

Jan. 2, 1940.

A. WEILAND ET AL
AIR CONDITIONING APPARATUS

2,185,387

Filed June 11, 1936

7 Sheets-Sheet 1

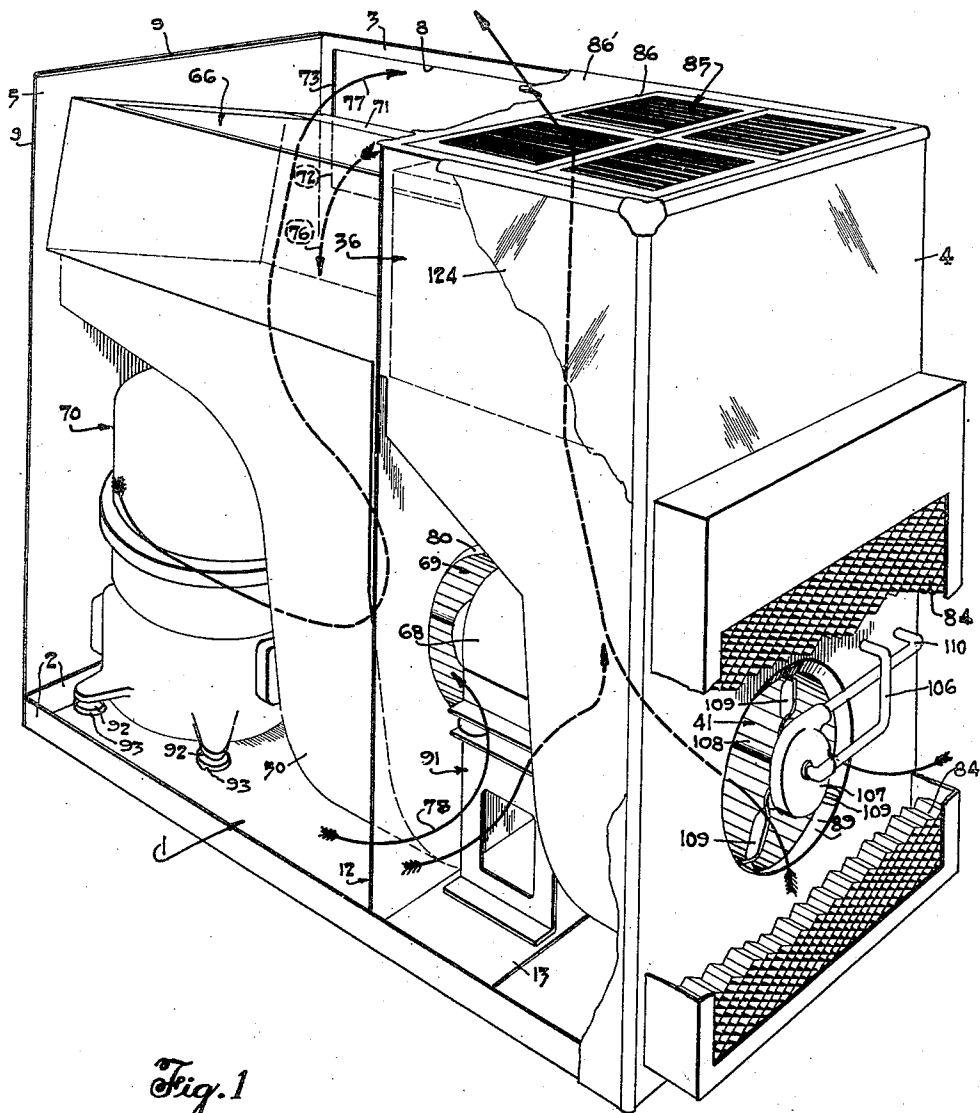


Fig. 1

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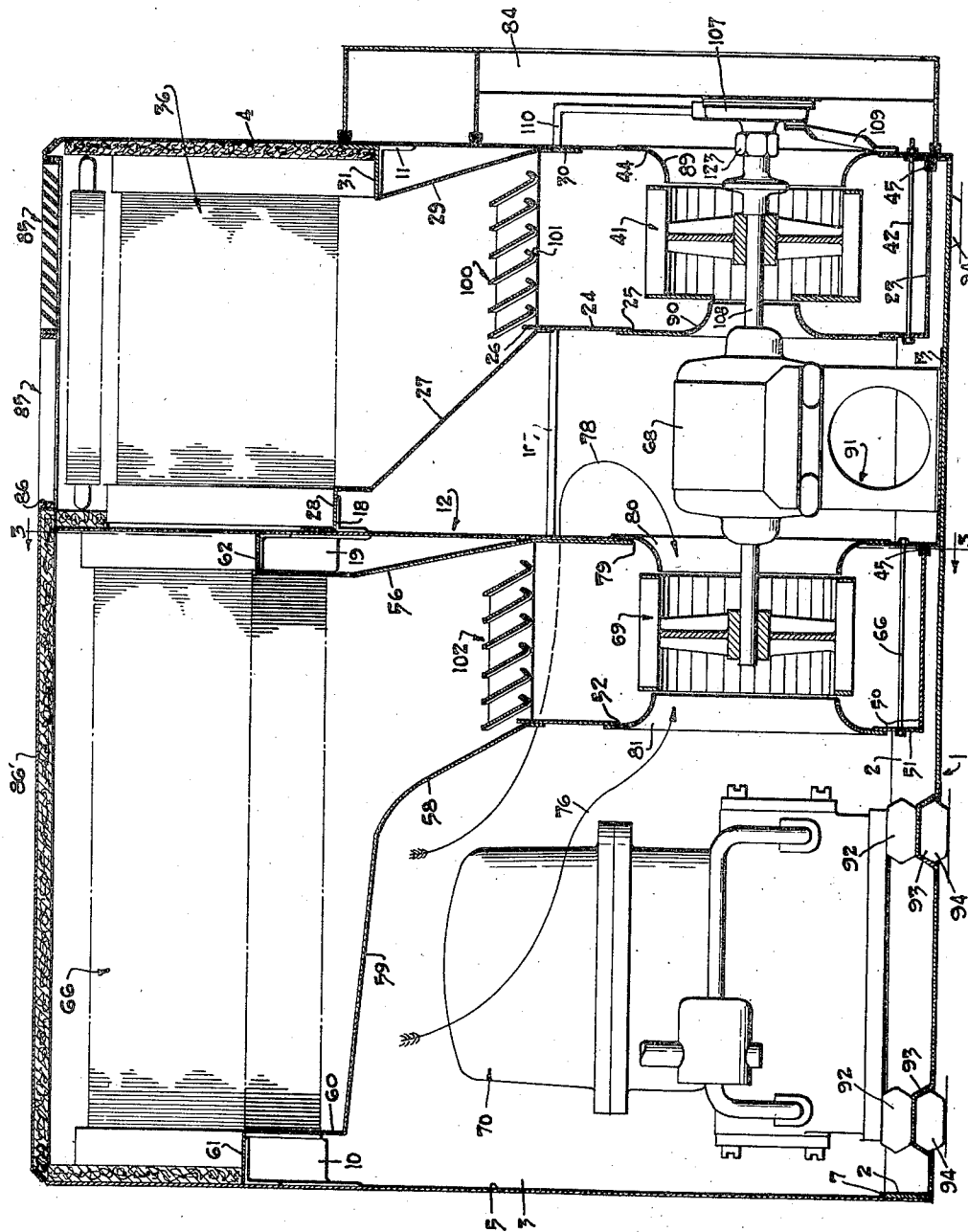
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7 Sheets-Sheet 2



