle by a blower motor suspension platform 41 molded integral with the firewall 17 and with the upper blower housing halves 40. A molded bar 42, integral with the interior wall 35, upper blower housing halves 40, suspension platform 41, and side wall 16 provides added strength.

As clearly shown in FIGS. 1, 3 and 4, the upper blower housing halves 40 are horizontally oriented semi-cylindrical envelopes provided with large air discharge openings 45 in their upper surfaces. Surrounding the semi-cylindrical envelopes of the upper blower housing halves 40 are drain pan areas 46 which slope toward the corners 47 and 48 where the interior wall 35 and outer wall 16 are connected to the firewall 17. In such corners 47 and 48 there are drain holes 49 extending through the firewall 17 to provide for fast run-off of the evaporator condensate from the forward compartment to the condenser drip pan 18 at the rear of the unit.

The lower blower housing halves 50 are desirably molded as separate parts using a single mold cavity and attached to the upper blower housing halves 40 using suitable fasteners (see FIGS. 1 and 3). However, it should be understood that the lower blower housing halves 50 could be molded as a single piece if desired, and the upper blower housing halves 40 with surrounding drain pan areas 46 could also be molded as a single piece separately from the chassis 3 and subsequently attached to the chassis using suitable fasteners if desired.

The suspension platform 41 is provided with suitable mounting bosses to facilitate attachment of a bracket 51 for the blower drive motor 13 to the bottom side of the suspension platform, after which the blowers 11 and 12 may be positioned within the upper blower housing halves 40 and completely enclosed by attachment of the lower blower housing halves 50 to the upper blower housing halves 40 using suitable fasteners as aforesaid. A filter plate 52 may then be attached to the chassis 3 beneath the blower housings to filter the air which is pulled into the unit by the blowers.

Additional mounting bosses 53 are provided on the upper blower housing halves 40 for attachment of evaporator mounting brackets 54 thereto which support the evaporator 10 at an angle above the blower discharge openings 45 for passage of the circulated room air therethrough. A suitable heating element 55 may also be mounted above the evaporator 10 using suitable brackets 56 for heating the room with the unit during cold weather if desired. A guard screen 57 may also be placed over the top of the heating element 55 for safety.

Preferably, a portion of the upper edge 58 of the interior wall 35 is made to slope downwardly as shown to provide adequate clearance between the evaporator 10 and interior wall for passage of wires leading from the

electrical control assembly 14 to the various electrical components, and notches 59 are also desirably provided in the upper edge 60 of the firewall 17 for passage of wires between the front and rear compartments.

The top cover 4 may be secured to the top of the chassis 3 using suitable fastening means such as pins or screws extending through the top cover into holes provided in strengthened sections along the upper edge of the side walls of the chassis. The top cover 4 may also include a cut-out section 61 for positioning of a louvered section 62 therein directly above the evaporator 10 and heating element 55, or the louvered section may be made integral with the top cover. Also integral with the top cover 4 is the upper half 63 of the fan cowling 31 which extends vertically downwardly therefrom and mates with the lower half 30 of the fan cowling extending upwardly from the floor member 18 as aforesaid. A downwardly extending lip 64 on the forward edge of the top cover 4 overlaps the front edge of the guard screen 57 as shown in FIG. 4.

Although it is preferred that the top cover 4 be a relatively flat and thin member to facilitate attachment to the chassis 3, it will be apparent that the chassis 3' may be split anywhere along its height and the remainder of the side walls 15' and 16' and firewall 17' may be made integral with the top cover 4' if desired as shown in FIG. 6. Otherwise, the details of construction of the enclosure 1' of the FIG. 6 embodiment may be substantially identical to the enclosure 1 previously described, and the same reference numbers followed by a prime symbol are used to designate like parts. The front cover 5 may also be attached to the front edges of the chassis 3 using suitable fasteners and decorated in any suitable manner as by attaching wood grain strips 65 or the like thereto.

Both the top cover 4 and front cover 5, like the chassis 3, may be made by known molding techniques from suitable plastic material to form rigid structural corrosion resistant parts which provide substantial economies in manufacturing costs with little or no maintenance required, and the parts may also be decoratively molded to provide an attractive appearance without the need for additional decorative covers.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An enclosure for air-conditioners and the like comprising a one-piece molded chassis having a pair of laterally spaced side walls, an integral fire wall extending between said side walls intermediate the ends thereof defining separate compartments on opposite sides of said fire wall, a floor member extending between said side walls on the rear side of said fire wall providing a drain pan area, said floor member being integral with said side walls and said fire wall, at least one blower housing forwardly of said fire wall, and a horizontal suspension platform integral with said fire wall and extending forwardly therefrom for mounting of a blower motor, said blower housing having an air discharge opening in its upper surface, means for mounting an evaporator above said blower housing and horizontal suspension platform, said blower housing and horizontal suspension platform being shaped to provide a drain pan area surrounding said air discharge opening, and a drain hole in said fire wall providing communication between said drain pan areas on opposite sides of said fire wall, said drain pan area surrounding said

air discharge opening being sloped to provide fast run-off of condensate forwardly of said fire wall to the rear thereof, said blower housing comprising upper and lower halves, one of said blower housing halves being integral with said fire wall and with said horizontal suspension platform.

