

Feb. 13, 1945

B. SONNTAG

2,369,375

AIR CLEANER AND PURIFIER

Filed May 26, 1943

3 Sheets-Sheet 1

FIG. 1.

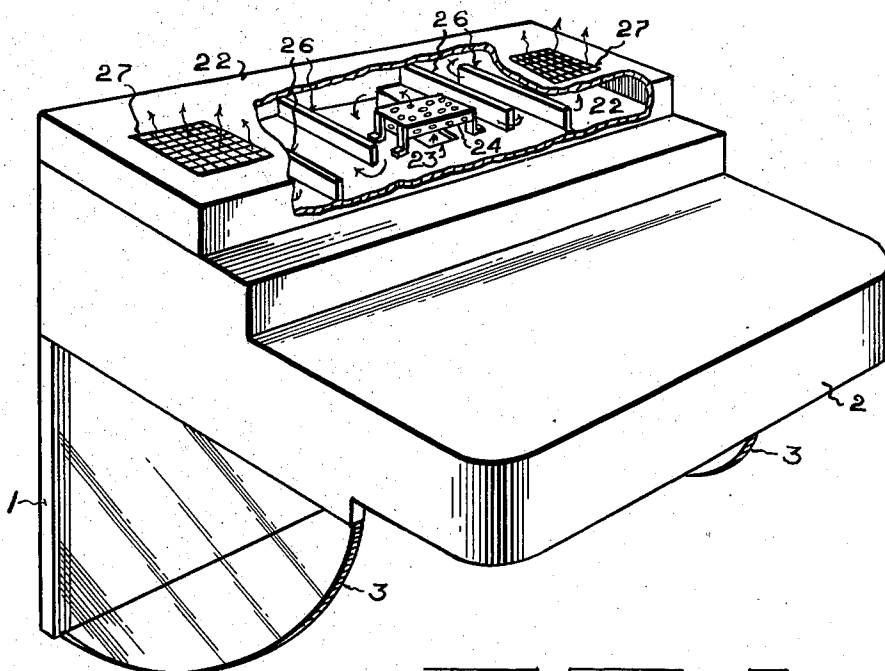


FIG. 2.

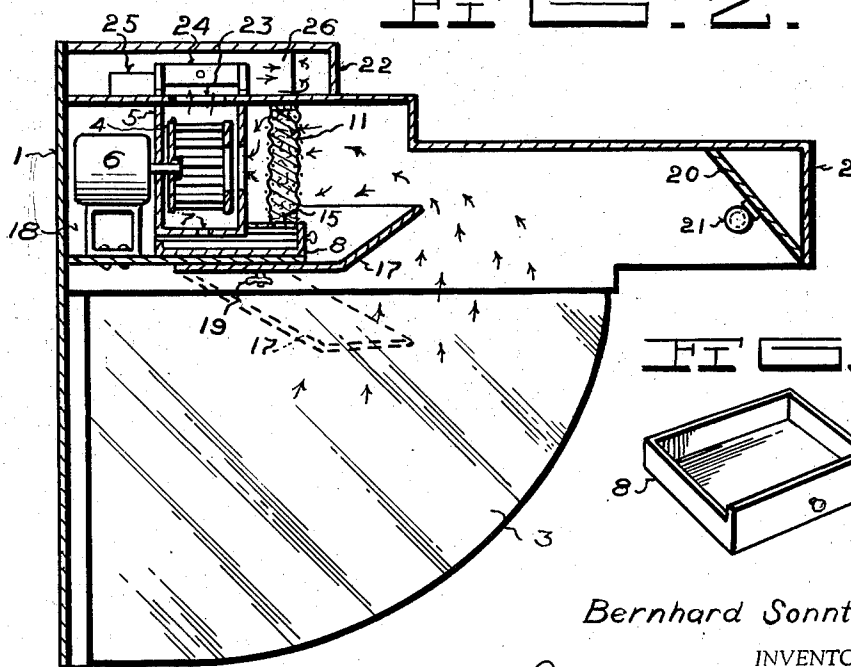
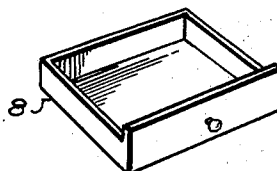


FIG. 3.