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7 Sheets-Sheet 3

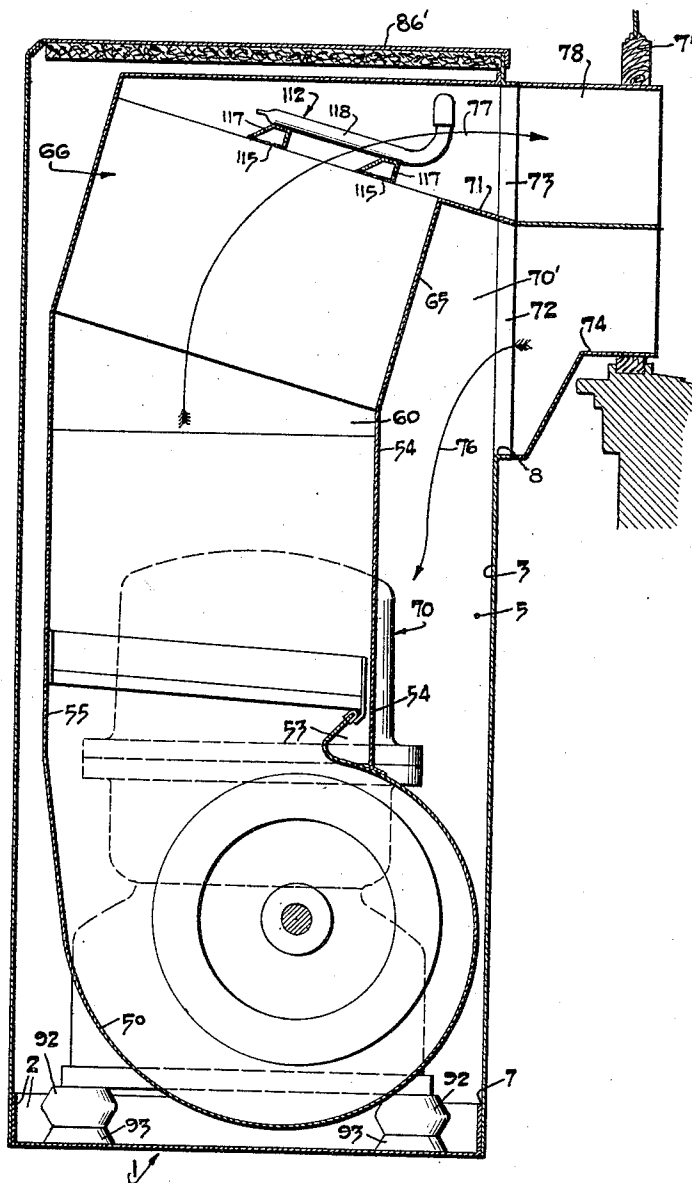


Fig. 3

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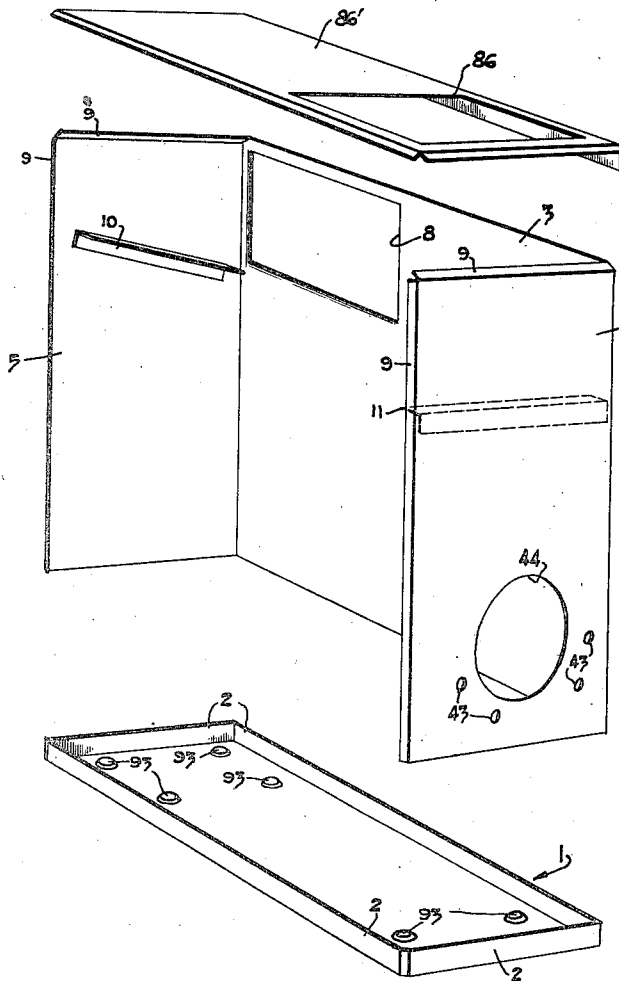


Fig. 6

Fig. 5

Fig. 4

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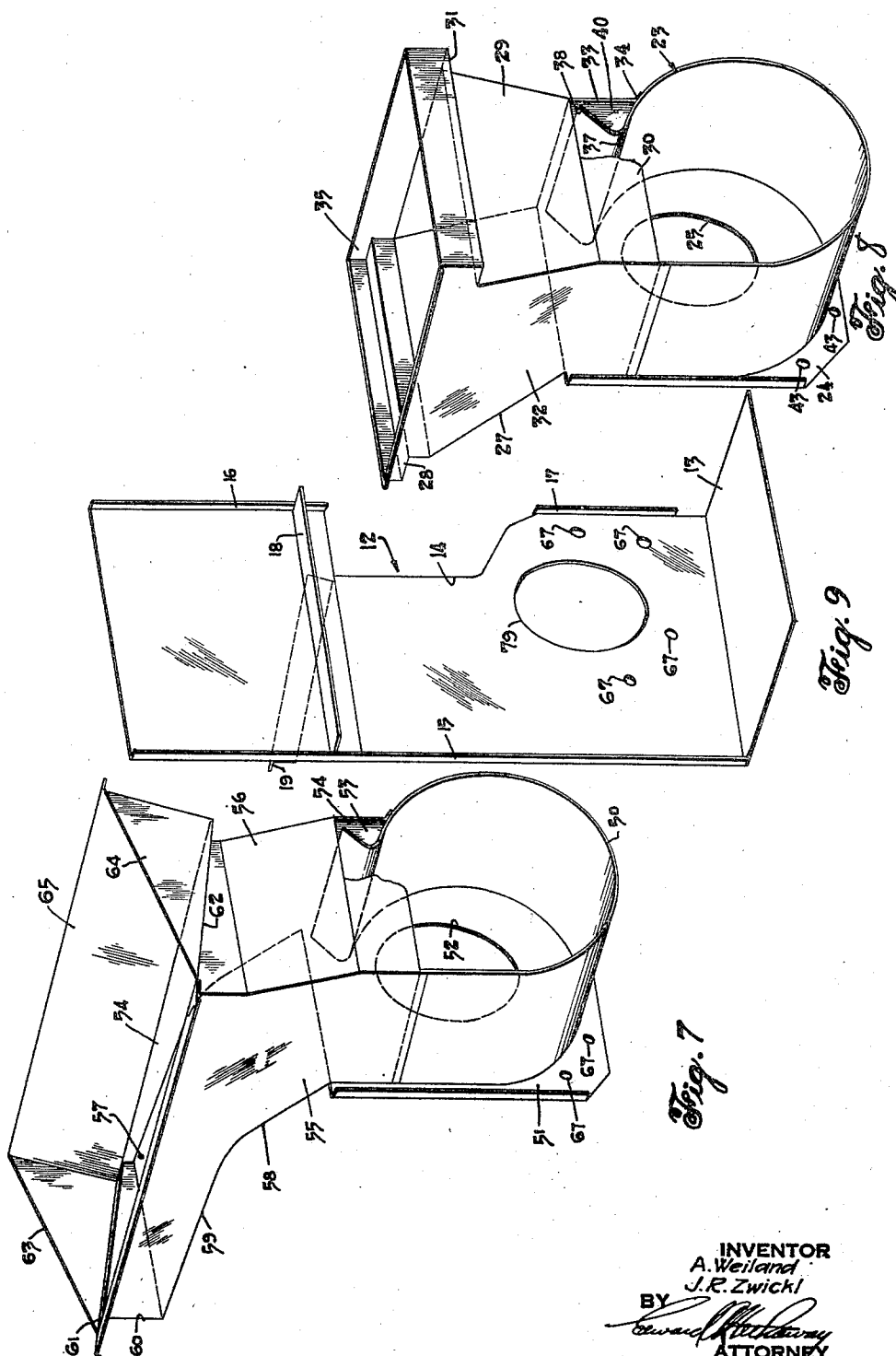
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AIR CONDITIONING APPARATUS

