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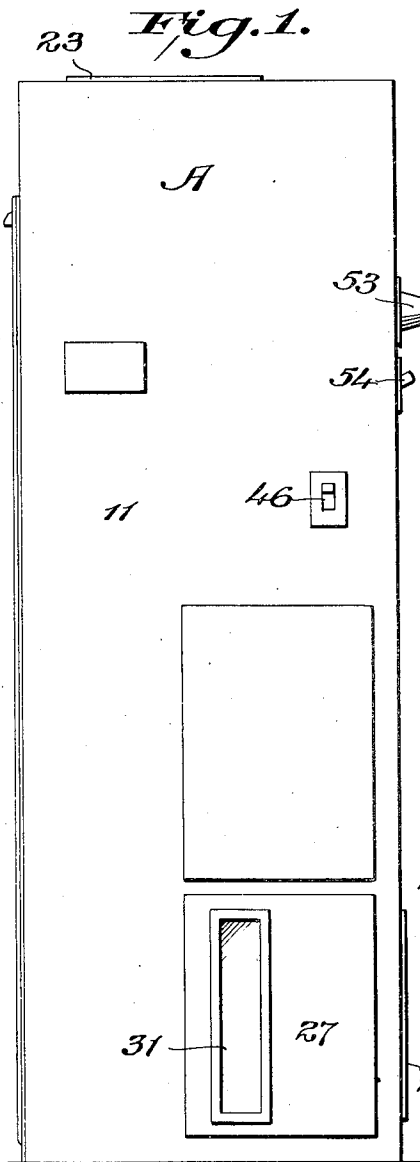
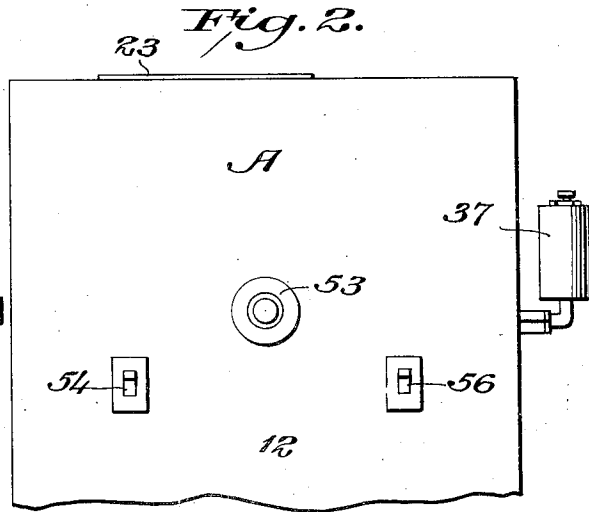
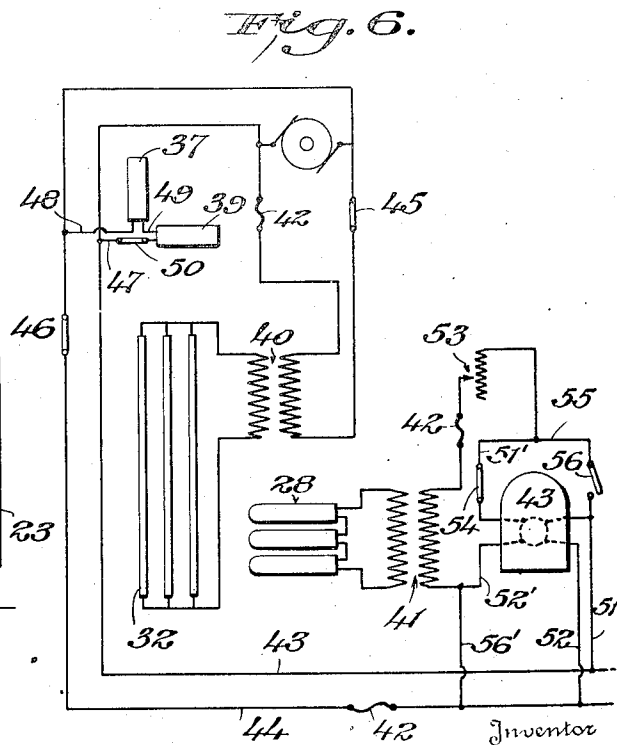
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2,265,367