Bernhard Sonntag
INVENTOR.

By *Joseph H. Appelman*
Attorney

Feb. 13, 1945

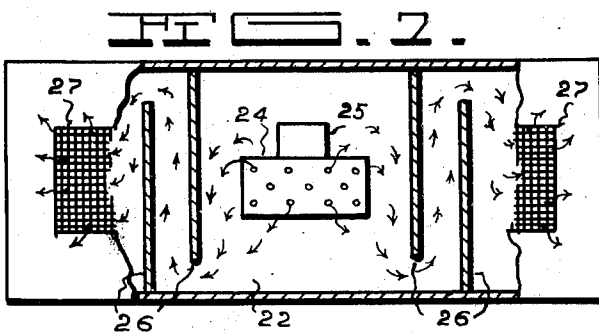
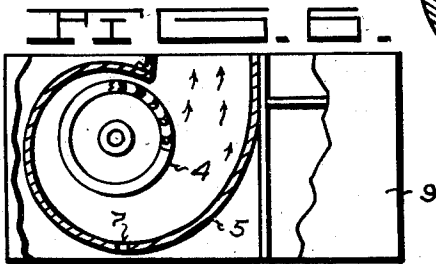
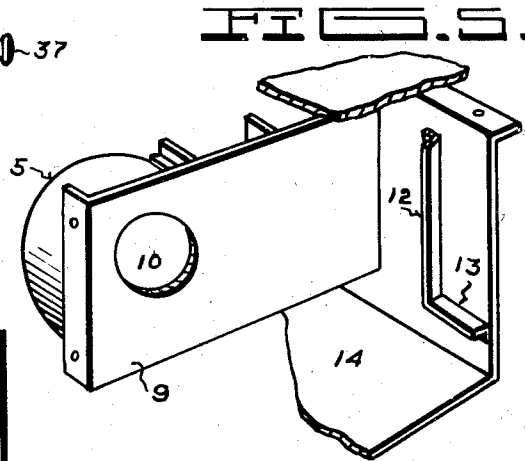
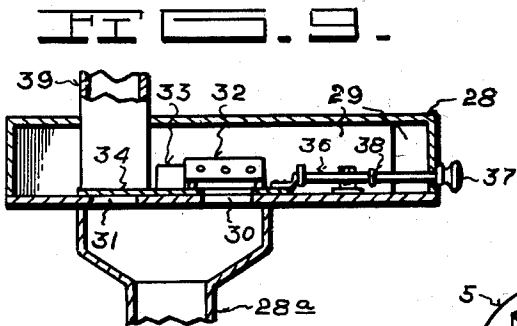
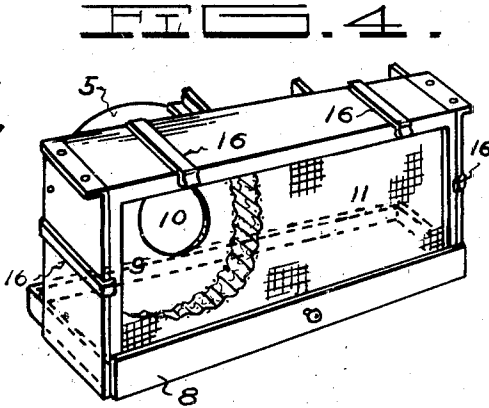
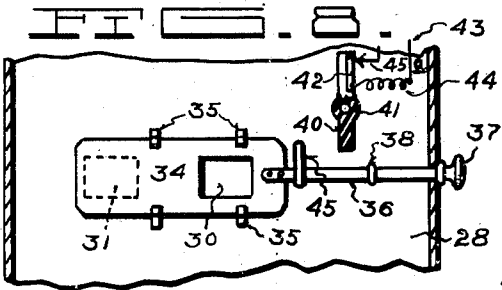
B. SONNTAG

2,369,375

AIR CLEANER AND PURIFIER

Filed May 26, 1943

3 Sheets-Sheet 2



Bernhard Sonntag
INVENTOR.