Filed June 11, 1936

7 Sheets-Sheet 5



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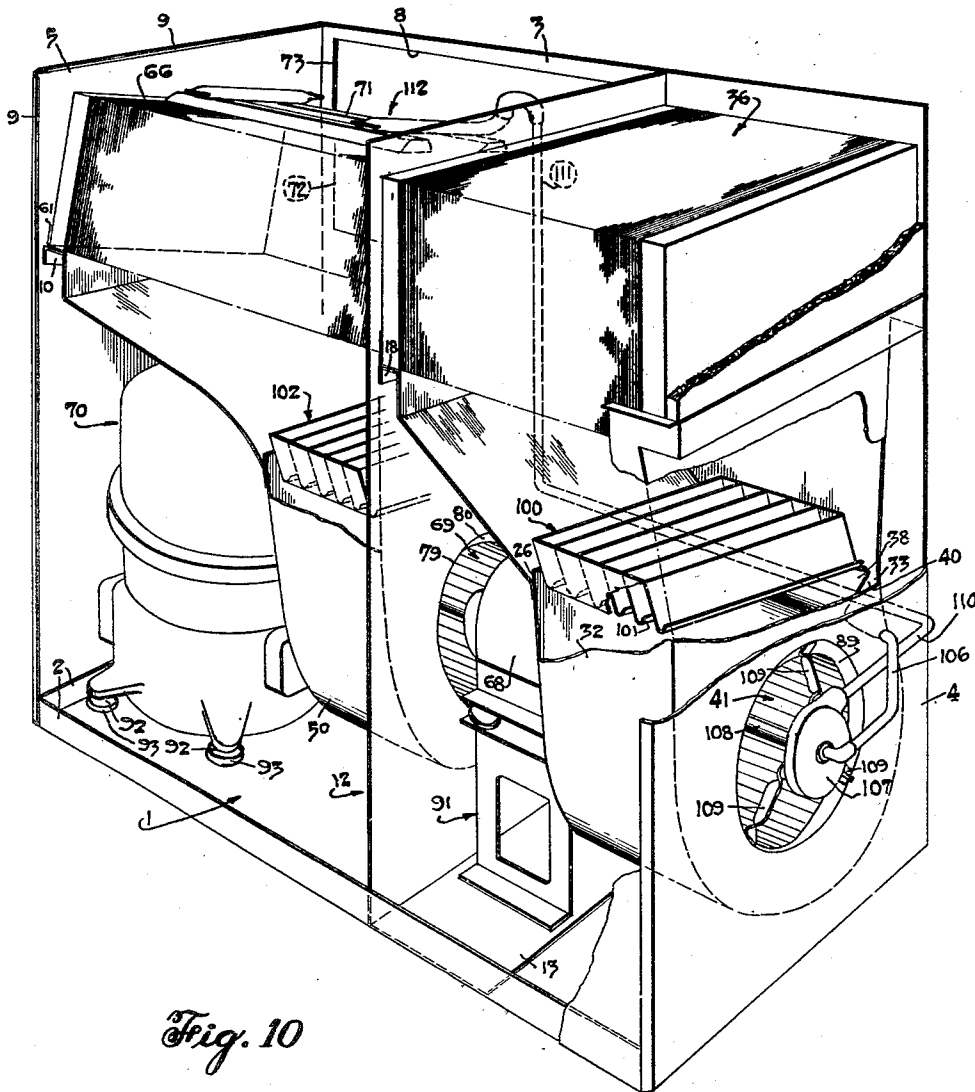
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Filed June 11, 1936

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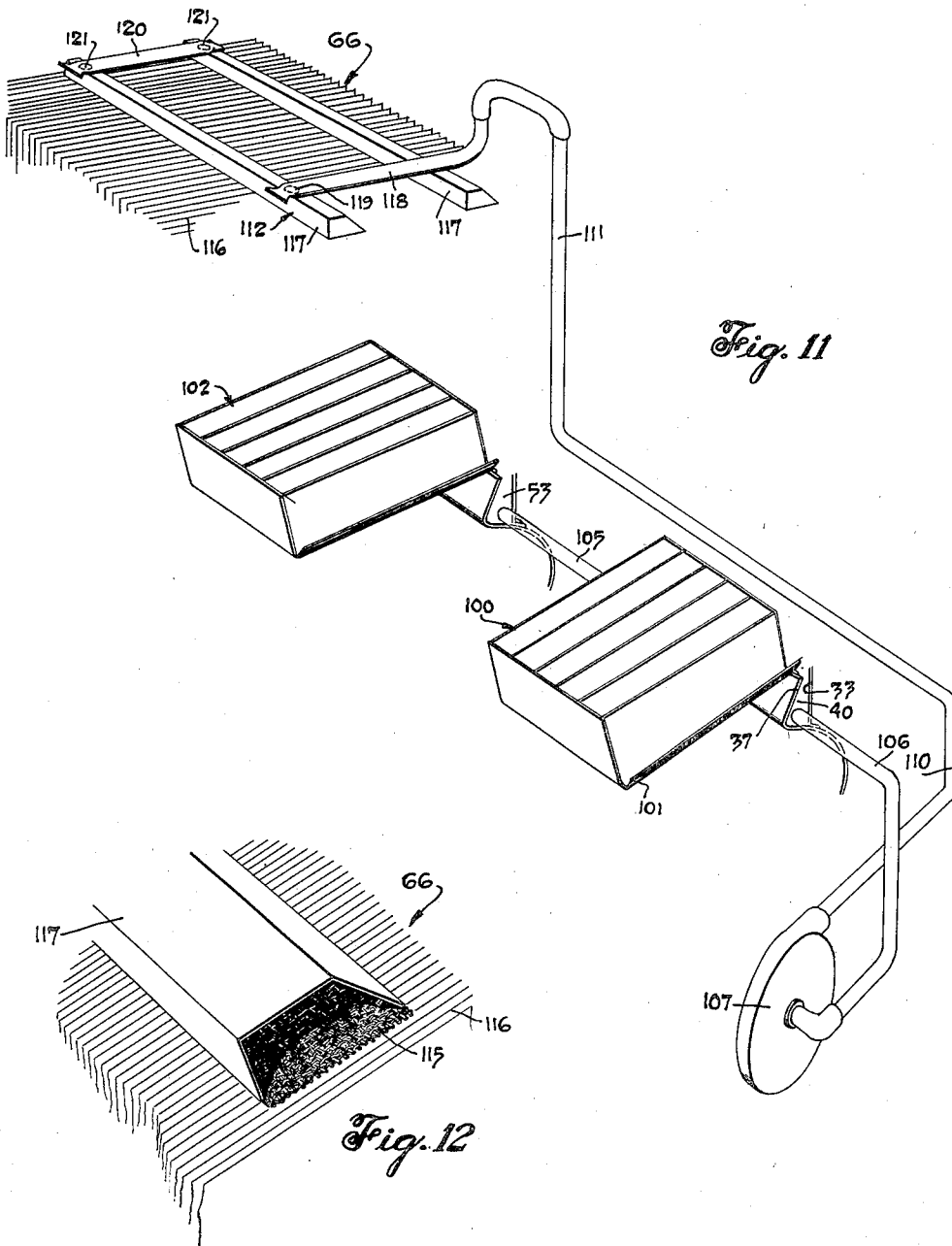
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AIR CONDITIONING APPARATUS

