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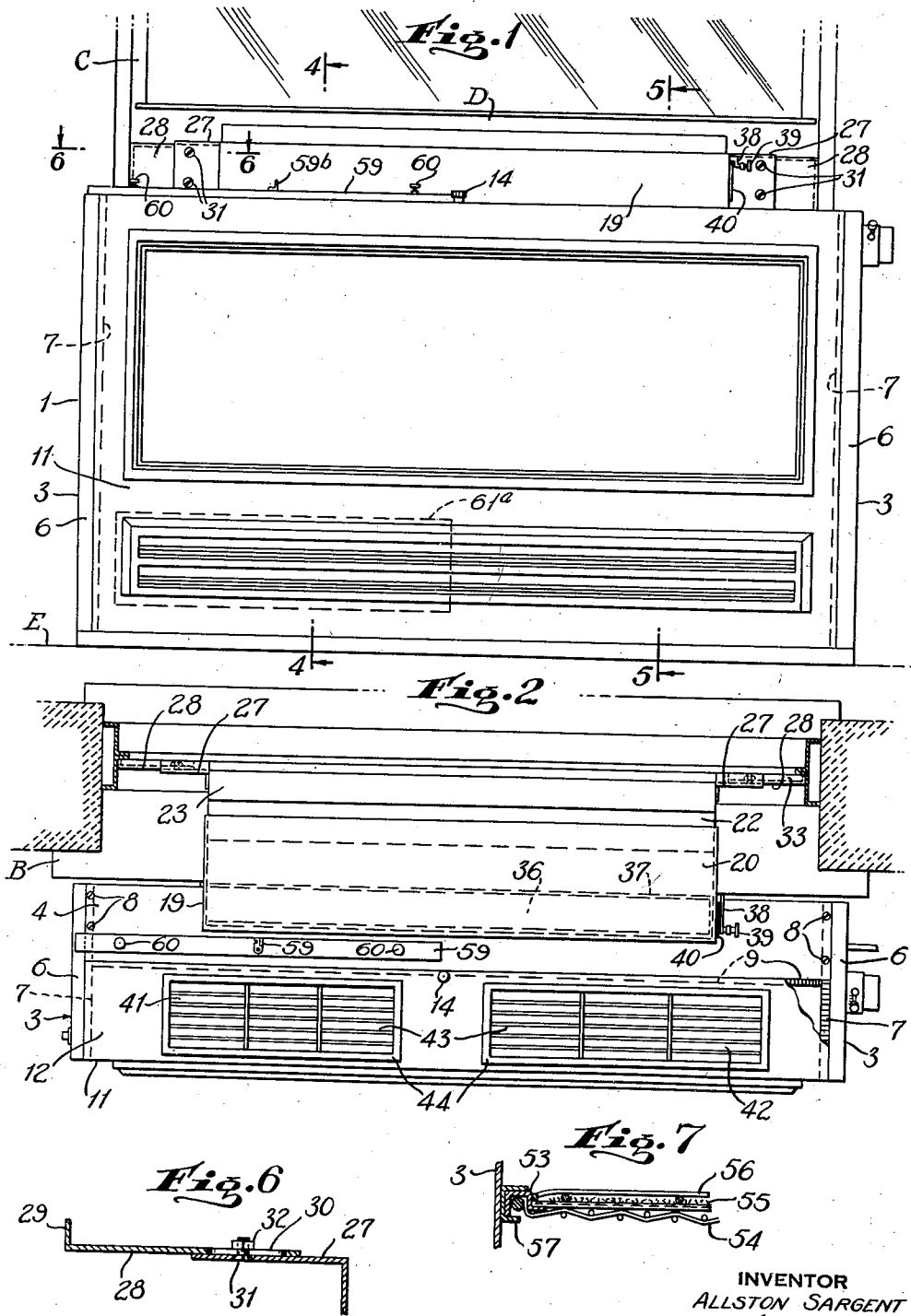
A. SARGENT