By *John H. Hallman*
Attorney

Feb. 13, 1945

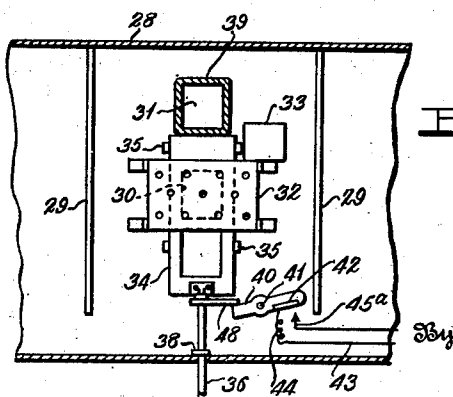
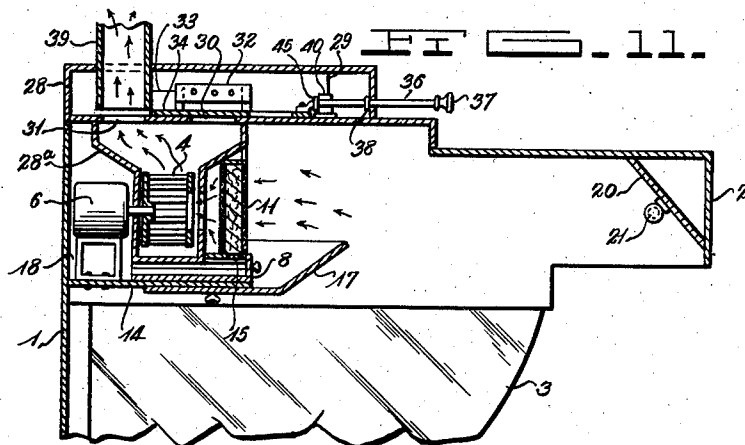
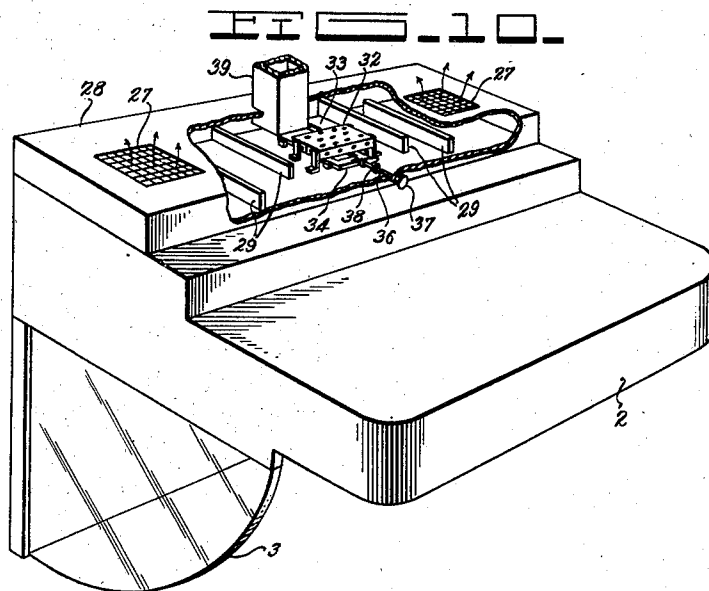
B. SONNTAG

2,369,375

AIR CLEANER AND PURIFIER

Filed May 26, 1943

3 Sheets-Sheet 3



Inventor

Bernhard Sonntag

John M. Spelman

Attorney

UNITED STATES PATENT OFFICE

2,369,375

AIR CLEANER AND PURIFIER

Bernhard Sonntag, Dallas, Tex.

Application May 26, 1943, Serial No. 488,597

11 Claims. (Cl. 21-74)

This invention relates to air cleaners and purifiers, and it has particular reference to an apparatus whereby the air in a kitchen is continuously circulated and separated from cooking odors, greasy vapors, smoke, fumes and the like, during the cooking operations.

The principal object of the invention is the provision of an apparatus whereby the heated air, laden with foreign material, which arises by convection above a kitchen stove is entrapped within the confines of a hood and is subsequently purified for return to the kitchen, thereby eliminating the objection of a vent to the outside of the house or apartment during the winter months.

Another object of the invention is the provision of a kitchen air purifying and circulating device which may be readily installed in a house, apartment or other dwelling which has already been constructed, without the necessity of costly construction charges in order to obtain a vent to the outside through a chimney or other outlet.

