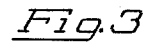
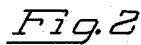


Filed March 16, 1954

SAFETY VENTILATOR UNIT

5 Sheets-Sheet 1



BY
Cook and Schermerhorn

Nov. 19, 1957

A. K. GAYLORD

2,813,477

SAFETY VENTILATOR UNIT

Filed March 16, 1954

5 Sheets-Sheet 2

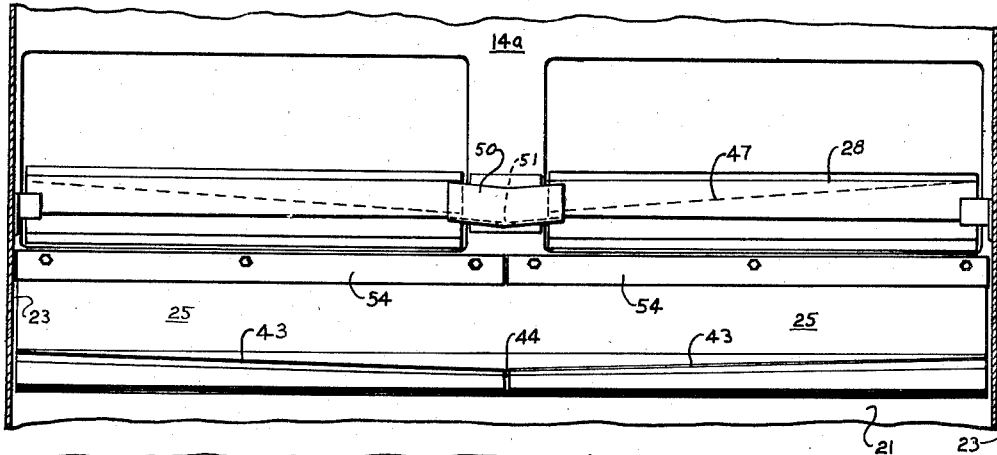