Filed June 11, 1936

7 Sheets-Sheet 7



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UNITED STATES PATENT OFFICE

2,185,387

AIR CONDITIONING APPARATUS

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Application June 11, 1936, Serial No. 84,758

21 Claims. (Cl. 62-129)

This invention relates generally to air conditioning apparatus of the type employing a refrigerating system and more particularly to an improved self-contained room cooler unit adapted to be disposed directly within a room to be conditioned.

Various arrangements of self-contained air conditioning apparatus have heretofore been proposed and manufactured, but the same have been deficient in various aspects such as requiring excessive space, high initial cost and inaccessibility of various parts for inspection or repair. It is one object of our invention to provide an improved self-contained room cooler unit that is economical in manufacture, maintenance and operation combined with quiet and efficient air flow through the unit whereby blower apparatus of minimum size may be used for a given capacity of refrigeration and volume of air circulation. A further object is to provide improved means for collecting condensate from the evaporator and disposing of it in a path of outside air which is preferably circulated through a window and thence over an air cooled condenser and out through the window to the outside atmosphere.

In one specific aspect of the invention the foregoing and other objects are accomplished by providing a sheet metal framework supported upon a base to form substantially two vertical compartments and then bodily inserting a combined fan scroll and evaporator duct unit into one compartment so as to direct a substantially vertical flow of room air through the unit and over the evaporator therein, this being in combination with a fan scroll and duct unit which is bodily inserted in the other compartment and arranged to extend vertically and laterally, thereby providing what might be termed a sub-compartment beneath said lateral portion to receive a compressor. Said evaporator unit is located at one end of the apparatus with a slight lateral deflection in the duct to provide a blower motor sub-compartment whereby the motor is located between the two scrolls. The condenser duct unit is further arranged in combination with the sheet metal frame so as to permit outside air to flow inwardly through an elongated opening in the back wall and thence downwardly over the compressor and inwardly through double axial inlets of the outside air fan to be discharged over the condenser and outwardly from the apparatus in a discharge passage overlying the inlet passage, the outside air flow into one of said blower inlets being adapted to enter a portion of the evaporator duct compartment but being prevented from mixing with

the room air due to the cooperative relation of duct and frame construction. To further improve the efficiency of air flow while still obtaining a highly compact unit, the condenser is inclined from the front of the unit downwardly toward the rear thereof and we further utilize this feature to place a portion of the condensate disposal means in cooperative relation to the condenser and outside air flow. To additionally simplify the construction and still permit efficient collection and handling of condensate, we provide a series of slightly inclined baffles in the air ducts beneath the complementary heat exchange elements such as the condenser and evaporator and form a trough at the lower edge of each baffle so as to discharge the condensate into collection chambers at one side of the ducts, these collection chambers preferably being formed by bending one of the terminal portions of the fan scroll toward a back sheet. This reversely bent portion of each fan scroll thus functions not only as a condensate receptacle or chamber but also as a cut-off for the normal flow of air discharging from the fan scroll into the duct. Hence the receptacle does not take up any space within the flow passage itself and yet adequately communicates with the baffle troughs in an efficient and simple manner. In another aspect of the improved condensate disposal means, absorbent pads are placed on top of the condenser fins and held in direct contact therewith by suitable elongated caps which also function as receivers for condensate pumped thereto from the liquid collection chambers above mentioned.

As a result of the foregoing features we are able to provide a simple and compact unit that is economical in manufacture and maintenance together with efficient air flow through the unit which permits maximum refrigeration capacity for a given size condenser which is preferably of the air cooled type.

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

Fig. 1 is a perspective of the unit with certain parts broken away and others omitted to show the general arrangement of elements;

Fig. 2 is a longitudinal vertical section through the unit;

Fig. 3 is a vertical transverse section taken substantially on the line 3-3 of Fig. 2;

Fig. 4 is a perspective of the base pan;

Fig. 5 is a perspective of an envelope forming

the back and end walls of a combined cabinet and frame;

Fig. 6 is a perspective of the cabinet top;

Fig. 7 is a perspective of the condenser duct and fan scroll unit;

Fig. 8 is a perspective of the evaporator duct and fan scroll unit;

Fig. 9 is a perspective of a combined partition and supporting standard interposed between the two duct units;

Fig. 10 is a perspective of the unit similar to Fig. 1 but with certain parts omitted and broken away to show in particular the condensate disposal elements in their relation to the other elements of the unit;

Fig. 11 is a perspective of the condensate collecting and disposal elements isolated from the unit to show their operative relation;

Fig. 12 is an enlarged fragmentary perspective of a portion of the condensate absorbing material and of the structure for pressing the absorbing material into contact with the condenser fins to form a liquid receiving chamber above the absorbing material.

In the particular embodiment of the invention which is disclosed herein merely for the purpose of illustrating one specific form among possible others that the invention might take in practice, I have shown in Fig. 4 a sheet metal base pan 1 having upwardly turned flanges 2 around its four sides. A three-sided combined frame and cabinet envelope has a back wall 3 and end walls 4 and 5 adapted to overlap preferably the outside of the rear and end flanges 2 and be welded thereto preferably along the corner juncture 7 of the flanges and walls. Said walls broadly constitute sheet metal frame standards as well as forming cabinet walls. An opening 8, Fig. 5, is provided in the back wall 3 to receive outside air ducts while both of the upper end edges of the envelope and the forward vertical edges of end walls 4 and 5 are bent inwardly in the form of angularly disposed flanges 9 to support the top and front panels to be described later. A downwardly inclined supporting flange 10 is secured to the inner side of end wall 5 while a horizontal supporting flange 11 is secured on the inner side of end wall 4. A sheet metal combined partition and supporting standard generally indicated at 12, Fig. 9, is next assembled with the base and envelope so that the partition extends transversely of the base 1 as shown in Fig. 10. The lower end of partition 12 is provided with a horizontal portion 13 which rests upon and is secured to the bottom of base pan 1. A portion 14 is cut out at the rear of the partition while a flange 15 extends continuously along the front edge of the partition and shorter flanges 16 and 17 are provided at the rear edges to be fastened directly to the back wall. A horizontal supporting flange 18 is secured to the side of the partition opposite to supporting flange 11, Fig. 5, while a downwardly inclined supporting flange 19, Fig. 9, is provided on the other side of the partition opposite to flange 10, Fig. 5. The foregoing combination of base pan, envelope and partition provides not only a very simple and compact arrangement but also one that is sturdy and economical in construction and of minimum weight. The partition 12 in association with the back and end walls provides generally two main compartments, one of relatively small size between end wall 4 and partition 12 and the other of relatively larger size between partition 12 and end wall 5, each extending for the full height of the unit.