Still another object of the invention is to provide a kitchen air cleaner, grease trap and air purifier, so arranged that the warm air, cooking odors and vapors from the kitchen range are circulated through the air cleaner and purifier, warm air in the kitchen being retained, thereby eliminating entirely heat loss during cold weather such as results when conventional blowers and vents to the outside are used.

Yet another object is to provide a combination hood for the kitchen stove or range and an air cleaner, grease trap and air purifier by means of which impure and grease-laden air arising from the range during cooking is entrapped within the hood, and is subsequently constrained to pass by reason of the action of a blower or fan through a filtering medium, such as steel wool or excelsior or other means, or effective chemical solutions or substances, to remove solid particles and greases, and is finally purified for return to the kitchen by means of an air purifying device such as an ozonizer or other suitable means, such as chemical solutions or substances.

The invention has also for an object the provision of an apparatus hereinafter described in detail which may be readily installed in any kitchen, and which is inexpensive in construction and thoroughly dependable in operation, whether employed to circulate, cleanse and purify the air within the kitchen itself or when arranged to exhaust the air to the outside.

A further object of the invention is to provide means for optionally controlling the flow of gases and the like whereby they may be withdrawn

from the kitchen during hot weather and passed to a chimney or other outside vent, whereas in cold weather the hot gases may be purified and returned to the kitchen, thus conserving heat.

A further object of the invention is to provide means for automatically breaking an electrical circuit to a transformer associated with an ozonizer when the valve is moved to such position as to exhaust the hot gases to the outside, thus cutting out the operation of the ozonizer when the purifying means is not employed.

The invention may be readily understood from a perusal of the following detailed description, taken in connection with the accompanying drawings, and in the drawings:

Figure 1 is a perspective view of the invention shown with portions broken away;

Figure 2 is a view of Figure 1 in vertical section;

Figure 3 is a perspective view of a grease trap forming part of the invention;

Figure 4 is a perspective view of a filter, with attendant parts;

Figure 5 is a fragmentary perspective view of the blower housing and showing the supporting means for the grease trap and filter means;

Figure 6 is a front elevational view of the blower, scroll, and supporting structure, with portions broken away;

Figure 7 is a plan view with portions broken away and showing the ozonizer, baffling means and grills;

Figure 8 is a fragmentary plan view of a modified form of the invention, showing valve means for controlling the path of the air exhausted from the hood whereby the air may either be purified and returned to the kitchen during cold weather, or exhausted directly to the exterior during hot weather;

Figure 9 is a view in vertical section of the control means illustrated in Figure 8;

Fig. 10 is a view similar to Fig. 1 but showing the modified form of invention disclosed in Figs. 8 and 9;

Fig. 11 is a section similar to Fig. 2 but showing the modification; and

Fig. 12 is a fragmentary plan view partially in section showing the modification.

Heretofore various methods have been employed to remove cooking odors and greasy vapors from the kitchen, each of which methods has its disadvantages. In the case of a direct vent to the outside, the air exhausted tends to carry off a large amount of heat or conditioned air, especially when a blower or fan is used and

exhausted to the outside. This heat or conditioned air must necessarily be replaced at a considerable expense. In other cases the air currents resulting from air circulation through central heating sources or air conditioners or air circulators tend to carry the cooking odors and grease-laden air from the kitchen to all parts of the house.

Moreover, many dwellings, particularly large apartment houses, have been so constructed that it is impossible to install a hood or kitchen ventilator which must have a passageway to the outside without necessitating a virtually prohibitive expense and at the same time necessitating unsightly pipes and outside vents.

The present invention contemplates the provision of an apparatus for cleansing and purifying the air within a kitchen, and whereby the above mentioned difficulties are completely eliminated.

Referring to the drawings, the reference numeral 1 denotes a panel which is suitably secured to the wall of a kitchen above the stove or range. A hood 2 is arranged as shown and is provided with a pair of lateral panels 3, constructed of plate glass or other suitable material. A blower or centrifugal fan 4, positioned within a scroll or housing 5 and driven by a motor 6, serves to exhaust the heated air, cooking odors and grease-laden vapors from the interior of the hood for subsequent treatment, or for delivery to the outside, as will be hereinafter explained in connection with Figs. 8 and 9. The scroll 5 is provided with an orifice 7 at the lower portion thereof to allow greases to drain into a grease trap 8, located beneath the scroll and illustrated in detail in Figure 3.