2,096,596

CASING FOR VENTILATING AND AIR TREATING APPARATUS

Original Filed May 10, 1932

3 Sheets-Sheet 1



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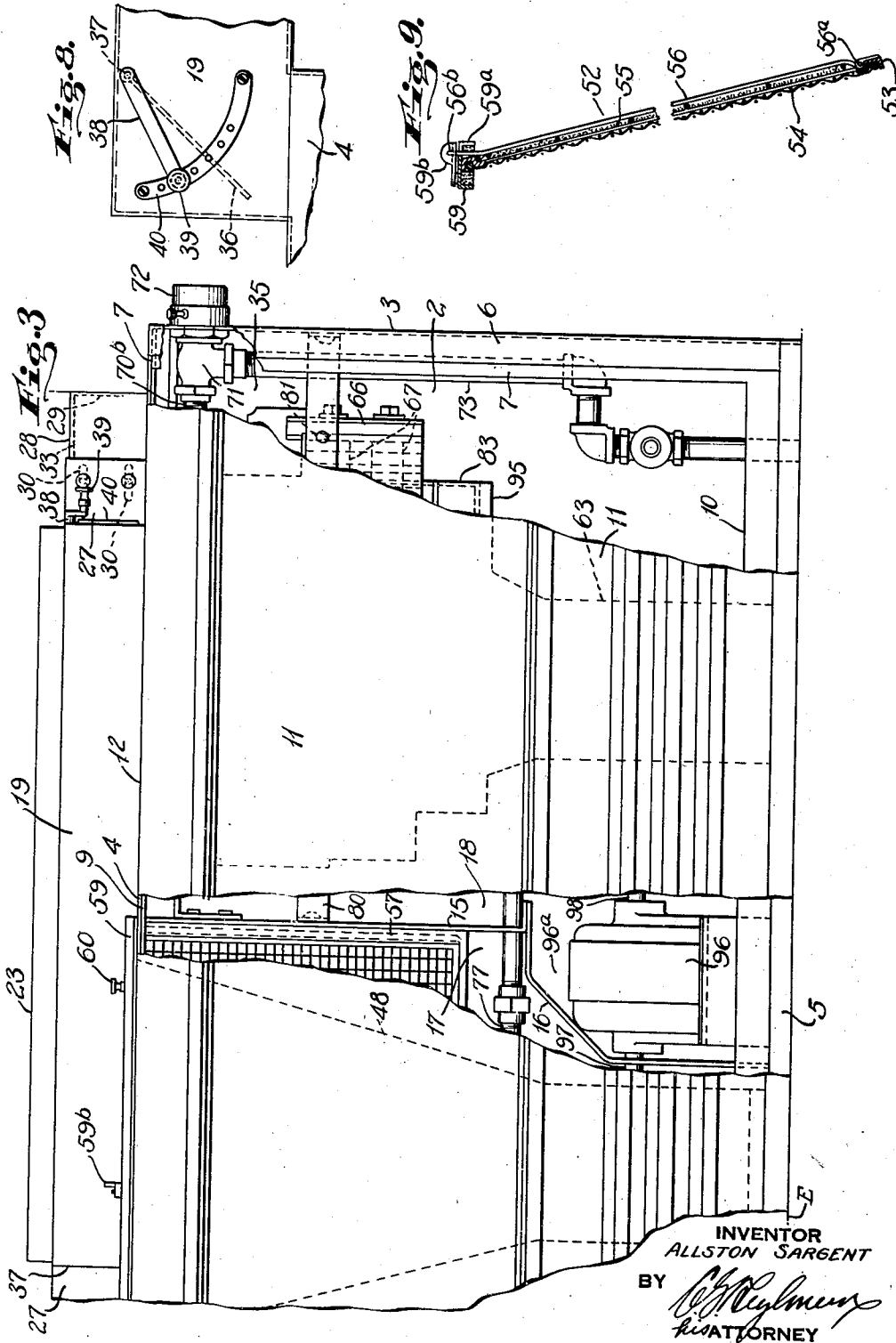