Disposed within the small compartment is a combined fan scroll and evaporator duct unit comprising as shown in Fig. 8 a sheet metal fan scroll 23 whose inner end is closed by a sheet metal member 24 in which an axial inlet opening 25 is provided. This end sheet terminates as shown in Fig. 2 in an upper free edge 26 to form a baffle intersecting the bottom wall 27. A laterally inclined wall 27 is connected as shown in Fig. 2 to end plate 24 below the edge 26 and is provided with an offset supporting flange construction 28, Fig. 8. The other end of this duct unit is provided with a plate 29 slightly laterally inclined, Fig. 2, and terminating at its lower end 30 near the upper portion of fan scroll 23 while its upper end is provided with a flange construction 31 in horizontal alignment with flange 28. A front wall 32 extends upwardly from scroll 23 and is of such conformation as to follow the inclined walls 27 and 29 as well as the flanged constructions 28 and 31. Also a rear wall 33, Fig. 8, is secured at its lower end 34 to the outside of scroll 23 and is also of such conformation as to conform to the sides 27 and 29 and flanges 28 and 31. The upper portions of the front and rear sides and the flange constructions are such as to provide a recess 35 to receive the lower end of an evaporator generally indicated at 36, Fig. 2. The evaporator is supported on the upper surface of the flanges 28 and 31, while the lower surfaces of these flanges are supported on the flanges 11 and 18, Figs. 2, 5 and 9. The sheet metal fan scroll 23, Fig. 8, is reversely bent at 37 for the full axial length of the scroll and has its free end 38 slightly spaced from the back wall 33, thereby forming a condensate or liquid chamber 40. This reversely bent portion 37 also functions as an effective cut-off for the air discharging from the fan rotor 41, Fig. 2, which revolves in a clockwise direction looking toward the open end of the scroll in Fig. 8. The foregoing scroll and duct unit is adapted to be bodily inserted into the smaller compartment and supported therein upon the flanges 11 and 18 as previously mentioned, thus providing an extremely simple and yet compact and economical arrangement adapted to be effectively bolted to the end wall 4 to produce a sturdy arrangement. This bolting is accomplished by a series of bolts 42, Fig. 2, extending through bolt holes 43 in end plate 24 and end wall 4, Figs. 8 and 5, thereby firmly clamping the outer free edge of scroll 23 against the inner face of end wall 4 in axial alignment with a blower inlet opening 44. To insure uniform contact and adjustment between the scroll and end wall 4 as well as to avoid any possibility of vibration therebetween, the free edge of the scroll may be provided around its circumference with a channel or other suitably shaped pad 45, Fig. 2. The foregoing duct unit and bolting construction permits the evaporator and scroll to be used with a cabinet-frame construction of varying heights whereby it is possible to standardize on the construction of the scroll-duct unit regardless of the height of the cabinet in which it is ultimately assembled as well as providing a very simple and effective means for insuring a sturdy and compact unit.

The condenser duct and scroll unit, Fig. 7, is identical in principle with the evaporator duct unit above described. Hence it will be only necessary to briefly apply reference characters to the general parts such as the fan scroll 50, end sheet 51, axial blower inlet 52, condensate chamber 53, back wall 54, front wall 55, end wall 56 75

and bottom wall 57. It will be noted, however, that wall 57 not only has an inclined portion 58 but also a substantial lateral portion 59 terminating in a vertical wall 60. This wall has a flanged portion 61 which slopes downwardly toward the rear wall 54, which has a lateral portion to conform to the laterally extending wall 59. Also the end wall 56 has a downwardly inclined flange portion 62 lying in the plane of flange 61. Triangular shaped end walls 63 and 64 support a rearwardly inclined wall 65, these walls together forming a suitable receptacle for a condenser generally indicated at 66, Fig. 2. The condenser rests upon the upper surfaces of flanges 61 and 62 while the under surfaces of these flanges are supported upon the flanges 19 and 10, Figs. 9 and 5. Bolts 66 extend through suitable openings 67 in the end wall 51 and partition 12, Figs. 7 and 9, to hold the unit in position against partition 12. Any suitable pad such as rubber or the like corresponding to the element 45, Fig. 2, may be inserted between the scroll and partition. All of the foregoing has the same advantages as those previously described for the evaporator duct and scroll unit. The condenser and evaporator are seen to be of rectangular form, the condenser being of greater length.

An outside air blower 69, Fig. 2, is operated by a motor 68 whose shaft also commonly supports the room air blower 41. It will be noted that the lateral offset 27 of the evaporator duct provides in effect a sub-compartment in which the motor 68 is compactly located between the two fan scrolls while the extended lateral expansion 59 of the condenser duct provides in effect a sub-compartment to receive a motor-compressor mechanism 70 disposed beneath the condenser unit. To circulate outside air through the unit and back to the outside in order to cool the condenser and also at the same time if desired to cause such air to pass over the compressor or any suitable compressor cooling apparatus, it will be noted in Fig. 3 that the back wall 54 of the condenser unit is spaced an appreciable distance from the rear cabinet wall 3 to form a portion of an inlet passage 70'. Also the upper edge of wall 65 of the condenser receptacle is turned outwardly as at 71 to divide the back wall opening 8, Fig. 5, into a lower inlet opening 72 and an upper outlet opening 73. Hence outside air flows inwardly as at 71 to divide the back wall opening 8, suitable wall opening such as a window 75 and thence flows as indicated by arrow 76 downwardly around the compressor unit 70 and into inlet 52, Figs. 2 and 7, thereby to be circulated upwardly by blower rotor 69 to flow across condenser 66 from the lower side thereof to the top and simultaneously be turned laterally, Fig. 3, as indicated by arrow 77 for communication with the outside atmosphere through a duct 78. A portion of the air which passes inwardly through opening 72, Fig. 3, is adapted to flow laterally through the cut-out portion 14, Fig. 9, and thereby flow over blower motor 68, Fig. 2, as indicated by arrow 78 for admission to the condenser blower rotor 69 through an opposed axial inlet opening 79 in partition 12. The inlet openings 79 and 52 may be provided with any suitable circular guiding walls 80 and 81 to efficiently direct the air into the blower rotor.

The room air flows inwardly through a relatively narrow filter 84 of small height, Fig. 2, and thence through inlet 44 to blower rotor 41 which circulates the air vertically upwardly over

evaporator 36 to be discharged through any suitable grille work 85 disposed within a suitable opening 86, Fig. 6, in the cabinet top 86'. A portion of the outside air has been described as flowing into the smaller cabinet compartment along the line indicated by arrow 78, Fig. 2, but yet this air does not have access to the room air inlet 44 because scroll 23 is held tightly against the outer cabinet wall 4. However, advantage is taken of the presence of outside air in the smaller compartment to admit a portion thereof through a reduced size inlet 25 as fresh air to be mixed with the room air and circulated by the room air blower 41. The openings 44 and 25 are provided with suitable curved inlet walls 89 and 90.