A removable panel 9 is affixed to the scroll 5 and provided with an opening 10 to permit ingress of cooking odors, greasy vapors and the like into the centrifugal fan 4 for expulsion into the scroll 5.

A filter 11 is supported by members 12 and 13 illustrated in Figure 5. It will be understood that members 12 and 13 are positioned on either side of the filter 11, and it will be noted that the members 13 are positioned above the base portion 14 in order to provide for the insertion of the grease trap 8. As illustrated in Figure 2, the grease trap 8 is of such dimensions that it will slide completely under the filter 11 and the scroll 5, thereby providing a trap for the grease draining through the orifice 7 in the scroll 5, as well as for the grease draining from the filter 11 through an orifice or orifices 15 in the lower portion of the supporting frame for the filter 11.

The filtering material may be steel wool, excelsior, or any other suitable material or substance which may be chemically treated if so desired. Spring clips 16 serve to removably hold the filter 11 in operative position.

A deflecting and spreading means 17 is provided with slanting sides as shown and is hingedly connected adjacent its rear portion to the sides or bottom of the motor and scroll housing 14. Thus it is possible to swing the deflector 17 downwardly to the position shown in dotted lines in Figure 2, thereby making it possible to remove the grease trap 8 for cleaning. The deflector 17 is held in operative position by means of a wing nut 19 or other mechanical means.

An inclined baffle 20 is positioned within the hood 2 along the front part thereof as shown in Figure 2. This baffle serves to deflect fumes and the like to the rear of the hood, and likewise

serves as a support for an electric light 21, preferably a tubular type of light.

The hood 2 may be provided with a purifying chamber 22, which chamber is preferably positioned above and to the rear of the hood 2 and is connected to the scroll 5 by means of a passageway 23.

An ozonizer 24 having connection with a transformer 25 is positioned above the opening in the chamber 22 and in the passage therein directed to grills 27.

Baffles 28, best shown in Figures 1 and 7, serve to deflect air, vapors, fumes, etc., as indicated by the arrows, during which travel they are intimately commingled with ozone and thus freed from cooking odors and the like prior to their return to the kitchen through the grills 27.

It will be understood that the form of purifying chamber shown in Figs. 1 and 2 is particularly adapted for use in a kitchen which is not provided with a flue or vent. In such cases it is necessary to purify the air and return the same to the kitchen. Where, however, the kitchen is provided with an outlet flue, vent or chimney, a slightly modified form of purifying casing may be employed which, in addition to the purifying elements described in connection with the preceding figures, is likewise provided with an outlet flue bypassing the purifying elements and adapted to convey the gases directly from the hood, after passing through the filter 11 and the scroll 7, to the external atmosphere. In such case it is necessary to have suitable control means to cut off the connection to the purifier when the gases are to be directed to the exterior, and vice versa to cut off access to the outlet flue when the gases are to be purified and returned to the kitchen. Such an arrangement is shown in Figs. 8, 9, 10 and 11. As shown a chamber 28 corresponding to the purifying chamber 22 of Figs. 1 and 2 is provided with baffles partially illustrated at 29 and corresponding to the baffles 26 shown in Figs. 1, 2 and 7, which baffles provide tortuous passageways leading to outlets (not shown in Figs. 8 and 9) corresponding to the outlets 27 of Figs. 1 and 7. The chamber 28 may be connected to a scroll outlet 28a which flares outwardly at its upper portion so as to communicate with a pair of openings 30 and 31. The opening 30 communicates with the interior of the purifying casing while the outlet 31 is adapted to communicate with the vent pipe 39 leading to the outside atmosphere. An ozonizer 32 corresponding to the ozonizer 24 of the first embodiment of the invention is shown located directly above the opening 30 leading from the scroll housing. A transformer for the ozonizer 32 is indicated conventionally at 33 and corresponds to the transformer 25 shown in the first embodiment of the invention.