AIR CONDITIONING APPARATUS

Filed Aug. 2, 1940

2 Sheets-Sheet 1



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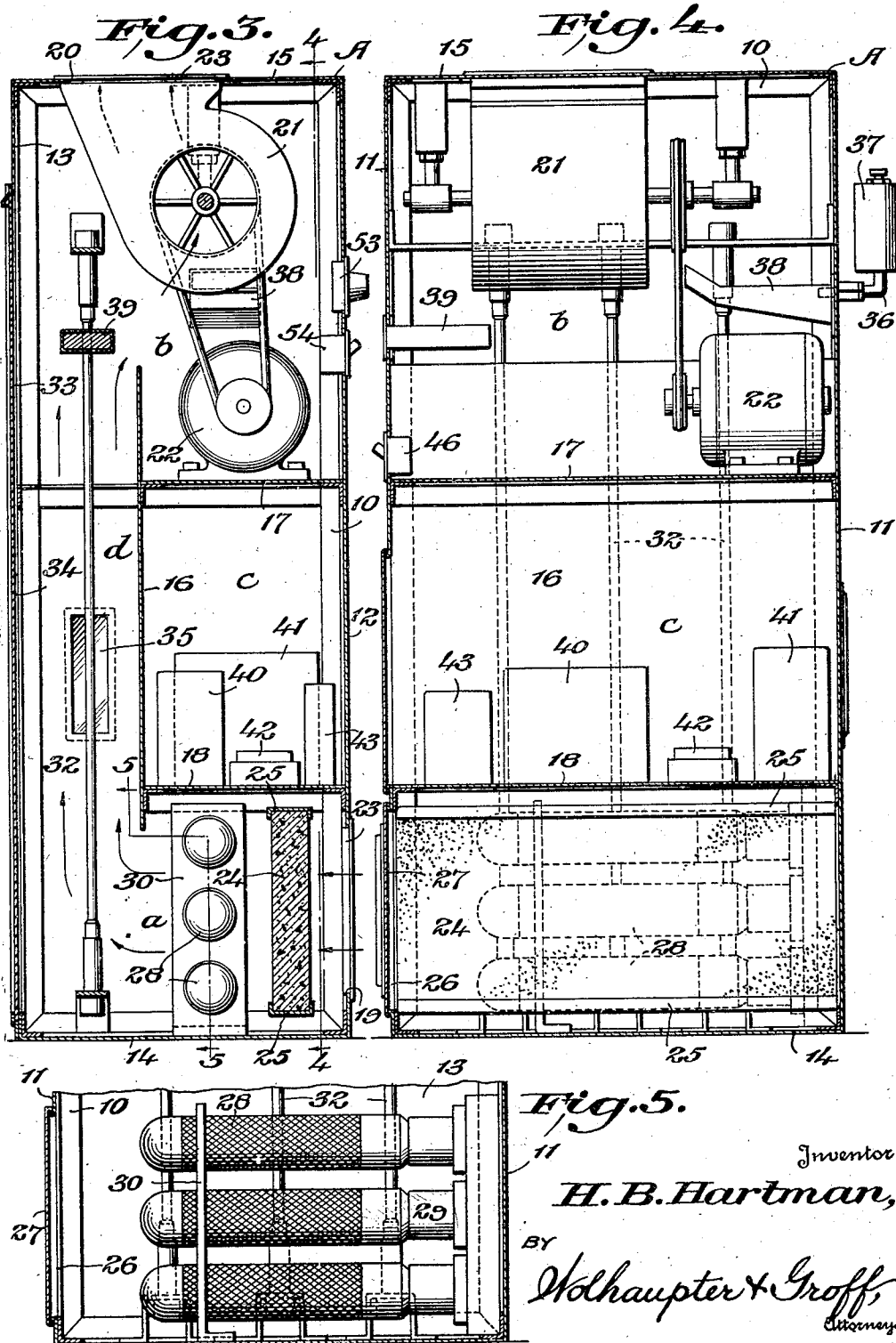
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,265,367

AIR CONDITIONING APPARATUS

Harry Buxton Hartman, Florence, Mass.

Application August 2, 1940, Serial No. 349,786

1 Claim. (Cl. 261-115)

This invention relates to air conditioning apparatus, and has for its general object to provide a simple, practical, inexpensive, compact unit embodying a casing, means for circulating air there-through, means for filtering the circulated air, means for ionizing and ozonizing the circulated air, means for sterilizing the circulated air, means for humidifying the circulated air, means whereby the ionizing and ozonizing, the sterilizing and the humidifying elements of the unit may be operated either concurrently or selectively and, in the case of the ionizing and ozonizing elements, means whereby the same may be operated either continuously or periodically, as may be desired in particular instances.

