

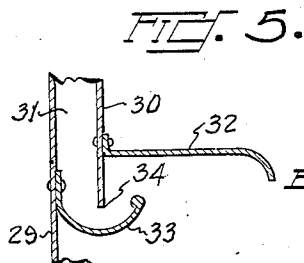
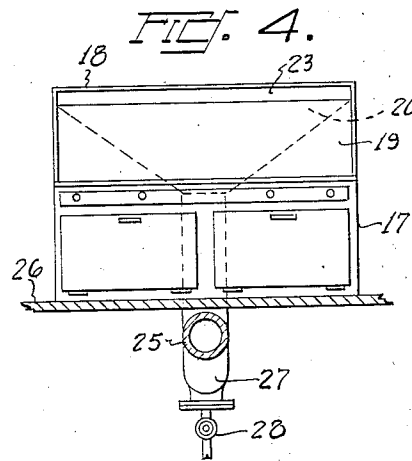
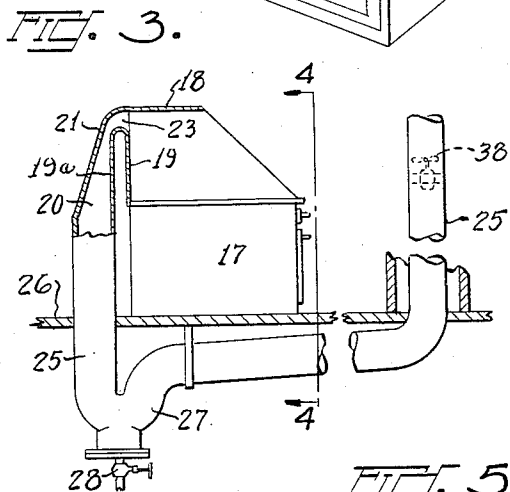
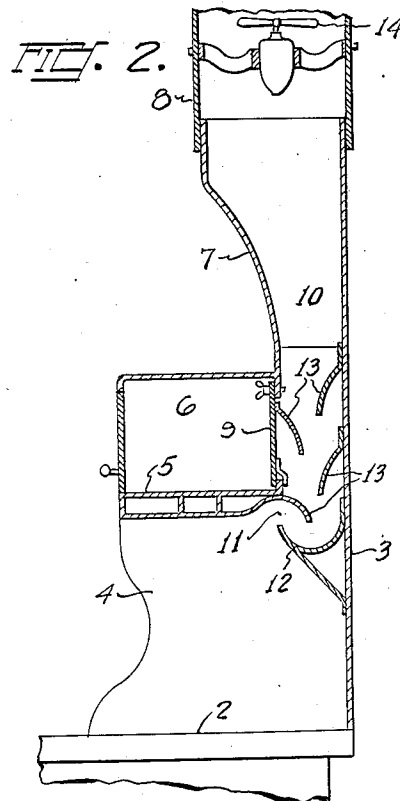
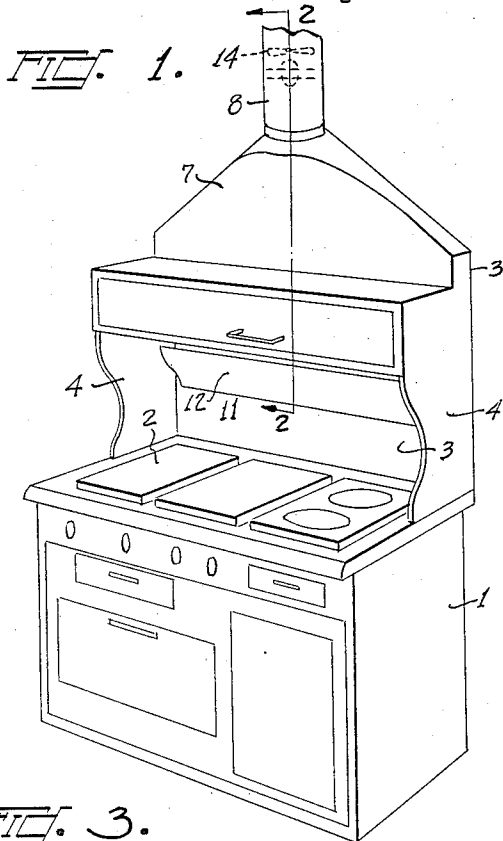
Jan. 1, 1946.

