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 purifier, 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, of 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 a 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of the invention is to provide means for optionally controlling the flow of gases and the like whereby they may be withdrawn from the kitchen during hot weather and passed to a chimney or other outside vent, whereas in cold weather the hot gases may be purified and returned to the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 or 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, baffle means and grids;
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.

Hereinafter 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 condi-
tioned air must necessarily be replaced at a con-
siderable expense. In other cases the air cur-
rents resulting from air circulation through cen-
tral 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 out-
side without necessitating a virtually prohibitive
expense and at the same time necessitating un-
sightly pipes and outside vents.

The present invention contemplates the pro-
vision of an apparatus for cleansing and purify-
ning the air within a kitchen, and whereby the
above mentioned difficulties are completely elimi-
nated.

Referring to the drawings, the reference nu-
meral 1 denotes a panel which is suitably se-
cured 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, con-
structed 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 por-
tion thereof to allow gases to drain into a gas
trap 8, located beneath the scroll and illus-
trated in detail in Figure 3.

A removable panel 9 is affixed to the scroll 5
and provided with an opening 10 to permit in-
gress 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 mem-
bers 13 are positioned above the base por-
tion 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 drain-
ing 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, ex-
celsior, or any other suitable material or sub-
stance 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 pro-
vided with slanting sides as shown and is hinged
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 down-
wardly 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, pref-
erably a tubular type of light.

The hood 2 may be provided with a purifying
chamber 22, which chamber is provided posi-
tioned above and to the rear of the hood and
is connected to the scroll 5 by means of a pas-
sageway 23.

An ozonizer 24 having connection with a trans-
former 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 inti-
mately 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 purify-
ing chamber shown in Figs. 1 and 2 is particu-
larly 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 pre-
ceding 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 5, 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 22 corre-
sponding to the purifying chamber 22 of Figs. 1
and 2 is provided with baffles partially illustrated
at 29 and corresponding to the baffles 28 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 22 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 com-
muicates with the interior of the purifying cas-
ing while the outlet 31 is adapted to communi-
cate with the vent pipe 33 leading to the outside
atmosphere. An ozonizer 24 corresponding to the
ozonizer 24 of the first embodiment of the inven-
tion is shown located directly above the opening
30 leading from the scroll housing. A trans-
former for the ozonizer 24 is indicated conven-
tionally as 33 and corresponds to the transformer
25 shown in the first embodiment of the inven-
tion.

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 ex-
terior 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 unco-

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ered and the opening 30 is closed. Cooking odors, vapors and the like are then free to pass through the flue 38 into a chimney or other outside vent. Heat is thus withdrawn from the kitchen, whereas heat is conserved during the winter months, the ozonizer being then unused 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 46 on the rod 36 serves to contact the arm 40 and a cutout 47 to break the electrical 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 cleaner 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, a removable filter means for freeing said air from grease, a grease trap arranged to receive 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 cleaner, 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 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 scroll, a blower and baffle means for permitting return of the air to the kitchen, a valve means in control of said passages and arranged to open either of said passages and simultaneously close the other, means whereby the ozonizer may be actuated only when the passage 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 having a connecting passageway from said scroll to said ozonizer chamber, a flue leading to the outside of the kitchen and likewise 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 passages and arranged to open either of said passages and simultaneously close the other, means whereby said ozonizer may be actuated only when the passage 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 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 openings 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 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 openings and simultaneously close the other of said openings.

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

air.
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 receiving 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.

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