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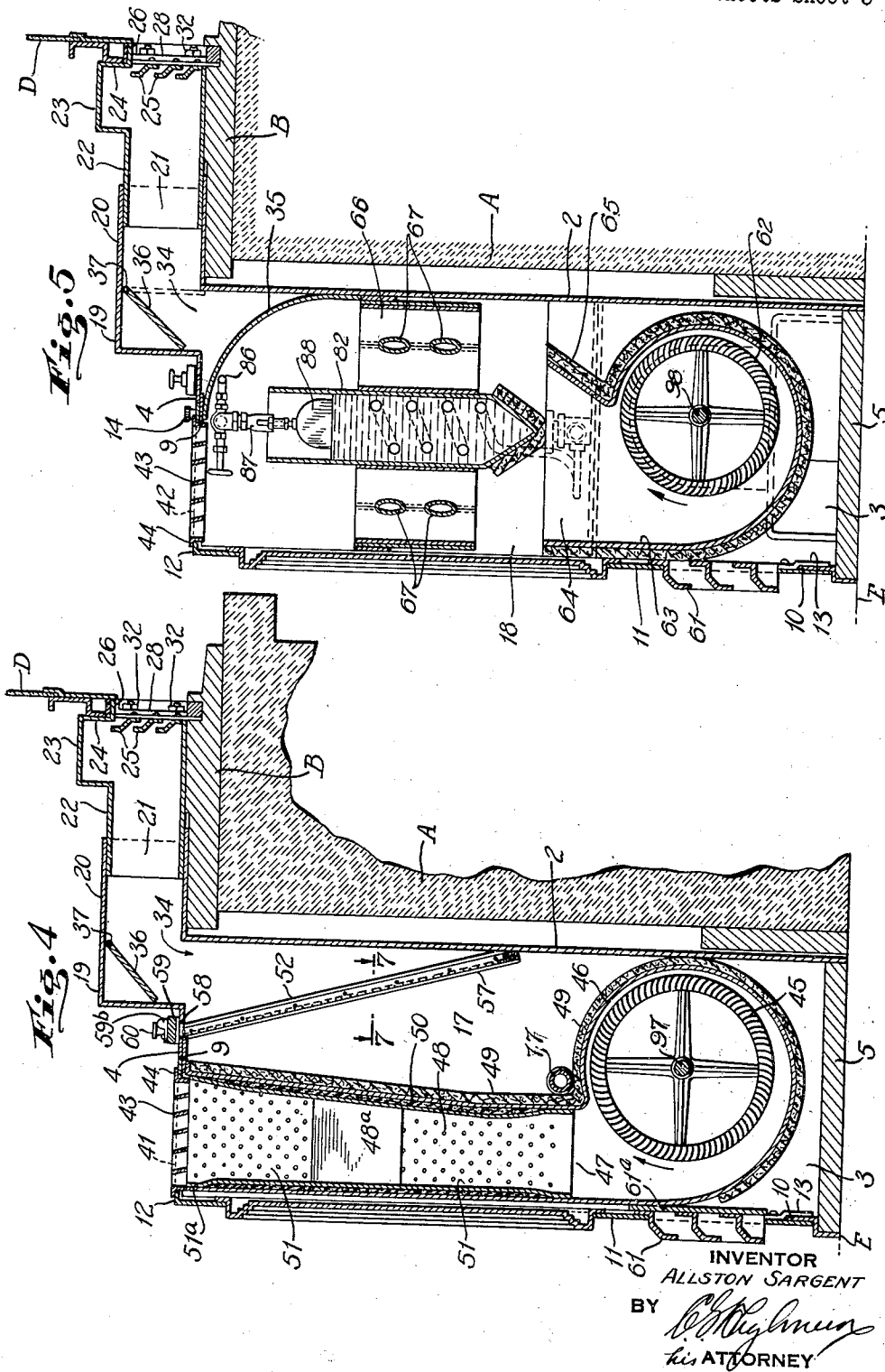
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UNITED STATES PATENT OFFICE