A. K. GAYLORD

2,392,038

VENTILATOR UNIT

Original Filed Nov. 24, 1939



INVENTOR
ASA K. GAYLORD

BY *Carroll D. Cook*
ATTORNEY

UNITED STATES PATENT OFFICE

2,392,038

VENTILATOR UNIT

Asa K. Gaylord, Portland, Oreg.

Continuation of application Serial No. 305,944,
November 24, 1939. This application January
18, 1943, Serial No. 472,720

7 Claims. (Cl. 126—299)

This invention relates to ventilators for collecting and removing smoke, gases, vapors, fumes and the like which commonly ascend from cooking ranges, and has particular reference to a method of and apparatus for collecting for convenient disposal the grease and similar substances which may ascend from the cooking surface in the form of vapor.

The object in general of the present invention is to provide a ventilator unit having means for collecting for convenient disposal the products of condensation from gases flowing therethrough.

It is a further object of the present invention to provide an apparatus for collecting for convenient disposal the grease and similar substances which may be separated from the gases in a ventilator unit so as to require periodic removal of such collected substances. In particular, the object of the invention is to collect the products of condensation in such a manner that the accumulation thereof will tend to obstruct the flow of air through the ventilator unit if such accumulation is not periodically removed.

Additional objects and advantages of the invention will become apparent as the description proceeds with reference to the accompanying drawing, it being understood that the drawing is illustrative only and that various changes and modifications may be resorted to without departing from the spirit or scope of the invention; and I deem myself entitled to all such changes and modifications as fall within the scope of the claims hereto appended.

In the drawing: Figure 1 is a perspective view of a cooking range and ventilator unit embodying the principles of the present invention; Figure 2 is a vertical section taken on the line 2—2 of Figure 1; Figure 3 is a side elevation, partly in section, of a cooking range and ventilator unit illustrating a modified form of construction embodying the principles of the invention; Figure 4 is a front elevation of the apparatus illustrated in Figure 3; and Figure 5 is a fragmentary detail in section illustrating an adaptation of the construction shown in Figure 3 as applied to an overhead ventilating unit.

The preferred embodiment of the invention is herein illustrated in connection with a ventilating unit for a cooking range 1 which may be of any type and construction employing a cooking surface 2. Extending vertically from the rear edge of the cooking surface is a back plate 3, and at the ends of said cooking surface are the end plates 4, 4. The end plates 4 are illustrated as extending a substantial distance forward on the

cooking surface 2 to form an enclosure with the back plate 3.

A hood or shelf 5 is mounted above the rear portion of the cooking surface, which may form the bottom of an oven or warming oven 6 as shown in Figure 2. The hood or shelf 5 is supported at its ends by the end plates 4, 4. A front plate 7 extends upwardly from the rear edge of the shelf 5, this front plate 7 having a changing contour and merging into the back plate 3 so as to provide a union with the vent pipe 8. The lower portion of the front plate 7 is provided with a removable cleanout door 9 extending substantially the width of the ventilator. The walls 3 and 7 thereby form a duct means defining a ventilation passageway 10 through which air may be drawn at high velocity by a fan 14 located at any convenient point in the vent pipe 8. Attached to the walls 3 and 7 and projecting into the passageway substantially the full width thereof are a plurality of collecting plates or baffles 13. Figure 2 illustrates one of said baffles 13 as being mounted on said removable door 9. Removal of said door and said one baffle exposes the surfaces of all of said baffles for cleaning purposes.