The motor 68 may be supported upon any suitable framework generally indicated at 91, Fig. 2. The compressor mechanism 70 may be supported upon suitable cushioning devices 92 which are preferably supported upon metal bosses 93 pressed upwardly from the sheet metal base pan. To further utilize the pressed bosses 93, it will be noted in Fig. 2 that they are of substantially the same configuration as the upper tapered portion of the cushions 92 whereby it is possible to support similar cushions 94 within the under side of the pressed bosses at each end of the base as shown in Figs. 2 and 4.

Condensate disposal system.—To collect condensate which drips from evaporator 36 and at the same time minimize resistance to the air flow through the ducts, we provide a series of transversely disposed baffles 100 of appreciable vertical extent compared with the relatively narrow width of flange troughs 101 formed along the lower edge of each baffle. The upper edges of the baffles, however, overlie the troughs 101 to prevent the possibility of water dripping into the fan scroll. It will also be noted from Fig. 2 that the upper edge 26 of the end plate 24 is adapted to catch water that flows down along the inclined wall 27. These baffles at their forward ends abut against or are permanently secured to the front duct sheet 32, Fig. 10, while the rear ends of the baffles rest upon the reversely bent or hollow fan cut-off 38 and are disposed in spaced relation to the rear wall 33 to permit water in troughs 101 to accumulate in liquid chamber 40. The troughs may if desired be slightly inclined downwardly to insure rapid discharge of water from the troughs into the chamber. A similar baffle construction is employed in the condenser duct as generally indicated at 102, Figs. 2 and 10. The two constructions are identical, and hence further description is not necessary.

The chambers 53 and 40, Figs. 7 and 8, are connected by a pipe 105, Fig. 2, while the chamber 40 is connected at its lowermost point by a pipe 106 to the inlet side of a rotary pump 107. This pump is preferably directly connected to the fan rotor shaft 108 and is supported by the end wall 4 or inlet guide 89 through a series of radial arms 109. Pump 107 discharges through a pipe 110 extending across and then upwardly as at 111 for connection to an improved condensate distributing means generally indicated at 112, Fig. 10. This condensate distributing means includes a pair of absorbent pads 115 pressed into firm contact with the top edges of condenser fins 116. To provide the necessary holding pressure and at the same time distribute the water over the pads, a pair of longitudinally elongated inverted channel members 117, Fig. 11, overlie and engage each

pad. These members may be suitably soldered, clamped or otherwise held down and their ends are closed to retain water therein. The water is circulated in a series path through the channels 117 by a pipe 118 which communicates with the forward channel 117 through an opening 119 while the other ends of the channels are interconnected by a pipe 120 through openings 121. Thus water flows through pipe 118 and first enters the forward channel through opening 119 and then flows around to the other channel. The upward flow of hot condenser air over the moistened pads causes the water to rapidly evaporate, this being augmented by the transfer of heat from the condenser fins to the pads through the direct pressure contact therewith together with the action of the pump 107 in continuously forcing water to the exposed surface of the pads regardless of the rate of evaporation. Thus the pads operate with a high degree of efficiency at all times. Also the holding pressure on the pads insures that any excess liquid will be discharged directly in contact with the fin surface. However, any condensate that may by chance drip over the condenser fins will be either evaporated by the condenser heat or be caught by the wall 59, Fig. 2, or baffles 102 to flow into chamber 53 and thence through pipe 105 to chamber 40 and pipe 106, Fig. 10, to pump 107 and thereby be recirculated. It is found that the foregoing condensate disposal system is extremely effective in quickly disposing of appreciable quantities of condensate with minimum resistance to the air flow, the pump becoming automatically primed upon the presence of any condensate. In the event of no condensate being present, the pump will idly rotate without damage to a suitable packing gland 123, Fig. 2, which can be of any usual self-sealing type.

It will, of course, be understood that the front side of the unit is closed by a front cabinet panel 124, Fig. 1, secured to the vertical flanges 9 and 15, Figs. 5 and 9, whereby a complete self-contained combined frame and cabinet is provided when the top 86' is placed in position and suitably secured to the envelope and front panel. It will be noted in Figs. 3 and 10 that by having the condenser 66 inclined downwardly toward the rear, a very appreciable space is provided not only for the discharged air to freely communicate with the outlet 73, Fig. 3, but also an ample space is provided to receive the condensate receiving means 112.

From all of the foregoing disclosure it is seen that we have provided a comparatively simple and compact construction that is economical in manufacture and maintenance and is efficient in operation so as to permit maximum refrigeration and air circulation for a given size unit while at the same time permitting the parts to be readily accessible.

We claim:

1. A room cooler unit comprising, in combination, a base; sheet metal walls forming two substantially vertically extending compartments; the first of said compartments having a heat exchange element, a vertical air flow duct and a blower for circulating air through said duct and over said heat exchange element; the second of said compartments having a compressor, a heat exchange element, a vertical air flow duct and a blower for circulating air over said compressor and heat exchange element; and each of said compartments having an inlet and an outlet communicating with the ducts disposed in the re-

spective compartments, the duct in the second compartment having a laterally extending portion forming substantially a sub-compartment within which the compressor is disposed.

2. A room cooler unit comprising, in combination, a base; sheet metal walls forming two substantially vertically extending compartments; the first of said compartments having a heat exchange element, a vertical air flow duct and a blower for circulating air through said duct and over said heat exchange element; the second of said compartments having a compressor, a heat exchange element, a vertical air flow duct and a blower for circulating air over said compressor and heat exchange element; each of said compartments having an inlet and an outlet communicating with the ducts disposed in the respective compartments, the duct in the first compartment having a laterally offset portion forming a blower motor sub-compartment within the first compartment, and a blower motor disposed within said sub-compartment.

3. A room cooler unit comprising, in combination, a base; sheet metal walls forming a pair of substantially vertically extending compartments; the first of said compartments having a heat exchange element and a duct and fan scroll unit adapted to be bodily inserted in said first compartment to form a blower motor sub-compartment, a blower motor therein, a second one of said compartments having a heat exchange element and a duct and fan scroll unit adapted to be bodily inserted in said second compartment to form a compressor sub-compartment, a compressor therein operatively connected to both of said heat exchange elements to provide a refrigerating cycle; means for circulating outside air through said compressor sub-compartment and over the heat exchange element disposed within the second compartment, and means whereby a portion of said outside air passes into said blower motor sub-compartment and thence through the duct in said second compartment and back to the outside together with the outside air circulated over the compressor.

4. A room cooler unit comprising, in combination, a base, sheet metal walls forming a pair of substantially vertically extending compartments, the first of said compartments having a heat exchange element and a duct and fan scroll unit adapted to be bodily inserted in said first compartment to form a blower motor sub-compartment, a blower motor therein, a second one of said compartments having a heat exchange element and a duct and fan scroll unit adapted to be bodily inserted in said second compartment to form a compressor sub-compartment, a compressor disposed therein, means for circulating outside air through said compressor sub-compartment and over the heat exchange element disposed within the second compartment, means whereby a portion of said outside air passes into said blower motor sub-compartment and thence into the duct in said second compartment to be discharged back to the outside together with the remaining outside air which is circulated over the compressor, and means whereby a portion of the outside air within the blower motor sub-compartment is admitted to the room air blower.