Fig. 4

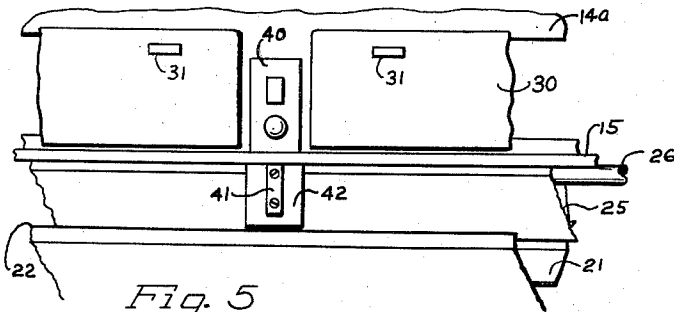


Fig. 5

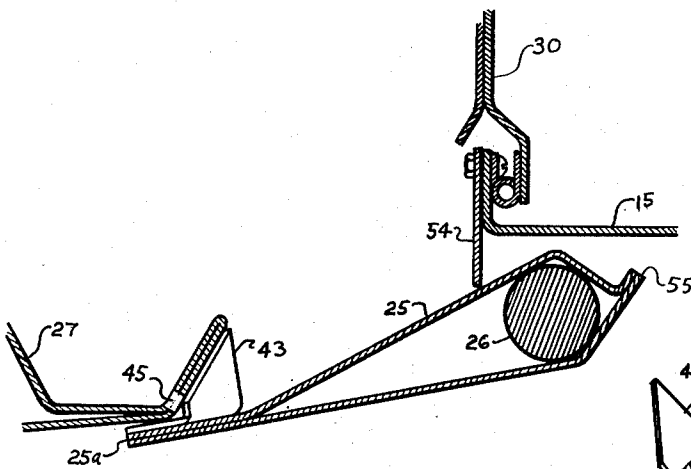


Fig. 6

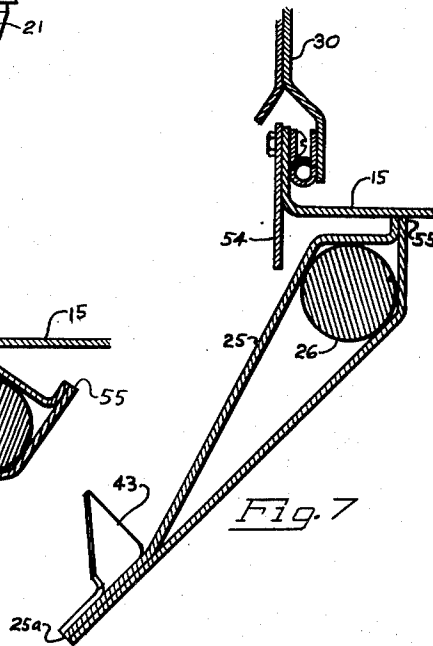


Fig. 7

INVENTOR.

ASA K. GAYLORD

BY

Cook and Schermerhorn

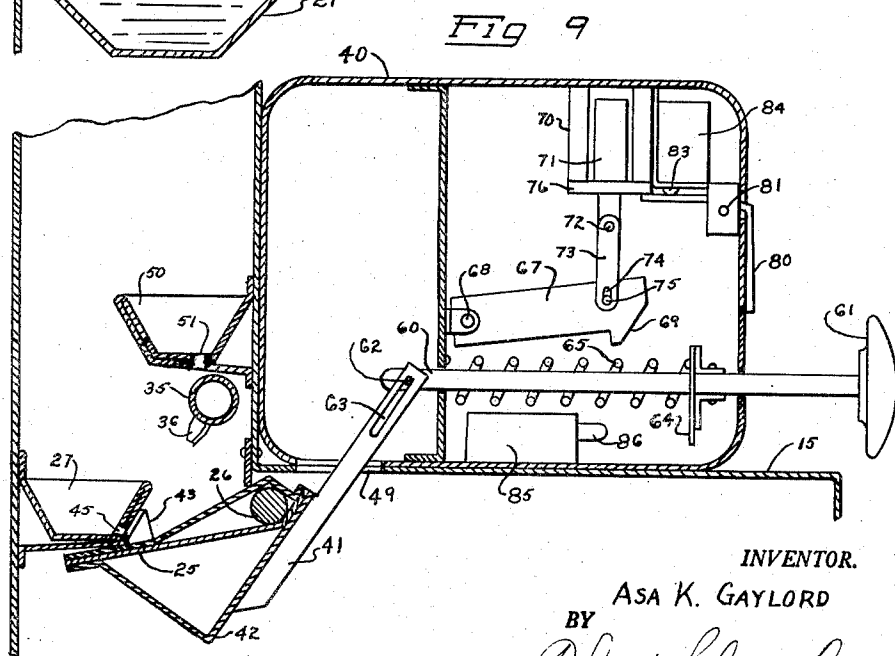
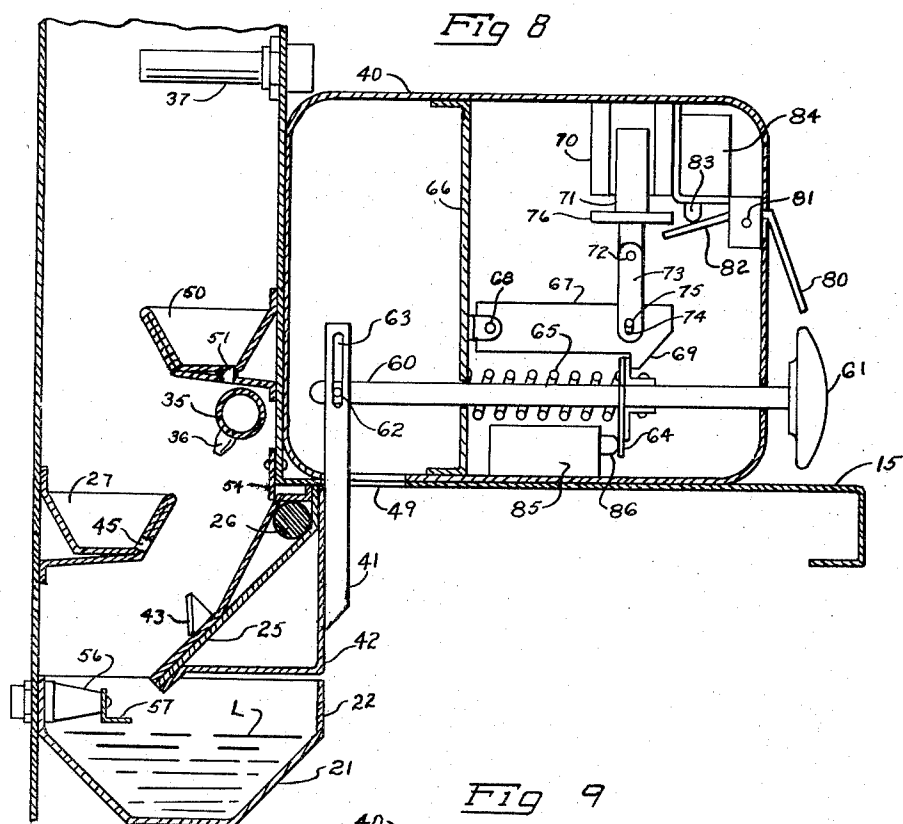
Nov. 19, 1957