An intake opening 11 having a width substantially equal to the length of the cooking surface 2 admits air into the lower portion of the passageway 10. A lower wall portion of the duct means adjacent the intake opening 11 of the passageway is so formed as to define a trough 12 which is substantially coextensive with the intake opening 11 and hence also substantially equal to the length of the cooking surface 2 of the range. The trough 12 is so arranged as to accumulate therein the products of condensation separated from the air flow passing through the ventilator unit. The lowermost baffle 13 extends downwardly from the upper wall of the duct means opposite the trough 12 and defines in part the intake end of the passageway 10, and cooperates with the trough 12 to govern the effective size of the intake opening or slot 11. The lower edge of this baffle terminates substantially over the bottom of the trough, and at the approximate elevation of its forward edge or rim, which forms the lower margin of the slot 11. The other baffles 13 are disposed alternately on the plates 3 and 7 in staggered relationship, as illustrated in Figure 2. These baffles may be constructed of sheet metal in such a manner that they are inclined downwardly in the passageway, and may be set at the desired angle at the time of installation. It is not necessary to the present invention that the baffles, except the lowermost

baffle, take this form, however, as they may project out horizontally from the plates 3 and 7 or they may be of any other convenient form which will satisfactorily perform the functions presently to be described.

The invention resides further in the provision for the collection of grease and other products of condensation which are separated from the gases flowing through the ventilator unit in a receptacle so arranged that such products of condensation may conveniently be removed with a minimum of time and effort. Referring particularly to Figures 1 and 2, the invention is embodied in the trough 12 together with the grease collecting baffles 13, particular attention being directed to the cooperation of the lower baffle 13 with the trough 12. The manner in which the separation of products of condensation is effected with the ventilator unit of the invention may be described as follows. When the fan 14 is in operation air will be drawn from above the cooking surface 2 and through the intake opening or slot 11 at a relatively high velocity. The lower baffle 13 will first direct this air stream downwardly under the depending edge of said baffle to cause grease particles contained therein to lodge within the trough 12, whereupon the air stream is deflected upwardly against the second baffle 13. From there on the alternately arranged baffles 13 will repeatedly reverse the direction of the air flow as it passes around the baffles on its way to the vent pipe 8. Globules of grease and other condensed products will tend to be thrown out of said air stream by the action of centrifugal force upon each of these sharp reversals of direction of flow, a considerable portion of these condensed products being separated in passing around the first or lower baffle 13. Particles not removed in the first stage will be thrown out of the air stream and upon the surfaces of the plates 3 and 7 and the baffles 13 as the air stream proceeds on its devious upward path.

In the above described arrangement, in which the lower baffle 13 extends substantially into the trough 12, it will be seen that accumulations in the bottom of the trough 12 will obstruct the air flow through the ventilator unit. The wall portion of the duct means forming the trough 12 and the opposite wall portion defining the baffle depending downwardly into the trough, the lower edge of which is substantially uniformly spaced from the bottom of the trough, thus cooperate to form a trap in the ventilation passageway. If the accumulations are not periodically removed they will rise to a level substantially in contact with the lower edge of the lower baffle 13, which condition seals the passageway against the intake of air. Even before the accumulation actually seals the passageway, the air flow will be so materially reduced that the ventilator unit will be substantially inoperative to remove smoke and fumes from above the cooking surface 2, thus compelling the cleaning out of the trough 12 before it fills to overflowing and creates a serious fire hazard.

In Figures 3 and 4 is illustrated a cooking range and ventilator unit employing a construction for exhausting smoke and other gases from the cooking surface by means of a downwardly extending vent pipe. In this construction the range 17 may be removed some distance from the nearest wall. Instead of projecting upwardly above the level of the shelf 18, the back plate 19 is bent downwardly to form a downward extension 19a which forms the front wall of a passageway 20. The

rear wall of the passageway 20 is formed by a plate 21 which joins the rear edge of the shelf 18. The walls 19a and 21 are joined by end pieces and together form the passageway 20 similar to the passageway 10 in Figures 1 and 2 except that it is inverted. Entrance to the passageway 20 is through a slot 23 defined by the rear edge of the shelf 18 and the uppermost portion of the back plate 19. The slot 23 may preferably be of the same length as the cooking surface, the width of the passageway 20 diminishing in proportion as the walls thereof approach the upper end of the vent pipe 25.