With the foregoing and other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in a unit embodying the novel combination and arrangement of elements as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claim.

In the accompanying drawings, wherein is illustrated one practical embodiment of the invention and wherein like characters of reference denote corresponding parts in the different views:

Figure 1 is a side elevation of the unit.

Figure 2 is a front elevation of the top portion of the unit.

Figure 3 is a vertical, longitudinal section through the unit.

Figure 4 is a vertical, transverse section through the unit taken approximately on the line 4-4 of Fig. 3.

Figure 5 is a vertical, transverse section taken approximately on the line 5-5 of Fig. 3; and

Figure 6 is a diagram of the electrical elements and circuits of the unit.

Referring to the drawings in detail, A designates a casing which may be constructed in any suitable manner from any suitable material and which may be of any suitable shape and may have any suitable dimensions. In the present instance and by way of example said casing is illustrated as being of vertically elongated, rectangular shape and as comprising an angle-iron frame 10 having a sheet metal covering including side walls 11, 11, a front wall 12, a rear wall 13, a bottom wall 14 and a top wall 15.

In the casing A is a vertical, transverse partition 16 which extends from side to side of said casing in forwardly spaced relationship to the casing rear wall 13 and which is spaced upwardly at its bottom from the bottom wall 14 and down-

wardly at its top from the top wall 15 of said casing. Also in said casing A are upper and lower horizontally disposed platforms 17 and 18, respectively, which are located near the top and near the bottom of the partition 16, respectively, and which extend between said partition and the casing front wall 12 and also from side to side of said casing. Thus, the casing A is divided into a lower compartment a, a top compartment b, an intermediate compartment c in front of the partition 16 and a vertically extending air passageway d behind said partition 16, which air passageway is in communication at its bottom and top with the compartments a and b, respectively. Thus, too, the compartments a and b constitute, in effect, bottom and top continuations of said passageway a as is apparent.

In the lower portion of the front wall 12 of the casing A is an opening 19 for the admission of air to the compartment a, while in the top wall 15 of said casing is an opening 20 for the exit of air from the compartment b.

Any suitable means may be employed for circulating air through the compartment a, the passageway d and the compartment b, but preferably a blower 21 suitably mounted in the compartment b and suitably driven by an electric motor 22, mounted for example upon the platform 17, is employed for this purpose. This blower, when in operation, draws air through the opening 19 into the compartment a, upwardly through the passageway d, into the compartment b and discharges the air through the opening 20. The openings 19 and 20 preferably are provided with grilles or the like designated as 23.

Disposed in the compartment a, in the path of flow of air circulated through the casing A, is a filter 24 by which the air is filtered immediately upon entering said casing. This filter may be of any suitable type and may be mounted in the compartment a in any suitable manner. In the present instance it is illustrated as comprising a slab of filtering material slidably mounted in upper and lower channel members 25 fixed within the compartment a whereby it may readily be removed for cleaning or replacement purposes through a doorway 26 in one of the casing side walls which normally is closed by a suitable door 27.

Also disposed in the compartment a, behind the filter 24, is one or more tubes 28 by means of which air passing through said compartment may be ionized and ozonized. In the present instance three of these tubes, disposed horizontally and extending transversely of the compartment

α in vertically spaced apart relationship, are illustrated, the same being mounted at their bases in suitable sockets 29 at one side of the compartment α , and being supported at points suitably spaced from their bases by a bracket 30 rising from the bottom wall 14 of the casing A. Said tubes, in respect to which no novelty per se is claimed, may be of any known or suitable type. Access to said tubes is afforded through the doorway 26 and their operation may be observed through a suitable window 31 provided, for example, in the door 27.

Disposed in the passageway d is one or more ultra-violet ray tubes 32 by means of which air passing through said passageway may be sterilized. In the present instance three of these tubes, disposed vertically in laterally spaced apart relationship are illustrated, same being supported at their tops and bottoms in suitable sockets or receivers suitably mounted in the casing A. To improve the functioning of these tubes the walls defining the passageway 2 preferably are provided with suitable linings which prevent absorption of light and reflect back and forth the rays emitted by said tubes. In the rear wall of the casing A is a doorway 33 which affords access to the tubes 32 and which normally is closed by a suitable door 34, while in one of the side walls of said casing is a window 35 through which the functioning of said tubes 34 may be observed.

Obviously it is not necessary that the tubes 28 and 32 be disposed in the compartment α and the passageway d , respectively. On the contrary, said tubes may be disposed at any other suitable locations in the path of air circulated through the casing A.