A. K. GAYLORD
SAFETY VENTILATOR UNIT

2,813,477

Filed March 16, 1954

5 Sheets-Sheet 3



INVENTOR.

ASA K. GAYLORD

BY

Book and Schermerhorn

Nov. 19, 1957

A. K. GAYLORD
SAFETY VENTILATOR UNIT

2,813,477

Filed March 16, 1954

5 Sheets-Sheet 4

Fig 10

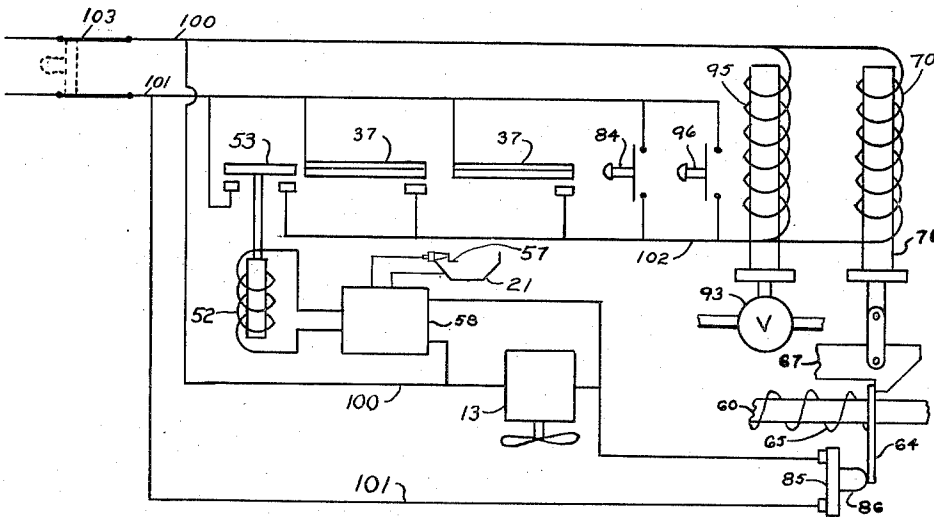
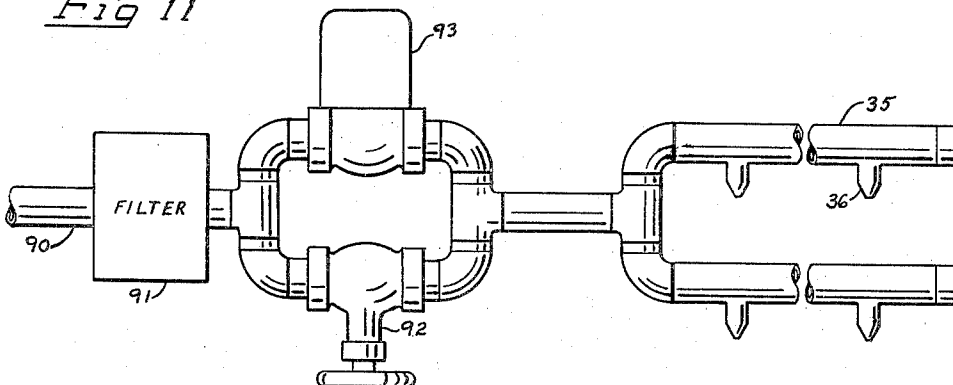