The vent pipe 25 extends downwardly through the floor 26 and then passes under the floor until it turns upward at any convenient outlet provided in the building. A fan 38 may be installed in the vent pipe 25 at any convenient location, to create a high velocity current of entering air through the slot 23. Preferably, that portion of the vent pipe lying beneath the floor is sloped slightly from horizontal, with its lowest point at the junction of the horizontal section of the pipe with the vertical section which connects with the range. Through inattention and neglect, the horizontal section of the pipe lying beneath the floor is likely to become filled with greasy accumulations, the weight of which would rupture the pipe joints and cause leaks through which a highly inflammable, greasy soot can escape to cover surrounding surfaces. Even should this not occur, the accumulated products of condensation in the pipe constitute a very real fire hazard, since these are easily ignited and burn with an intense heat. To compel the removal of such accumulations applicant provides a trap 27 intermediate the vertical section of the pipe and the pipe lying beneath the floor, in which unremoved accumulations of the products of condensation will form a seal to prevent the passage of smoke and other gases to be exhausted from the cooking surface. Thus, if the accumulations of grease and the like be not periodically removed, as by means of the drain valve 28, the trap will tend to fill up and obstruct the vent pipe 25 against the further passage of smoke and other gases until such time as the trap is emptied.

In Figure 5 is illustrated an adaptation of the construction illustrated in Figure 3, the construction illustrated comprising a back plate 29 and a front plate 30 which form an enclosure for an upwardly extending passage 31. A hood or shelf 32 is affixed to the front plate 30, the construction thus far described being similar to that illustrated in Figure 2. The lower end of the passage 31 is defined in part by a trough 33 affixed to the back plate 29 for catching particles of grease and the like which may collect on the walls of the ventilator unit and drop downwardly in the passage. A wall portion of the duct means defining the passageway 31 opposite the trough 33, such as the lower edge 34 of the front plate 30, extends downwardly from the rear edge of the shelf 32 to a point within the trough 33 below the level of the rim, and the current of air entering the ventilating unit must, of necessity, flow transversely of the trough under the edge 34 of the front plate. If accumulations of grease and the like be not removed from the trough 33, these will obstruct the flow of air through the intake opening and will eventually coact with the depending edge 34 to form a seal to prevent the passage of air through the ventilator unit.

Having described the apparatus for collecting particles of grease and the like in a ventilator

unit, the method of the present invention as carried out in said apparatus is as follows:

Referring to the drawing, it will be noted that in the various forms of construction illustrated entering currents of air are caused to reverse their direction of flow. For example, as described in connection with the construction illustrated in Figures 1 and 2, air ascending from the cooking surface is drawn into the ventilator unit by way of the passageway 11. In passing around the baffles 13 successively, the direction of air flow is repeatedly sharply reversed in the manner described, causing liquid and solid particles to be separated onto the walls of the ventilator unit by centrifugal force. The products of condensation thus separated from the air stream will deposit themselves in the trough 12 where they may conveniently be disposed of, the trough 12 being readily accessible through the intake opening 11 for the cleaning thereof. As described, the relationship of the trough 12 with the lower baffle 17 is such as to compel frequent disposal of accumulations in order to maintain proper operation of the ventilator. A high velocity air current is employed in the vent pipe, satisfactory results having been obtained with an air velocity of from 500 to 1500 feet per minute, depending upon the structural variations in the ventilator unit. With such a rapid air flow the action within the unit is quite turbulent. It should be remembered that grease ascending from the cooking surface in the form of hot vapor is rapidly condensed in the colder strata of air above the cooking surface and is more or less in globular form when acted upon by the centrifugal forces created by the tortuous passage of the air through the ventilator unit.

In the construction illustrated in Figure 5 the current of entering air is first caused to flow over the rim of the trough 33 and then under the depending edge 34 of the front plate 30. The air current is then caused to follow the contour of the inner surface of the trough 33, during which movement its velocity is increased in proportion as its volume is limited by the size of the opening intermediate the edge 34 and the surface of the trough. Particles of grease and the like carried in the air stream are thrown centrifugally as the direction of flow is reversed upon entering the ventilator unit.

It will be appreciated that a similar result is achieved in the construction illustrated in Figure 3, in which high velocity air currents are caused to reverse the direction of their flow in passing through the trap 27.

Although the invention has been disclosed and described in terms of specific structures for reversing the direction of the air flow and establishing a trap or the substantial equivalent thereof in the collecting trough, its application is not necessarily confined thereto, but may be used either in its entirety or in part, and either with or without modifications, in any construction wherein provision is made for collecting and disposing of products of condensation in a ventilator unit wherein the accumulation of said products is caused to interfere with the proper operation of said ventilator unit, and I deem myself entitled to all such uses, modifications and variations as fall within the spirit and scope of the appended claims.