Means of any suitable type may be provided for humidifying air circulated through the casing A. In the present instance the means for this purpose is illustrated as comprising a water supply pipe 36, an electrically operable valve 37 controlling supply of water through said pipe, and a tubular member 38 extending into the compartment b from one of the side walls of the casing A and into which the pipe 36 is arranged to discharge, said tubular member being open at its inner end and having its inner end portion inclined with respect to its outer end portion to provide a baffle against which water supplied by the pipe 36 strikes and is atomized prior to being delivered into the compartment b . Provided at a suitable point in the path of air circulated through the casing A is a humidostat 39 for controlling operation of the valve 37.

In the compartment c is mounted a transformer 40 through which current is supplied to the tubes 28; a second transformer 41 through which current is supplied to the tubes 32; fuses 42 for the electrical circuits of the unit, and a clock 43 for actuating switch means to periodically open and close the circuit of the tubes 28.

Referring now to Fig. 6 of the drawings which diagrammatically illustrates the electrical circuits of the unit, 43 and 44 designate current supply conductors which lead to the motor 22 and, beyond said motor, to the primary side of the transformer 40 the secondary side of which is connected to the tubes 32. In one of said conductors, between the motor 22 and the transformer 40, is a suitable switch 45 whereby the transformer circuit may be opened or closed to render the tubes 32 active or inactive without disturbing the motor circuit. Also in one of said conductors, between the motor 22 and the source

of power, is a switch 46 whereby the motor and consequently the blower may be started and stopped at will.

Branches 47 and 48 of the conductors 43 and 44 lead to the water control valve 37 and the humidostat 39, respectively, and another conductor 49 connects said valve with said humidostat whereby the former is under the control of the latter. In one of the branch conductors 47 or 48 is a switch 50 whereby operation of the humidifying means may be controlled without affecting operation of the motor 22 or of the transformer 40.

Other branches 51 and 52 of the conductors 43 and 44 lead to one side of the periodically opened and closed switch of the clock 43 and continuations 51', 52' of these branches lead to the primary side of the transformer 41 the secondary side of which is connected with the tubes 28. In the continuation 51' is a rheostat 53 for regulating the current flow to the transformer 41. Also in the continuation 51' is a switch 54 for opening and closing the circuit of the transformer 41 as controlled by the clock operated switch.

Connecting the conductor 51' with the branch conductor 51 is a conductor 55 in which is a switch 56, while connecting the conductor 52' with the conductor 44 is a conductor 56'. Thus, by opening the switch 56 and closing the switch 54 the tubes 28 will be periodically operated by the clock-operated switch. On the other hand, by opening the switch 54 and closing the switch 56 the tubes 28 obviously will be continuously operated. In either case the rheostat 53 is effective to regulate the intensity of the current flow to said tubes 28. Safety fuses 42 may be interposed at any desired points in the different circuits.

From the foregoing it will be apparent that the tubes 28 and 32 and the humidifying means may be operated concurrently or selectively while the blower 21 is being operated, and that, in the case of the tubes 28, same may be operated either continuously or periodically under the control of the clock-operated switch to effect either continuous or periodic ionization of air circulated through the unit as may be desired in particular instances.

When the various elements of the unit are in operation, the blower 21 serves to circulate air through the casing A, the filter 24 serves to remove foreign matter from the air, the tubes 28 serve to ionize and ozonize the air, and the tubes 32 serve to sterilize the air.

The device is simple, compact, highly efficient in operation and ready access is afforded to all of the parts thereof for replacement or repair purposes.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claim.

I claim:

Air conditioning apparatus comprising a casing having an air inlet opening in its lower front portion and an air outlet opening in its top, a vertical transverse partition in said casing spaced forwardly from the back thereof to provide a passageway for air and a space to accommodate air sterilizing means, a horizontal platform above

the bottom of said casing extending from said partition to the front of said casing to provide a compartment in the bottom of said casing to accommodate air filtering means and air ionizing and ozonizing means, a second platform above said first mentioned platform extending from said partition to the front of said casing to provide an upper chamber in said casing to accommodate air humidifying means and means for circulating air through said casing and also to provide a closed intermediate compartment in

5 said casing to accommodate controls for the air sterilizing, ionizing, ozonizing, and humidifying and circulating means, the top of said partition being disposed below the top of said casing so that said air passageway is in communication with said upper compartment, and means for circulating air from said inlet opening through said lower compartment and said passageway and said upper compartment to said air outlet opening.

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