2,096,596

CASING FOR VENTILATING AND AIR
TREATING APPARATUS

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Original application May 10, 1932, Serial No.
610,351. Divided and this application January
13, 1934, Serial No. 706,498

7 Claims. (Cl. 98—1)

My invention comprises new and useful im-
provements in casings primarily devised and
adapted for the enclosure of apparatus installed
in a room or chamber in order to ventilate the
same and produce therein desired atmospheric
conditions, for example, to maintain the air sup-
plied to or existing in the room or chamber at a
desired temperature or desired relative humidity.
The invention in its preferred embodiment com-
prises features of construction and arrangement
primarily devised and especially adapted for use
in an efficient unit structure which may be in-
stalled in a room or chamber, and which is pro-
vided with means, such as those disclosed and
claimed in Patent 1,949,379, granted February 27,
1934 on my application filed May 10, 1932, of
which the present application is a division, for
moving fresh air into the room or chamber from
an outside source, and for imparting desired
characteristics of temperature to the air within
the casing, for example, to heat the air or to
reduce its temperature to a degree desired.

The primary object of the present invention is
to provide a casing suitable for the purposes speci-
fied above, and characterized by features of con-
struction and arrangement contributing to the
mechanical simplicity and effectiveness of the
casing construction, and to its production and
installation at a relatively low cost, and to facility
with which the casing may be opened up and
restored to its normal condition, whenever this
becomes desirable, as for the inspection, repair or
replacement of apparatus within the casing.

The various features of novelty which charac-
terize the present invention are pointed out with
particularity in the claims annexed to and form-
ing a part of this specification. For a better
understanding of the invention, however, its ad-
vantages and specific objects obtained with its
use, reference should be had to the accompanying
drawings and descriptive matter in which I have
illustrated and described a preferred form of
embodiment of the present invention.

Of the drawings:—

Fig. 1 is a view in front elevation of the com-
plete casing installed in connection with a window
of a room to obtain a supply of fresh air from a
space below the raised sash of the window;

Fig. 2 is a top plan view of the construction
shown in Fig. 1, certain features of an adjacent
wall and window being in horizontal section;

Fig. 3 is a view taken similarly to Fig. 1 but on
a larger scale and showing a portion only of the
complete casing shown in Fig. 1 and with parts

broken away and shown in section to illustrate
details of casing construction;

Fig. 4 is a vertical section on the line 4—4 of
Fig. 1;

Fig. 5 is a section on the line 5—5 of Fig. 1;

Fig. 6 is a detail section on the line 6—6 of
Fig. 1;

Fig. 7 is a detail section on the line 7—7 of
Fig. 4;

Fig. 8 is a detail in elevation of a damper oper-
ating device; and

Fig. 9 is a section taken similarly to Fig. 4 but
on a larger scale and showing a portion only of a
filter screen part shown in Fig. 4.

In the accompanying drawings, 1 designates,
generally, an enclosure or cabinet adapted to be
installed in the space to be ventilated, preferably
adjacent an outer building wall A beneath a sill B
of a window frame C and window sash D. The
cabinet may be made of sheet metal and includes
a rear vertical wall 2, vertical end walls 3 and a
horizontal top wall 4, said end and rear walls
rising from a base plate or board 5 which is
adapted to rest on the floor E of a room. The end
walls are each provided with an inwardly directed
edge flange 6 extending along the vertical and
top edge portions thereof, which flanges are pro-
vided with inset edge portions 7 to which the top
wall 4 terminates about midway between the front
and rear of the end panels 3 as clearly shown in
Fig. 2, and this front edge of the top wall 4 is
provided with a down-set flange or lip 9 lying in
the same plane as the top flanges 7 on the end
walls. At the lower, front portion of the cabinet
the flanges 7 are connected by a horizontal cross
piece or flange 10, lying in the same vertical plane
as said flanges 7.