Having now described my invention and in what manner the same may be used, what I claim as new and desire to protect by Letters Patent is:

1. In a ventilator unit for a cooking range and the like, means including a rear wall and a front wall defining a passageway therebetween, a baffle secured along one edge to one of said walls substantially the width thereof and extending outwardly from said one wall into said passageway, means defining a trough in the lower part of said passageway, the lower edge of said baffle depending substantially into said trough, and means located above the cooking surface of the range defining an inlet for said passageway extending substantially the entire length of said cooking surface.

2. In a ventilator unit for a cooking range and the like, duct means defining a ventilation passageway, means positioned above the cooking surface of said range defining an inlet extending substantially the entire length of said cooking surface, means for effecting a high velocity flow of air through said passageway, means forming a baffle extending outwardly and downwardly from an upper wall portion of said duct means into said passageway substantially the entire width thereof to cause separation of condensed grease particles and the like from said air flow, a portion of a lower wall of said duct means adjacent said inlet defining a receptacle coextensive with said inlet for collecting grease particles and the like separated from said air flow in said passageway, the lower edge of said baffle depending substantially into said receptacle and spaced from the bottom thereof whereby accumulations of grease and the like in said receptacle will retard flow of air through said passageway.

3. In a ventilator unit for a cooking range and the like, duct means defining a ventilation passageway, means for moving a current of air through said passageway, means for separating products of condensation from said current of air, said last mentioned means including a baffle depending from a first wall portion of said duct means into said passageway and a trough formed in a second wall portion of said duct means opposite said first wall portion and arranged beneath said baffle for collecting said products of condensation, the lower edge of said baffle extending substantially into said trough forming therewith a trap in said passageway wherein accumulated products of condensation will effectively restrict flow of air through the ventilator unit.

4. In a ventilator unit for a cooking range and the like, duct means defining a ventilation passageway, means for moving a current of air through said passageway, means for separating products of condensation from said current of air, said last mentioned means including a baffle provided on each of a pair of opposite walls of said duct means, said baffles extending outwardly into said passageway in a transverse direction and longitudinally spaced as regards the length of said passageway, said baffles defining a tortuous path for said air current through said passageway, a portion of one of said opposite duct walls including one of said baffles being removable for exposing the surfaces of said baffles for cleaning purposes, and means for detachably securing said wall portion and said baffle in working position.

5. In a ventilator unit for a cooking range and the like, duct means defining a ventilation passageway, means for moving a current of air through said passageway, a plurality of elements for separating products of condensation from said current of air including a baffle depending from a first wall portion of said duct means into said passageway and a trough formed in a second

wall portion of said duct means opposite said first wall portion and arranged beneath said baffle for collecting said products of condensation, the lower edge of said baffle depending substantially into said trough and spaced from the bottom thereof whereby accumulations of grease and the like in said trough will retard the flow of air through said passageway, at least one of said elements being removable for cleaning purposes.

6. In a ventilator unit for a cooking range and the like, duct means defining a ventilation passageway, means for moving a current of air through said passageway, means for separating the products of condensation from said current of air, said last mentioned means including a baffle provided on each of a pair of opposite walls of said duct means, said baffles extending outwardly into said passageway in a transverse direction and longitudinally spaced as regards the length of said passageway, said baffles defining a tortuous path for said air current through said passageway, means defining an opening in said

duct means, a detachable closure member for closing said opening, one of said baffles being secured to said closure member and being removable therewith.

7. In a ventilator unit for a cooking range and the like, duct means defining a ventilation passageway, means for moving a current of air through said passageway, means mounted in said duct means for separating the products of condensation from said current of air, a portion of said duct means forming a receptacle for collecting grease particles and the like separated from the air flow in said passageway, said last named means including a baffle provided on each of a pair of opposite walls of said duct means, said baffles extending outwardly into said passageway in a transverse direction and being longitudinally spaced as regards the length of said passageway, one of said baffles and said receptacle cooperatively defining a tortuous path for said air current through said passageway.

ASA K. GAYLORD.