Fig 11



INVENTOR.
ASA K. GAYLORD

BY
Cook and Schermerhorn

Nov. 19, 1957

A. K. GAYLORD
SAFETY VENTILATOR UNIT

2,813,477

Filed March 16, 1954

5 Sheets-Sheet 5

Fig. 12

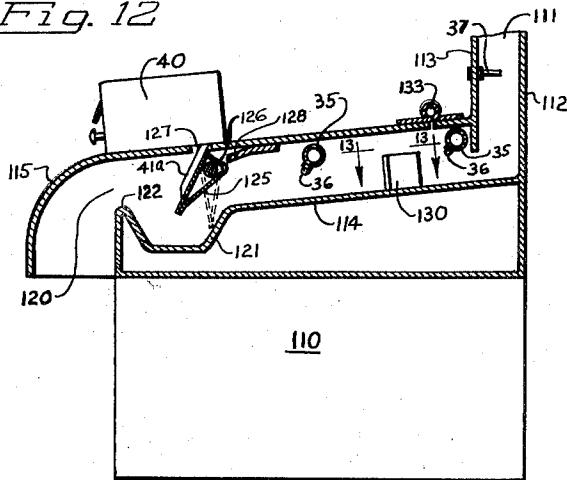


Fig. 13

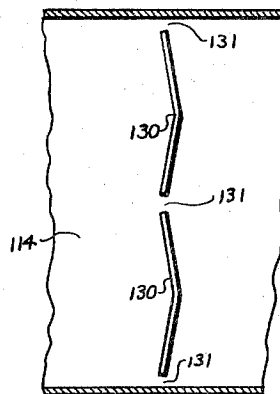


Fig. 14

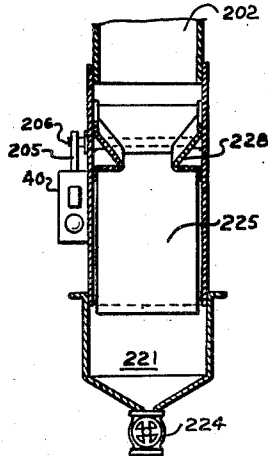
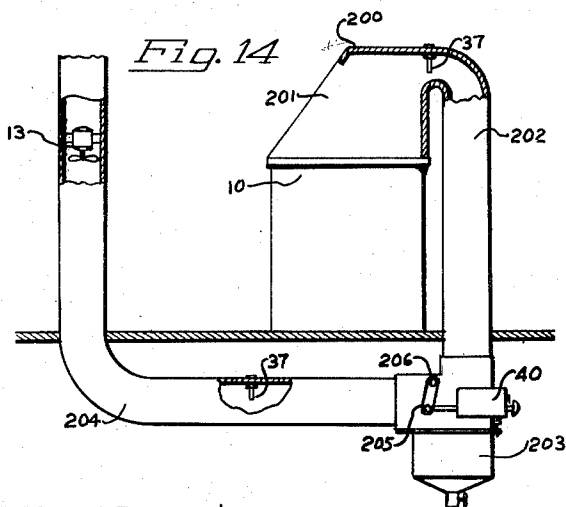


Fig. 15

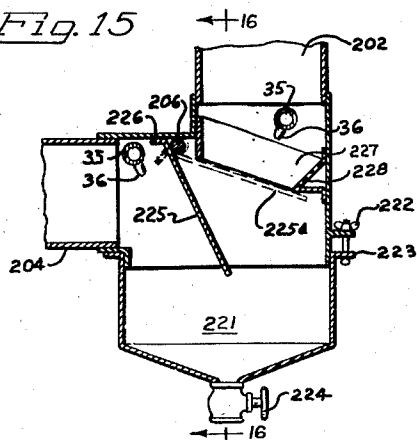


Fig. 16

INVENTOR.

ASA K. GAYLORD

BY

W. and Schermerhorn

1

2,813,477

SAFETY VENTILATOR UNIT

Asa K. Gaylord, Portland, Oreg.