5. A self-contained room cooler apparatus comprising, in combination, a base, means forming a pair of sheet metal standards having horizontal supporting flanges, means cooperating with said standards to form a compartment, a combined duct and fan scroll unit adapted to be bodily in-

serted into said compartment and having flanges adapted to rest on said supporting flanges to vertically support said unit, a heat exchange element associated with said duct, and a blower rotor in said scroll for circulating air over said heat exchange element and through said duct.

6. A self-contained room cooler apparatus comprising, in combination, a pair of vertically extending sheet metal walls having horizontal supporting flanges, a combined duct and fan scroll unit provided with flanges adapted to rest upon said supporting flanges, means for holding said unit against the side of one of said walls to effect a mutual reinforcing relation therebetween, a heat exchange element associated with said duct, and a blower rotor in said scroll for circulating air over said heat exchange element and through said duct.

7. A self-contained room cooler apparatus comprising, in combination, a pair of vertically extending sheet metal walls having horizontal supporting flanges, a combined duct and fan scroll unit provided with flanges adapted to rest upon said supporting flanges, an end plate closing one side of said scroll, means for holding the other side of said scroll against the face of one of said walls thereby to close said other side, a heat exchange element associated with said duct, and a blower rotor in said scroll for circulating air over said heat exchange element and through said duct.

8. A self-contained room cooler apparatus comprising, in combination, a pair of vertically extending sheet metal walls having horizontal supporting flanges, a combined duct and fan scroll unit provided with flanges adapted to rest upon said supporting flanges, an end plate closing one side of said scroll, means for holding the other side of said scroll against the face of one of said walls thereby to close said other side, and a yieldable element interposed between said wall and said other side of said scroll.

9. A self-contained room cooler unit comprising, in combination, a base, a sheet metal back wall having an outside air opening located in the upper portion of the unit, a combined evaporator duct and fan scroll extending vertically from the lower portion of the unit to the upper portion thereof and supported in one end of said unit, and a combined condenser duct and fan scroll extending vertically from the lower portion of the unit to the upper portion thereof and supported in the other end of the unit, said condenser duct being spaced inwardly from said back wall, the lower portion of said outside air opening communicating with the space between said back wall and condenser duct, and the upper portion of said outside air opening communicating with the condenser duct, whereby outside air is drawn inwardly through the lower portion of said opening and down through said space and around the outside of said condenser duct and fan scroll to be discharged upwardly through the duct and back to the outside through the upper portion of said opening.

10. A self-contained room cooler unit comprising, in combination, a room air duct and blower for circulating room air therethrough, an evaporator associated with said room air duct so as to cool the room air passing therethrough, a vertically extending outside air duct and a blower associated therewith for circulating outside air upwardly therethrough, means forming a lateral outlet from the top of said outside air duct, and a condenser disposed in the upper

portion of said outside air duct and inclined downwardly toward the rear side thereof whereby the upwardly flowing outside air is angularly turned to said lateral outlet by initially engaging the rear bottom portion of said inclined condenser.

11. A self-contained room cooler unit comprising, in combination, a room air duct and blower for circulating room air therethrough, an evaporator associated with said room air duct so as to cool the room air passing therethrough, a back wall for said unit, a condenser and means for circulating outside air inwardly of said unit and over said condenser and thence back to the outside including a duct extending substantially vertically from near the bottom of said unit to the top thereof and spaced inwardly from said back wall of the unit to provide an air space, an outside air duct having inlet and outlet passages each located near the upper portion of said back wall of the unit and one of which communicates directly with the upper end of said vertical duct and the other of which communicates with the upper end of said air space, and a blower associated with said duct for circulating outside air over said condenser.

12. A self-contained room cooler unit comprising, in combination, a room air duct and blower for circulating room air therethrough, an evaporator associated with said room air duct so as to cool the room air passing therethrough, a condenser and means for circulating outside air inwardly of said unit and over said condenser and thence back to the outside including a duct extending substantially vertically from near the bottom of said unit to the top thereof and spaced from the rear side of the unit to provide an air space, an outside air duct having inlet and outlet passages one of which communicates directly with the upper end of said vertical duct and the other of which communicates with said air space, and a blower associated with said duct for circulating outside air over said condenser, said blower which is associated with said vertical air duct comprising a fan scroll with its axis offset from the vertical center of the duct toward the rear of the unit, and the passages in said outside air duct being disposed in superimposed relation with the uppermost passage thereof communicating with the top of said vertical passage and the lower one of said passages communicating directly with the space between the rear of said unit and the vertical duct.

13. A self-contained room cooler unit comprising, in combination, a room air duct and blower for circulating room air therethrough, an evaporator associated with said room air duct so as to cool the room air passing therethrough, a condenser and means for circulating outside air inwardly of said unit and over said condenser and thence back to the outside including a duct extending substantially vertically from near the bottom of said unit to the top thereof and spaced from the rear side of the unit to provide an air space, an outside air duct having inlet and outlet passages one of which communicates directly with the upper end of said vertical duct and the other of which communicates with said air space, and a blower associated with said duct for circulating outside air over said condenser, said blower which is associated with said vertical air duct comprising a fan scroll with its axis offset from the vertical center of the duct toward the rear of the unit, and the passages in said outside air duct being disposed in superimposed relation with

the uppermost passage thereof communicating with the top of said vertical air passage and the lower one of said passages communicating directly with the space between the rear of said unit and the condenser duct, the offset portion of said fan scroll being disposed rearwardly beneath at least a portion of said rear air space.

14. A self-contained room cooler unit comprising, in combination, a room air duct and blower for circulating room air therethrough, an evaporator associated with said room air duct so as to cool the room air passing therethrough, a condenser and means for circulating outside air inwardly of said unit and over said condenser and thence back to the outside including a duct extending substantially vertically from near the bottom of said unit to the top thereof and spaced from the rear side of the unit to provide an air space, an outside air duct having inlet and outlet passages one of which communicates directly with the upper end of said vertical duct and the other of which communicates with said air space, and a blower associated with said duct for circulating outside air over said condenser, said unit having a compressor operatively connected to said condenser and evaporator, and the outside air passage which communicates with said rear space also communicates with the compressor so that outside air flows thereover.

15. A self-contained room cooler unit comprising, in combination, a condenser and evaporator, air ducts associated therewith and extending vertically from near the bottom of the unit to the top thereof, blowers for circulating air in substantially vertical directions through said ducts, said ducts flaring laterally in the same longitudinal vertical plane to form compartments in each of said laterally flaring duct portions, and a compressor and a blower motor disposed in said compartments beneath said flaring duct portions.

16. A self-contained room cooler unit comprising, in combination, a frame, a compressor located at one end thereof, a vertically extending duct having a blower disposed laterally adjacent to said compressor, a condenser in said duct, outside air passages communicating with said duct and blower for circulating outside air over said condenser, an evaporator, a vertically extending room air duct associated therewith and disposed adjacent to said condenser duct at the side thereof opposite to the compressor side, and means for circulating room air through said room air duct so as to cool the room air by said evaporator.