The front of the cabinet is closed by a detach-
able vertical wall or panel 11, the lower edge of
which rests on the base piece 5 and the upper
edge of which is provided with an inwardly di-
rected wall member 12 at an angle to the front
wall, and preferably in a horizontal plane, the
vertical side edges of the panel 11 and the member
12 resting respectively on the vertical and hori-
zontal portions of the flanges 7 on the end walls 3,
and the inner transverse edge of the member 12
resting on the flange 9, when the front panel is
assembled in place. The front panel is detachably
held in position to close the front of the cabinet
by means of inwardly directed clips 13 at the lower
portion thereof, which set over the flange 10 (Figs.
4 and 5), and by means of a clamping screw 14
passed through an opening in the inner edge of
the member and threaded into the flange 9. The

front panel may be readily removed by disengaging the screw 14, and then lifting the panel vertically to disengage the clip members 13 from the flange 10, when it is desired to have access 5 to the interior of the cabinet. As shown, the interior of the cabinet is divided by a substantially vertical wall 15 and a laterally offset wall 16 into two compartments 17 and 18, which may be used for purposes presently to be described, said walls 15 and 16 extending from the horizontal wall 4 to the base wall 5. The walls 15 and 16 extend from the rear wall 2 to the front edge portion of the cabinet, so that when the front panel member 11 is in place, the vertical and horizontal portions thereof contact the vertical front edges of the walls 15 and 16, and the top horizontal edge of the wall 15, respectively, to close the compartments 17 and 18 from each other.

At its rear portion the horizontal wall 4 is provided with an air inlet duct, preferably in the form of a box or trunk 19, provided with a rearwardly extending inlet duct or neck 20 projecting beyond the rear face of the inlet box 19 and adapted to overlie the window sill B adjacent to which the apparatus is installed. The duct or neck 20 is telescopically engaged, as at 21, by a neck 22 of an inlet box extension member 23 having a forward open wall 24 provided with inlet louvers 25, the wall 24 having above its inlet opening a horizontal flange 26. The construction is such that when the apparatus is located in place, the inlet box 23 may, by virtue of the telescoping connection 21, be adjusted so that the flange 26 may be projected into a window opening and located beneath a window sash D, the latter being lowered onto said flange 26 to seal the opening at this point. In order to adapt the inlet to windows of varying widths, the transverse width of the inlet duct is preferably less than the usual width of the windows, so that the air receiving end of the duct can readily be located between the vertical side members of a window frame, and beneath a raised window sash.

In order to seal the space between the sides of the member 23 and the vertical portion of a window frame, I provide the ends of the box 23 with laterally extending, vertical channel-irons constituting flanges 27, each of which carries a filler piece or plate 28 having a flange 29 to abut the adjacent vertical face of the window frame. The filler pieces 28 are horizontally adjustable with reference to the plates 27 in order to be adjusted to the width of the window, and for this purpose have horizontal slots 30 to receive the shanks of clamping screws 31 carried by the plates 27 and adapted to receive clamping nuts 32 adapted to clamp the filler pieces rigidly in adjusted position against the plates. The filler pieces are provided with horizontal flanges 33, which form a substantial continuation of the upper horizontal flange of the channel-iron, and together therewith may receive a suitable packing upon which the sash rests when lowered into engagement with the flange 26.

As shown, the inner end of the air inlet box 20 communicates through an opening 34 in the top wall 4, with the interior of the compartment 17, but the interior of the air inlet box is closed off by a forwardly curved baffle wall 35 from the interior of the compartment 18, so that the air entering the air inlet duct passes only to the compartment 17. The air inlet box 20 may be shut off entirely from the compartment 17, or the amount of air entering the compartment 17 may be regulated, by means of a damper plate 36 75 mounted on a shaft 37 mounted to rock in bear-

ing apertures in the end walls of the box 20 at the top thereof, the damper plate being movable by said shaft to take a position across the interior of the duct 20, as indicated in dotted lines in Fig. 5, to thereby shut off the supply of air to compartment 17, or to the position shown in full lines in Figs. 4 and 5 to permit the air to enter compartment 17. The damper is operated by an extension of its pivot shaft which carries a crank arm 38 having a spring locking pin 39 to cooperate with spaced sockets in a quadrant 40 mounted on the end of the box 20.

The top wall 12 of the front panel member is provided with a rectangular opening 41 overlying the compartment 17, and also with an opening 42 overlying compartment 18, these openings constituting the air outlets from said compartments, as will be presently described. In each opening is seated a removable grill 43 having a surrounding flange 44 resting on the wall 12 around its opening.