Application March 16, 1954, Serial No. 416,469

23 Claims. (Cl. 98—115)

This invention relates to an improved ventilator for installations subject to accumulations of inflammable deposits, such as ventilators for removing grease bearing gases, vapors, fumes and smoke from cooking ranges, grills, broilers, and other appliances using hot oils and fats.

This application is a continuation-in-part of my prior co-pending application, Serial No. 182,766, filed September 1, 1950, now abandoned.

Such ventilating systems constitute a serious fire hazard unless special precautions are taken to dispose of grease accumulations which result from condensation of the grease bearing vapors from the various cooking processes. Without some form of grease extractor, the grease tends to condense and accumulate in large quantities in the relatively cool ductwork of the ventilating system, and mixed with the grease is usually a quantity of soot from smoking cooking surfaces and meats. These deposits are not only highly inflammable, but, when they build up to some thickness in the ductwork, they contain enough fuel supply to create an intensely hot fire which will quickly ignite any nearby wooden structure. The danger to the building is, of course, greatly increased if the ventilating fans in the system continue to operate to supply the fire with oxygen under forced draft.

Attempts have heretofore been made to collect the grease in a receptacle or filter for its periodic disposal, and to prevent accumulations in the more inaccessible parts of the ductwork, but most prior devices for this purpose are cleaned so infrequently in practice that they constitute almost as great a hazard as if the grease had been allowed to accumulate in the duct itself. It must be recognized that there exists, not only the problem of keeping grease and smoke deposits out of the ventilating duct, but also the problem of insuring that the collected grease will be removed frequently and the problem of the prevention of a serious fire in case the collected grease should ignite. It must be recognized, further, that, because of the highly inflammable nature of grease, there will be occasional grease fires on the frying surface or in the broiler, even in the best regulated kitchens. For adequate fire protection, the ventilating system must be designed, not only to reduce the likelihood of fire as much as possible, but also to provide means for keeping occasional and unavoidable small grease fires under control.

The general object of the present invention is, therefore, to provide an improved ventilating unit equipped with means to insure frequent removal of accumulated grease and further equipped with means to prevent a fire from burning in the ductwork.

Further objects are to provide improved means for extracting the grease from the air stream and collecting it in a convenient receptacle, to provide improved means to obstruct the flow of air through the ventilating system and thus render it inoperative if the grease receptacle is not cleaned regularly, to provide a novel form of damper for the ventilating duct, and to provide thermal responsive means for closing the damper in case of fire.

2

Another object is to provide an automatic fire stop damper mechanism which is required to function regularly in normal kitchen operation, in order to insure its operability in case of emergency.

Another object is to provide a kitchen ventilator having steam cleaning and fire extinguishing nozzles.

Another object is to provide a ventilator unit of the type described which is of simple construction, easy to clean, reliable in operation, and adapted to different kitchen requirements.

In general, the invention comprises the provision of a movable damper baffle mounted in cooperative relationship with a grease receptacle to assist in extracting grease and smoke particles from fumes and vapors drawn through the ventilating duct, and to obstruct the ventilating passage when the grease is not removed from the receptacle at regular intervals. By rendering the whole ventilating system ineffective by the presence of an excessive amount of grease in the collecting receptacle, at least a certain minimum of cleanliness is insured and the receptacle will not be allowed to fill until the volume of grease contains enough fuel to constitute a serious fire hazard.

In case of fire, the damper baffle is tripped automatically by thermal responsive mechanism which moves it to a position to close the duct and cut off all draft there-through, the fan in the duct being stopped at the same time. An important feature of the invention is that the damper mechanism may be designed so that it must be operated in order to obtain access to the grease receptacle to clean it out. Thus, the operating mechanism of the protective device may be installed so that it must be tested regularly and insured of being in good operating condition, and cannot stand idle for long periods of time to be rendered inoperative by rust or corrosion, as in the case of many protective devices which function only in case of emergency. In the present system, the operator is promptly apprised of any defect in the mechanism without making a special effort to test it from time to time.

These and other objects and advantages will become apparent and the invention will be better understood from the following description of certain preferred embodiments illustrated on the accompanying drawings. It is to be understood, however, that various changes may be made in the construction and arrangement of parts and that certain features may be used without others without departing from the spirit of the invention as defined in the appended claims. It will be appreciated by persons skilled in the art that certain features of the invention may be useful in ventilators other than kitchen ventilators where similar problems arise.