17. A self-contained air conditioning unit comprising, in combination, an oblong rectangular base having upturned edges, back and end walls supported by said base, a top wall supported by said back and end walls, a motor-compressor mechanism of substantially cylindrical form with its axis extending vertically and located at one end of said unit, a vertically extending condenser air duct having a fan scroll at its lower end and disposed so that said motor-compressor mechanism and scroll are positioned adjacent a common vertically extending transverse plane, said duct having one of its lateral sides flaring in a direction lengthwise of the unit at points above said scroll while the opposed lateral side of the duct extends in a substantially vertical transverse flat plane whereby said duct is wider at the top than at the bottom, said scroll having a tangential outlet communicating with said duct near the front side of said unit thereby allowing said duct to be spaced from the rear wall of the unit to provide an air space between said duct and back

wall, a pair of coaxial inlet openings in opposite lateral sides of said scroll communicating with said space behind said duct and with the space in which said motor-compressor mechanism is disposed, a condenser disposed in the widened portion of said duct at its upper end and inclined downwardly toward the rear of the unit, an atmospheric discharge opening in said back wall communicating with the upper end of said duct above the condenser therein, an atmospheric intake opening in said back wall immediately below said discharge opening in relative superimposed relation to each other, said intake opening communicating with the space behind said duct and with the space in which said motor-compressor mechanism is disposed, a vertically extending room air duct disposed at the other end of said unit entirely to the lateral side of said condenser duct and having a lateral portion extending lengthwise of the unit in a direction toward the condenser duct, an evaporator associated with said room air duct at said laterally disposed portion thereof, a room air inlet formed in the end of the unit at the lower portion thereof adjacent said room air duct for communication therewith, a room air outlet formed in said top wall of the unit to allow air to flow vertically from said room air duct and through said outlet into the room, a fan rotor in said room air duct at the lower portion thereof, a fan rotor in said scroll of the condenser air duct, a driving shaft commonly supporting said fan rotors in axial alignment with each other and extending horizontally lengthwise of the unit, and a motor connected to said shaft for simultaneously driving said fan rotors so that outside air is circulated inwardly through the back wall intake opening from which the air divides to pass downwardly over said motor-compressor mechanism and downwardly through the space behind said condenser duct and thence inwardly through the double axial inlets of the condenser fan scroll and thence upwardly through said condenser duct to be discharged laterally through the back wall discharge opening while room air is circulated horizontally inwardly through the room air inlet in the end of the unit and thence upwardly through the room air duct to be discharged vertically through the top of the unit into the room.

18. A self-contained air conditioning unit comprising, in combination, a base, back and end walls supported by said base and a top wall, a compressor located at one end of said unit, a vertically extending condenser air duct having at its lower end a fan scroll disposed so that said compressor and scroll are adjacent a common vertically extending transverse plane, said duct flaring in a direction lengthwise of the unit at points above said scroll whereby said duct is wider at the top than at the bottom, said scroll having a tangential outlet communicating with said duct near the front side of said unit thereby allowing said duct to be spaced from the rear wall of the unit to provide an air space between said duct and back wall, a pair of coaxial inlet openings in opposite lateral sides of said scroll communicating with said space behind said duct and with the space in which said compressor is disposed, a condenser disposed in the widened portion of said duct at its upper end, an atmospheric discharge opening in said back wall communicating with the upper end of said duct, an atmospheric intake opening in said back wall communicating with the space behind said duct and with the space in which said compressor is dis-

posed, a vertically extending room air duct disposed at the other end of said unit entirely to the lateral side of said condenser duct and having a lateral portion extending in a direction lengthwise of the unit, an evaporator associated with said room air duct at said laterally disposed portion thereof, a room air inlet formed in the end of the unit adjacent said room air duct for communication therewith, a room air outlet formed in said top wall of the unit to allow air to flow vertically from said room air duct and through said outlet into the room, a fan rotor in said room air duct, a fan rotor in said scroll of the condenser air duct, a driving shaft commonly supporting said fan rotors in axial alignment with each other and extending horizontally lengthwise of the unit, and a motor connected to said shaft for simultaneously driving said fan rotors so that outside air is circulated inwardly through the back wall intake opening from which the air divides to pass downwardly over said compressor and downwardly through the space behind said condenser duct and thence inwardly through the double axial inlets of the condenser fan scroll and thence upwardly through said condenser duct to be discharged laterally through the back wall discharge opening while room air is circulated horizontally through the room air inlet of the unit and thence upwardly through the room air duct to be discharged vertically through the top of the unit into the room.

19. A self-contained air conditioning unit comprising, in combination, a base, a back wall, a compressor located at one end of said unit, a vertically extending condenser air duct having at its lower end a fan scroll disposed so that said compressor and scroll are adjacent a common vertically extending transverse plane, said duct flaring in a direction lengthwise of the unit at points above said scroll whereby said duct is wider at the top than at the bottom, a pair of coaxial inlet openings in opposite lateral sides of said scroll, a condenser disposed in the widened portion of said duct at its upper end, a plurality of atmospheric openings in said back wall communicating respectively with said duct and with the space in which said compressor is disposed, a vertically extending room air duct disposed at the other end of said unit entirely to one of the lateral sides of said condenser duct and having a lateral portion extending in a direction lengthwise of the unit, an evaporator associated with said room air duct at said laterally disposed portion thereof, a room air inlet and a room air outlet communicating with said room air duct, a fan rotor in said room air duct and a fan rotor in said scroll of the condenser air duct, a driving shaft commonly supporting said fan rotors in axial alignment with each other and extending horizontally lengthwise of the unit, and a motor connected to said shaft for simultaneously driving said fan rotors so that outside air is circulated inwardly

through one of said back wall openings and downwardly to the double axial inlets of the condenser fan scroll and thence upwardly through said condenser duct to be discharged laterally through the other back wall opening while room air is circulated inwardly through the room air inlet of the unit and thence upwardly through the room air duct to be discharged through said room air outlet.

20. A self-contained air conditioning unit comprising, in combination, a base, a compressor located at one end of said unit, a vertically extending condenser air duct disposed adjacent said compressor, said duct having a fan scroll at its lower end and a portion flaring in a direction lengthwise of the unit at points above said scroll whereby said duct is wider at the top than at the bottom, an axial opening in one side of said scroll, a condenser disposed in the widened portion of said duct, means providing a plurality of atmospheric openings in the back of the unit near the top thereof communicating respectively with said duct and with the axial opening in said scroll, a vertically extending room air duct disposed at the other end of said unit entirely to one side of the lateral sides of said condenser duct and having a lateral portion extending in a direction lengthwise of the unit, an evaporator associated with said room air duct at said laterally disposed portion thereof, a room air inlet and a room air outlet communicating with said room air duct, a fan rotor in said room air duct and a fan rotor in said scroll of the condenser air duct, power means for driving said fan rotors so that outside air is circulated inwardly through one of said back openings and downwardly to said axial opening of the condenser fan scroll and thence upwardly to be discharged laterally through the other back opening while room air is circulated inwardly through the room air inlet of the unit and thence upwardly through the room air duct to be discharged through said room air outlet.

21. A self-contained air conditioning unit comprising, in combination, a condenser air duct having a blower associated therewith, a room air duct having a blower provided with a double inlet casing one of which inlets is relatively small, means whereby outside air communicates with said condenser blower and also with the smaller one of said room air inlets, the larger one of said room air inlets communicating with the room air, and power means for operating said blowers whereby outside air is circulated through said condenser duct and also into said room air blower through the smaller inlet opening thereof while room air is circulated through the larger inlet opening of the room air blower and through the room air duct.

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