A slide valve or other satisfactory mechanism 34 is positioned by guides 35 and is provided with a rod 36, which rod terminates in a knob 37 exterior to the chamber 28. A stop 38 limits the outward travel of the rod 36 and the slide valve 34. Thus it will be seen that when the valve is in the position illustrated, cooking odors, vapors, and the like are free to pass through the opening 30, after which they are commingled with ozone for deodorization and are finally returned to the kitchen through a pair of grills similar to the grills 27.

When the slide valve and its assembly are moved to the right until the movement is stopped by the projection 38, the opening 31 is uncov-

ered and the opening 30 is closed. Cooking odors, vapors and the like are then free to pass through the flue 30 into a chimney or other outside vent. Heat is thus withdrawn from the kitchen during hot weather, whereas heat is conserved during the winter months, the ozonizer being then used and the heated and purified air returned to the kitchen.

In order to prevent actuation of the ozonizer when the apparatus is set for exhausting to the outside, switching means are provided which automatically break the electrical circuit to the ozonizer when the slide valve is moved to the right in order to exhaust to the outside. The switching means may be any mechanical or electrical arrangement or comprised primarily of an arm 40 of insulating material which is pivoted at 41. A conducting segment 42 is fixedly positioned on the arm 40 as shown. A wire 43 is connected to the conducting segment 42 through a spring 44, which spring serves to hold the segment 42 in electrical contact with a switch 45—a when the valve assembly is in the position illustrated, that is with the ozonizer ready for use when a master switch, not shown, is closed. When, however, the slide valve is moved to the right, a projection 45 on the rod 36 serves to contact the arm 40, thereby swinging the same so as to break the contact between the point 45—a and the segment 42 and opening the circuit through the ozonizer.

Manifestly, while the disclosure presents a practical working embodiment of the invention as embodied in an air cleaner and purifier, it is obvious that changes, modifications and alterations may be made therein, such as would be within the spirit of the invention and embraced in the scope and meaning of the claims appended hereto.

I claim:

1. An air cleanser and purifier for kitchens comprising a hood arranged to be positioned above a kitchen stove for receiving grease laden air therefrom, an air passage interconnecting the interior of said hood and the kitchen space exterior to said hood, a blower arranged to force through said passage heated air laden with grease and impurities from a cooking operation into said hood, removable filter means for freeing said air from grease, a grease trap arranged to receive said greases draining from said filter means and blower, ozonizer means for purifying said air prior to its return to said kitchen space, and means for commingling ozone formed by said ozonizer means with air within said passage.

2. An air cleanser, circulator, and deodorizer comprising a hood arranged to be positioned above a kitchen range for receiving grease laden air therefrom, a filter for removing greases from the heated air rising by convection into said hood, a blower for expelling air trapped within the confines of said hood, a scroll housing for said blower, said housing having an orifice in the lowermost part thereof, a removable grease trap for receiving greases drained from said filter and from said scroll through said orifice, an ozonizer, baffle means for commingling ozone generated by said ozonizer with the air expelled by said blower and means for permitting return of the air to the kitchen space for recirculation.

3. A combination ventilator, air cleaner, circulator and deodorizer for kitchens comprising a hood arranged to be positioned above a kitchen stove for receiving grease laden air therefrom, a filter, a blower for drawing air through said

filter and expelling the same from said hood, a scroll housing for said blower, a removable grease trap for receiving greases drained from said filter, an ozonizer and a chamber therefor, said chamber having a passageway leading from said housing, a flue leading to the outside of the building and having a connecting passageway from said housing, a valve means in control of said passageways and arranged to open either of said passageways and simultaneously closing the other, means whereby the ozonizer may be actuated only when the passageway to said ozonizer chamber is open and baffle means to commingle air with ozone generated by said ozonizer prior to expulsion of the purified air from said chamber into the kitchen.