In the drawings:

Figure 1 is a perspective view of the present ventilator installed in a kitchen;

Figure 2 is a cross sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 1;

Figure 4 is an elevation view taken on the line 4—4 of Figure 2;

Figure 5 is a fragmentary front elevation view of the central part of the structure shown in Figs. 1 and 4;

Figure 6 is an enlarged sectional view showing the damper baffle of Figure 1 in closed position;

Figure 7 is a view similar to Figure 6 showing the damper baffle in open position;

Figure 8 is an enlarged view of the apparatus in Figure 3 with one wall removed from the damper baffle control mechanism housing to show the positions of the parts therewithin when the damper baffle is in open position;

3

Figure 9 is a view similar to Figure 8 showing the damper baffle in closed position;

Figure 10 is a schematic wiring diagram of the control system for the ventilator;

Figure 11 is a diagram of the steam piping system;

Figure 12 is a cross sectional view showing an application of the principles of the invention to a ventilator installed in connection with a salamander or broiler;

Figure 13 is a view taken on the line 13—13 of Figure 12;

Figure 14 is a further modification in which the grease receptacle and damper baffle are installed in ductwork under the floor;

Figure 15 is an enlarged sectional view of the grease receptacle and damper baffle of Figure 14; and

Figure 16 is a sectional view taken on the line 16—16 of Figure 15.

Figure 1 embodiment

Figures 1 to 11 illustrate a typical restaurant installation having a row of cooking units 10 projecting forward from a back wall 11. The ventilating duct 12 is ordinarily equipped with a fan 13, shown in Figure 10, for drawing a strong current of air through the duct to withdraw from the kitchen the smoke, fumes, steam, vapors and cooking odors produced by the cooking units 10. The duct 12 has a lower portion 14 with sloping walls which flare out to embrace the whole length of the array of cooking units 10 as they are disposed along the wall 11. Mounted on the front wall 14a of the lower portion 14 is a shelf 15 projecting out over the cooking units.

Air is drawn into the ventilating duct through a narrow throat 20 between the bottom of shelf 15 and a grease trough receptacle 21 mounted on the back wall 11. Trough 21 has a forward lip 22 spaced a short distance below the underside of shelf 14 to define the lower edge of throat 20. The upper edge of this throat is defined by the underside of shelf 15 and the ends are defined by vertical end walls 23. One of the end walls 23 is omitted in Figure 1 to illustrate the internal structure of the ventilator. The walls 11 and 23, and the shelf 15, thereby form a hood to cause all the smoke, fumes and cooking vapors from the cooking units 10 to be drawn through the narrow throat 20 and expelled through the upper duct 12 into the outside atmosphere.

Air entering the throat 20 is required to pass around a damper baffle 25 mounted on a shaft 26 supported on the front wall 14a. When the damper baffle 25 is in open position, as shown in Figure 2, its lower edge 25a depends downwardly substantially into the trough 21 approximately on the level of lip 22, although the edge 25a may be slightly above or slightly lower than lip 22 without departing from the principles of the invention. A fixed baffle trough 27 projects forwardly into the air passage of the lower portion of the duct 14 from the back wall 11 immediately above the trough 21 and on the approximate level of shaft 26. The trough 21, damper baffle 25 and baffle trough 27 extend the full length of the array of cooking units 10 and shelf 15. Baffle troughs 28 are mounted on removable panels 30 having handles 31. These panels are retained in place by spring catches 32, permitting each panel 30, with its integral trough 28, to be easily lifted out for cleaning purposes.

Steam pipes 35 having nozzles 36 are mounted in the lower duct portion 14, as shown in Figure 2. The numeral 37 designates a number of temperature responsive switches which may be mounted in appropriate locations in the upper and lower duct portions 12 and 14. These switches are far enough from the cooking units so that they are not affected by the heat of the various cooking operations but do respond to flame temperature in the ductwork to close electrical circuits to certain control mechanism presently to be described.