Within the compartment 17 in the arrangement shown, is an air impelling means preferably comprising a centrifugal blower fan 45 mounted in a double-eyed casing 46, the outlet 47 of which connects with an upwardly flaring discharge duct 48, the upper end of which rises to a point closely adjacent to the casing wall 12 and is substantially coextensive with the outlet opening 41 therethrough. This centrifugal blower operates to draw fresh air up through the duct 48 and out through the opening 41 into the space containing the unit. The discharge duct 48 is rectangular in cross-section and made preferably of sheet metal, and the walls thereof are covered externally, as is also the circumferential wall of the blower casing, with a layer 49 of sound deadening and absorbing material such as acoustic felt, suitably attached thereto by cement. The inner surfaces of the duct 48 are likewise covered with sound deadening and absorbing material 50 cemented thereto and covered by a layer 51 of perforated leather, or other material, such as cribble cloth to prevent the air blast from dislodging fiber from the sound deadening material, and cemented in place, as at 51^a. In duct 48 is a deflector plate 48^a extending transversely thereof from front to rear, and which may be inclined as disclosed in said Patent 1,949,379, and which acts to deflect or distribute the air so that the discharge thereof will be equally distributed over the area of outlet 41. The sound deadening and absorbing material described serves to absorb the sound waves propagated through the inlet 34 to the compartment, and prevent external noises entering the room through the outlet 41.

Between the inlet 34 and the compartment 17, is an air filtering screen 52, comprising a rectangular metallic frame 53 supporting a wire mesh screen 54 over which is laid and held a sheet of suitable air filtering material such as 55, held in place by an overlying wire backing 56 (see Figs. 7 and 9), hinged at 56^a to the frame, and at its free end having a locking pin 56^b to project through a slot 59^a in the strip 59 and be engaged by a slotted holding latch 59^b pivoted on said strip to thereby detachably hold the backing down over the material 55. The screen is slidably held in inclined channel-guides 57, mounted, respectively, on the wall 15 and the end wall 3 of the chamber 17, the screen being inserted in said channel-guides through a slot 58 in the wall 4, the upper edge member of the screen frame 53 being provided with a closure finishing means formed by the previously mentioned strip 59 75

which serves to close the slot 58 and overlies the adjacent portion of the wall 4, and limits the downward movement of the screen when inserted. The finishing strip 59 is provided with finger pieces 60 by which the screen may be inserted and removed from the unit. It will be seen that by the arrangement just described, fresh air may be drawn from a source outside the room, filtered by the screen 52 so as to remove dust particles therefrom, and then delivered into the room to revivify the air therein, this being accomplished without the propagation of sound from external sources into the room, due to the fact that the sound waves are deadened and absorbed, in the chamber 17 and by the construction of the outlet duct 48. It will be noted that the screen 52 is of large area relative to the area of the inlet 34, so as to provide an extended filtering surface to the incoming air, and thereby reduce resistance to the air in being drawn by the impeller into the compartment 17, and assure that the impeller will deliver efficiently an ample supply of fresh air through the outlet 41.

In the compartment 18 in the arrangement shown is located apparatus for receiving air from the interior of the room, treating such air, and returning it to the room, with a desired characteristic, for example, temperature, humidity etc. In order to supply the compartment 18 with air from the interior of the room, the front panel 11 is provided at its lower portion with horizontally disposed inlet louvres 61, which for symmetry extend entirely across the panel, but are closed by a plate 61^a (shown in section in Fig. 4 and indicated by dotted lines in Fig. 1), adjacent the compartment 17 so that air from the room cannot enter the latter compartment. In the compartment 18 is a centrifugal fan blower 62, mounted in a double-eyed blower casing 63 having an upwardly directed outlet duct 64. This casing and duct are covered externally with sound deadening material 65, such as acoustic felt, so as to deaden sound which might emanate from any vibration of the fan and duct. The upper end of the duct 64 terminates preferably at a point below the horizontal center of the compartment 18 and is so arranged as to deliver the air upward toward the outlet 42 from the compartment.