2. The enclosure of claim 1 wherein there are a pair of said blower housings forwardly of said fire wall, each comprising upper and lower halves, with air discharge openings in the upper halves thereof, said horizontal suspension platform being disposed between said blower housings and integral with one half of each of said blower housings, both of said blower housings and horizontal suspension platform therebetween being shaped to provide drain pan areas surrounding said air discharge openings, and there are a plurality of drain holes in said fire wall providing communication between said drain pan areas on opposite sides of said fire wall.

3. The enclosure of claim 2 wherein said drain pan areas surrounding each of said air discharge openings slope away from each other toward opposite corners, and there are drain holes in said fire wall at said opposite corners to provide fast run off of condensate forwardly of said fire wall to the rear thereof as aforesaid.

4. The enclosure of claim 2 further comprising an interior wall integral with said fire wall and extending forwardly therefrom between said side walls, said interior wall providing a pair of spaced apart compartments forwardly of said fire wall which are isolated and insulated from each other, one of said compartments containing said blower housings, and the other compartment being adapted to receive the electrical controls for various components, one half of each of said blower housings also being integral with said interior wall and one of said side walls, respectively.

5. The enclosure of claim 4 further comprising notches in the upper edge of said fire wall for passage of electrical wires leading from the electrical controls to various electrical components.

6. The enclosure of claim 4 wherein the upper edge of said interior wall is sloped downwardly to provide a clearance between the evaporator and interior wall for passage of electrical wires leading from the electrical controls to various electrical components.

7. The enclosure of claim 6 further comprising mounting brackets for supporting the evaporator at an angle above said blower housings and horizontal suspension platform.

8. The enclosure of claim 1 further comprising means for mounting a heater element above the evaporator.

9. The enclosure of claim 4 further comprising a bar integral with the forwardmost portions of said blower housings and suspension platform for increased strength, the ends of said bar also being integral with said interior wall and said one side wall, respectively.

10. The enclosure of claim 1 further comprising separate top and front covers adapted to be attached to the top and front edges, respectively, of said enclosure, said top and front covers and said enclosure being molded from plastic material to provide a rigid, corrosion resistant assembly.

11. The enclosure of claim 10 wherein said plastic is

a fiberglass reinforced plastic.

12. The enclosure of claim 1 wherein said side walls include a vertically extending step forwardly of said fire wall facing rearwardly for abutting engagement with a wall when said enclosure is inserted into an opening therein.

13. The enclosure of claim 12 wherein said opening is lined with a plastic sleeve.

14. The enclosure of claim 1 further comprising mounts integral with said floor member for mounting of compressor and condenser motors rearwardly of said fire wall, and a groove in said floor member for collecting condensate, said condenser motor having a fan with a slinger ring adapted to extend into said groove for picking up the condensate in said groove and blowing the condensate across a condenser adapted to be mounted at the rear of said enclosure.

15. The enclosure of claim 14 wherein the lower half of a fan cowling is integral with said floor member, and the upper half of said fan cowling is integral with a one-piece molded cover member adapted to be attached to the upper edges of said enclosure.

16. An enclosure for air-conditioners and the like comprising a one-piece molded chassis having a pair of laterally spaced side walls, an integral fire wall extending between said side walls intermediate the ends thereof defining separate compartments on opposite sides of said fire wall, a floor member extending between said side walls on the rear side of said fire wall providing a drain pan area, said floor member being integral with said side walls and fire wall, an interior wall integral with said fire wall and extending forwardly therefrom between said side walls, said interior wall providing a pair of spaced apart compartments forwardly of said fire wall which are isolated and insulated from each other, one of said compartments forwardly of said fire wall containing blower housings, and the other compartment forwardly of said fire wall being adapted to receive the electrical controls for various components, said blower housings comprising upper and lower halves, said upper halves being integral with said fire wall and said interior wall and one of said side walls and having air discharge openings in their upper surfaces, and a horizontal suspension platform between said blower housings for mounting of a blower motor, said horizontal suspension platform being integral with said fire wall and said upper halves of said blower housings, means for mounting an evaporator above said blower housings and horizontal suspension platform, said blower housings and horizontal suspension platform being shaped to provide drain pan areas surrounding said air discharge openings, and drain holes in said fire wall providing communication between said drain pan areas on opposite sides of said fire wall, said drain pan areas surrounding said air discharge openings being sloped to provide fast run off of condensate from the forward side of said fire wall to the rear side thereof, and separate one-piece top and front covers adapted to be attached to the top and front edges, respectively, of said enclosure, said top and front covers and said enclosure being molded from plastic material to provide a rigid, corrosion resistant assembly.

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