The numeral 40 generally designates a damper operating mechanism which, in the present installation, is mounted in the middle of the length of shelf 15 to oper-

4

ate the baffle damper 25 by means of a lever arm 41. In the region of arm 41 the trough 21 is shielded by a plate 42 on damper baffle 25 which meets lip 22 and closes a small portion of throat 20 when the damper is closed, as shown in Figures 3 and 5. The inner side of damper baffle 25 is equipped with a pair of gutters 43 which slope downwardly from opposite ends of the baffle damper to a narrow gap 44. Products of condensation collected by the gutters 43 drip from the ends thereof at the gap 44 immediately behind the shield plate 42 so that the draining material will drop freely into the trough 21 and not be picked up and carried upward by the relatively high velocity air stream entering the throat 20.

Baffle trough 27 slopes downwardly from both ends toward a drain aperture 45 immediately behind shield 42, as shown in Figures 3 and 6. The drainage from aperture 45 thereby drips into a shielded portion of trough 21 and is not picked up by the entering current of air. Aperture 45 is placed in the forward side wall or lip 46 of the trough, rather than in the bottom, so that it will not provide a draft opening through the baffle trough 27 when the baffle damper 25 is raised to its closed position. Baffle trough 27 is of double walled construction whereby the inside of the trough slopes as described and the outside bottom of the trough is horizontal to effect a substantially draft-tight seal with the lower edge 25a of the damper baffle when the latter is in closed position.

The baffle troughs 28 are similarly constructed, having inner bottoms 47 which slope toward the center of the ventilator as shown in Figure 4. The two troughs 28 drain into a short trough section 50 on front wall 14a having a central drain aperture 51, as shown in Figure 3. The drip from this drain thereby falls through a relatively quiescent zone immediately behind and above the shield plate 42 where the air velocity is not sufficient to pick up the drops and carry them along with the air stream. Upon removal of the panels 30 and troughs 28, there is afforded convenient access to the interior of the lower portion of the ventilator duct for wiping out the troughs 27 and 50 and the gutters 43. The vertical dimensions are exaggerated in Figure 4 to show more clearly the slopes of gutters 43 and baffle trough bottoms 47.

When the damper baffle is closed, as shown in Figure 6, a narrow strip of metal 54 is engaged by the damper baffle, as shown, to close the draft leak between shaft 26 and shelf 15. The strip 54 also forms a drip edge to prevent condensation liquids from running or creeping forward along the underside of shelf 15. When damper baffle 25 is in its open position, as shown in Figure 7, a rear edge 55 abuts the underside of shelf 15 to form a stop and also to close the draft leak between the shaft 26 and the shelf 15.

On smaller installations it is not necessary to provide two separate troughs 28 and two removable panels 30, and in such case the damper mechanism 40 may be located at one end of the shelf 15 and shaft 26 adjacent one of the end walls 23 with the troughs 27 and 28 and a single gutter 43 all sloping toward a shielded region at one end of the structure. Short trough section 50 would then be unnecessary.

Figure 8 also illustrates a grease level detector which may be provided as optional equipment, where desired. The numeral 56 designates an insulator carrying an electrode 57 in the trough 21 just below the level of its front lip 22. When condensation materials accumulate in the trough 21 to a level L closely approaching the electrode 57, the change in capacitance between the trough and electrode produces a signal in the detector apparatus 58 in Figure 10 which energizes relay solenoid 52 to close switch 53 in parallel with the circuits of thermostats 37. A preferred form of liquid level signal device is manufactured by Fielden Instrument Corporation of Philadelphia, Pennsylvania, under the trade name of "Tector," type AJ-1.

Figures 8 and 9 illustrate the construction and oper-

ation of the operating mechanism 40 for the damper baffle 25. Lever 41 projects upwardly through slots 49 in the shelf 15 and housing of the mechanism 40 for connection with a plunger 60 having a manual operating knob 61. A pin 62 in the end of plunger 60 is engaged in slot 63 in the lever 41. Plunger 60 also carries a catch plate 64 which serves as a thrust abutment for compression spring 65. The other end of spring 65 abuts against a wall 66. Spring 65 is of sufficient strength to move plunger 60 to the right and lift the damper baffle 25 to closed position, as shown in Figure 9.