In the arrangement shown, above the upper end of the outlet duct 64 is arranged a heat exchange unit 66 including vertically disposed headers connected by transverse horizontal flow pipes 67, upon which may be mounted vertically disposed fin members to provide a plurality of vertical flues through which the air delivered by the blower flows upwardly and has its temperature modified by the heat exchange element. The latter may be either a heat emitting element to raise the temperature of the air, or a cooling element in the low temperature side of a refrigerating system in order to lower the temperature of the air, but is shown as a heat radiator receiving steam through an inlet nipple 70^b and regulating valve 71 from a steam supply pipe 73, and discharging air and water of condensation into a return pipe 77. This valve 71 may be provided with a thermostatic controller 72 subject to room temperature.

It will be understood that if the heat exchange element is to be employed to reduce the temperature of the air in the room, and which is driven through the compartment 18 by the impeller 62, the heat exchange element instead of being supplied with a heating fluid by the pipe 73, would be supplied with a refrigerant through said pipe,

and the refrigerant after cooling the heat exchange element would be returned to the refrigerant source by means of the return pipe 77. In this case, the heat exchange element would abstract heat from the air passing through the compartment 18, thereby cooling such air and delivering it through the outlet 43 at a lower temperature into the room, and thereby producing a cooling effect therein. The heat exchange element is supported rigidly in the casing by means of horizontal stringers 80 rigidly connected in any suitable manner to the wall 15 and the right hand-end wall 3, the headers of the element 66 being bolted, as at 81, to said stringers.

When the heat exchange element 66 is to be employed for heating the air, the casing may enclose means for adding moisture to the heated air to humidify the same, the means shown for the purpose comprising a relatively narrow water holding receptacle or tank 82 arranged in the space between the pipes 67 of the heat radiator and open at its top. The tank 82 is accessible for insertion and removal when the casing member forming the front panel 11 and top panel 12 is removed. In use heat radiated by the element 66 vaporizes water within the tank 82, and the vapor formed mixes with the air moved upward through the compartment 18. Water may be supplied to the tank 82 as required to maintain a suitable water level therein through a supply pipe 86 and valve 87 controlled by a float 88 resting on the water in the tank.

In the arrangement shown, the air impeller rotors 45 and 62 are mounted on drive shafts 97 and 98, respectively, carried at the opposite ends of the rotor of an electric motor 96 seated on the base board 5 and arranged in a recess 96^a or extension portion of the chamber 18 which the partition wall 16 is offset to provide. This arrangement permits the motor to be located not only in the path of the relatively cool air entering the lower openings 61, but also to be sufficiently far away from the heat exchange element 66 in the chamber 18 as not to be deleteriously affected by the heat emitted therefrom.

Further references to the construction and arrangement of the air moving and air treating means within the casing compartments 17 and 18 is unnecessary, as the specific form and character of those means form no part of the present invention and are fully disclosed and claimed in my above mentioned application, Serial No. 610,351, and have been referred to herein primarily only by way of illustration of an advantageous use which may be made of the features of casing construction and arrangement disclosed and claimed herein.

While in accordance with the provisions of the statutes, I have illustrated and described the best form of embodiment of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the form of the apparatus disclosed without departing from the spirit of my invention as set forth in the appended claims and that in some cases certain features of my invention may be used to advantage without a corresponding use of other features.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A casing structure for housing ventilating and air treating apparatus and comprising a casing body adapted to rest upon the floor and adjacent a vertical wall of a room and including end walls and a first top wall portion connecting

the end walls at the rear of the casing to form a partial closure for the top thereof, a second top wall portion connecting the end walls at the front of the casing and joining the first top wall portion to close the remaining part of the casing top, and a front wall portion extending between the end walls and closing the front of the casing, said second top wall portion and said front wall portion being secured together and removable from the casing as a unit to permit inspection of the interior thereof, without disturbing the relation of said casing body to said floor and vertical room wall.

2. A casing structure for housing ventilating and air treating apparatus and comprising a casing body adapted to rest upon the floor and adjacent a vertical wall of a room and including end walls and a first top wall portion connecting the end walls at the rear of the casing to form a partial closure for the top thereof, a second top wall portion connecting the end walls at the front of the casing and joining the first top wall portion to close the remaining part of the casing top, said second top wall portion having an opening therein for the discharge of air from the interior of the casing, a front wall portion extending between the end walls and closing the front of the casing, said second top wall portion and said front wall portion being secured together and removable from the casing as a unit to permit inspection of the interior thereof, without disturbing the relation of said casing body to said floor and vertical room wall.