4. A combination ventilator, air cleaner, circulator and deodorizer for kitchens including a hood arranged to be positioned above a kitchen stove, a removable filter for removing grease from the heated air entrapped within the confines of said hood, a blower for drawing air through said filter and expelling the same from said hood, a scroll housing for said blower, said housing having an orifice in the lowermost portion thereof, a removable grease trap for receiving greases drained from said filter and from said scroll, an ozonizer and a chamber therefor, said chamber having a connecting passageway from said scroll housing, a flue leading to the outside of the kitchen and likewise having a connecting passageway from said scroll housing, a valve means in control of said passageways and arranged to open either of said passageways and simultaneously close the other, means whereby said ozonizer may be actuated only when the passageway to said ozonizer chamber is open and baffle means to commingle air with ozone generated by said ozonizer prior to expulsion of the purified air from said chamber into the kitchen.

5. In a ventilator including a hood arranged to be positioned above a kitchen stove, a motor, a blower, the motor operating the blower, the motor and blower mounted in the rear of the hood, a scroll housing having the blower spaced therein, the scroll housing having an inlet opening, a removable filter means spaced in the front of the inlet opening of the scroll housing, a chamber spaced above the scroll housing and the outlet opening of the scroll housing connecting with the chamber and the chamber having outlet openings, a flue connected by a passageway with the scroll housing, valve means for controlling the flue passageway and the outlet opening of the scroll housing and the said valve means arranged to open either the flue passageway or the scroll housing outlet opening and simultaneously close the other of said openings.

6. In a ventilator including a hood arranged to be positioned above a kitchen stove, a motor, a blower, the motor operating the blower, the motor and blower mounted in the rear of the hood, a scroll housing having the blower spaced therein, the scroll housing having an inlet opening and an outlet opening, a removable filter means spaced in the front of the inlet opening of the scroll housing, a deflecting plate secured to the front inside the hood, a chamber spaced above the scroll housing and the outlet opening of the scroll housing connecting with the chamber, the housing having baffles arranged therein, and the chamber having outlet openings.

7. A combination ventilator, air cleaner, circulator and deodorizer for kitchens including a hood arranged to be positioned above a kitchen

stove, a blower for drawing air through the hood, a scroll housing for the blower, an ozonizer and a chamber therefor, said chamber having a connecting passageway from said scroll housing, a flue leading to the outside of the kitchen and likewise having a connecting passageway from said scroll housing, a valve means in control of said passageways and arranged to open either of said passageways and simultaneously close the other, means whereby said ozonizer may be actuated only when the passageway to said ozonizer chamber is open, and baffle means to commingle air with ozone generated by said ozonizer prior to expulsion of the purified air from said chamber into the kitchen.

8. A ventilating apparatus for kitchens for removing odors, grease and fumes from the air therein during cooking operations comprising a hood adapted to be disposed over a kitchen stove for receiving grease laden air and gases therefrom, an air purifier, comprising a casing, resting upon the hood, an outlet opening in the top of the hood communicating with the interior of the casing, an ozonizer within the casing located above the opening, an outlet opening in the casing for returning purified air to the kitchen after purification, and a tortuous passageway leading from the ozonizer to said outlet.

9. A kitchen ventilator comprising a hood adapted to be positioned above a kitchen stove to receive the air and gases therefrom, means associated with said hood for purifying the air and returning the hot purified air to the kitchen, a flue communicating with said hood for receiv-

ing unpurified air and gases and passing the same to the exterior atmosphere, and valve means for selectively controlling the flow of air from said hood to said flue or said purifying means whereby in hot weather the hot gases may be vented directly to the outer atmosphere, while in cold weather the air may be purified and the hot air returned to the kitchen to conserve heat.

10. A kitchen ventilator comprising a hood adapted to be disposed over a stove for receiving grease-laden air and gases therefrom, a casing disposed above the hood, an opening in the top of the hood communicating with the interior of the casing, air purifying means within the casing above said opening, an outlet from said casing for returning hot purified air directly to the kitchen, an outlet flue leading from the hood to the exterior and bypassing the purifying means, and control means for selectively directing air from the hood to the purifying means or to the outlet flue at the will of the operator.

11. A kitchen ventilator, a hood adapted to be disposed over a stove to receive the grease-laden air and gases therefrom, a casing located above the hood, an opening in the hood communicating with the interior of the casing, an ozonizer located above said opening, a transformer associated with said ozonizer, a flue leading from said hood to the external atmosphere, and valve means for selectively cutting off said opening or said flue, and switch means associated with the control means for controlling the transformer associated with said ozonizer.

BERNHARD SONNTAG.