3. A casing structure for housing a ventilating and air treating apparatus and comprising vertical end walls, a first top wall portion connecting the end walls at the rear of the casing to form a partial closure for the top thereof and being provided with a flange along its forward edge, said end walls having inwardly directed flanges at the vertical and top edge portions thereof, a second top wall portion connecting the end walls at the front of the casing and joining the first top wall portion to close the remaining part of the casing top, the second-named top wall portion being supported along its side and rear edge portions by the flanges on the end walls and first-named top wall, respectively, and a front wall portion extending between the end walls to close the front of the casing and engaging the vertical flanges on said end walls, said second top wall portion and said front wall portion being secured together and removable from the casing as a unit to permit inspection of the interior thereof.

4. A casing structure for housing a ventilating and air treating apparatus and comprising vertical end walls, a first top wall portion connecting the end walls at the rear of the casing to form a partial closure for the top thereof and being provided with a flange along its forward edge, said end walls having inwardly directed flanges at the vertical and top edge portions thereof, a second top wall portion connecting the end walls at the front of the casing and joining the first top wall portion to close the remaining part of the casing top, the second-named top wall portion being supported along its side and rear edge portions by the flanges on the end walls and first-named top wall, respectively, a front wall portion extending between the end walls to close the front of the casing and engaging the vertical flanges on said end walls, said second top wall portion and said front wall portion being secured together and removable from the casing as a

unit to permit inspection of the interior thereof, and means for detachably securing said second top wall portion to said first top wall portion.

5. A casing structure for housing ventilating and air treating apparatus and comprising a casing body adapted to rest upon the floor and adjacent a vertical wall of a room and including end walls and a first top wall portion connecting the end walls at the rear of the casing to form a partial closure for the top thereof, a second top wall portion connecting the end walls at the front of the casing and joining the first top wall portion to close the remaining part of the casing top, a transverse frame member connecting said end walls at the lower and front portions thereof, a front wall portion extending between the end walls and closing the front of the casing and engaging said transverse member, said second top wall portion and said front wall portion being secured together and removable from the casing as a unit to permit inspection of the interior thereof, without disturbing the relation of said casing body to said floor and vertical room wall.

6. A casing structure for housing ventilating and air treating apparatus and comprising a casing body adapted to rest upon the floor and adjacent a vertical wall of a room and including end walls and a first top wall portion connecting the end walls at the rear of the casing to form a partial closure for the top thereof, a second top wall portion connecting the end walls at the front of the casing and joining the first top wall portion to close the remaining part of the casing top, a front wall portion extending between the end walls and closing the front of the casing, said second top wall portion and said front wall portion being secured together and removable from the casing as a unit to permit inspection of the interior thereof, without disturbing the relation of said casing body to said floor and vertical room wall, a transversely extending member connecting said end walls at the lower portions thereof, the lower edge portion of said front wall portion being detachably connected to said member, and means for detachably securing said second top wall portion to said first top wall portion.

7. A casing structure for housing ventilating and air treating apparatus and comprising a casing body adapted to rest upon the floor and adjacent a vertical wall of a room and including end walls and a first top wall portion connecting the end walls at the rear of the casing to form a partial closure for the top thereof, a second top wall portion connecting the end walls at the front of the casing and joining the first top wall portion to close the remaining part of the casing top, a front wall portion extending between the end walls and closing the front of the casing, said second top wall portion and said front wall portion being secured together and removable from the casing as a unit to permit inspection of the interior thereof, without disturbing the relation of said casing body to said floor and vertical room wall, a transversely extending member connecting said end walls at the lower portions thereof and arranged in overlapping relation with the lower edge portion of said front wall portion, clip means on the lower edge portion of said front wall portion for effecting engagement and disengagement of the latter with said transversely extending member by vertical movement of said front wall portion, and means for detachably securing said second top wall portion to said first top wall portion.