Damper baffle 25 is held open in its Figure 8 position by a latch bar 67 which is pivotally mounted at 68 on a bracket on wall 66. Latch bar 67 has a sloping nose 69, causing the latch bar to be cammed upwardly by the catch plate 64 when the plunger is pushed in by the knob 61.

Latch bar 67 is raised to unlatched position by a magnetic plunger 71 in solenoid 70. A pin 72 in plunger 71 connects with a link 73 having a slot 74 receiving a pin 75 on the latch bar 67. Slot 74 provides a lost motion connection between the latch bar and solenoid plunger to enable the latter to acquire considerable upward velocity in free movement after energization of solenoid coil 70 in order to add its own momentum to the pulling force of the solenoid to overcome the friction between the latch bar and catch plate 64 in the unlatching movement. Solenoid plunger 71 also carries a striker plate 76.

The numeral 80 designates a manual trip lever of L-shape which is pivotally mounted on a pin 81 and has an inner end 82 engaging the actuating button 83 of a normally open switch 84. It will be observed in Figure 10 that the closing of switch 84 energizes solenoid coil 70 to lift the magnetic plunger 71 and release the latch bar 67. In case the solenoid 70 fails to operate, because of power failure or for some other reason, a further movement of trip lever 80 will cause the arm 82 of the trip lever to engage striker plate 76 and lift the solenoid plunger by mechanical action. A light pressure on trip lever 80 is sufficient to close switch 84 but if the solenoid does not operate a firm pressure on the trip lever is necessary to lift the latch bar 67, thereby indicating to the operator that there is a fault in the electrical system.

A fan switch 85 having an actuating button 86 is mounted immediately behind the catch plate 64. In Figure 8, actuating button 86 is depressed by catch plate 64 to hold the switch 85 in closed circuit position, but when the catch plate is released by latch bar 67, as shown in Figure 9, the actuating button 86 is extended by an internal spring (not shown) to open the switch and stop the fan 13.

Referring now to Figure 11, the steam pipes 35 are supplied from a steam line 90 through a filter 91. Steam nozzles 36 may be operated at any time by hand valve 92 for cleaning purposes, but this valve is normally closed. In case of fire in the ventilating duct, the nozzles 36 are supplied with steam by operation of solenoid valve 93. This valve is of conventional construction, having a valve member actuated by a magnetic plunger which responds to the energization of solenoid coil 95 in Figure 10.

Referring now to Figure 10, it will be observed that the switch 84 in the damper control mechanism 40 of Figures 8 and 9 is one of a plurality of manual push button switches wherein the others are designated by the numeral 96. The electrical system including these switches is energized from supply wires 100, 101. Solenoids 70 and 95 are connected between the wire 100 and a wire 102. Wire 102 may be connected with wire 101 to energize the two solenoids by means of any one of a number of different instrumentalities connected in parallel. Manual switch 84 is operated by trip lever 80 on the housing of control mechanism 40 in a conveniently accessible position to anyone working over the various cooking units. The switches 96 may be located on remote walls of the kitchen, and, if desired, one of them may be mounted outside the

kitchen. Each thermostat switch 37 comprises a tubular metal shell containing a bimetallic element which is normally in open circuit position and adapted to close a circuit when subjected to an abnormal high temperature.

The switch contacts and bimetallic element are sealed into the said metal shell so that these parts are not affected by grease and smoke in the ventilator. The shell is equipped with a screw base for convenient mounting projecting inwardly from the front duct wall 14a. The unit 58 is of conventional construction, the details of which are immaterial to the present invention. This unit and its associated grease level detector contact 57, in Figure 8, are not essential to the invention, but merely provide an additional means to compel cleaning of the grease trough receptacle 21 when an excessive amount of grease has been allowed to accumulate. Ventilator fan 13 and unit 58 are energized in a separate circuit controlled by the switch 85. As previously explained, this switch is opened by the release of latch bar 67 from catch plate 64, either by manual trip lever 80 or solenoid 70.

It will be apparent from Figure 10 that when the damper baffle 25 is closed by operation of trip lever 80 or switches 84 or 96 it may be immediately re-opened and latched open by merely pushing in knob 61. However, when it is closed by thermostats 37 or grease detector 53 it cannot be again latched open by knob 61 until the cause for its closing is removed. Main switch 103 may be opened to turn off the steam and permit re-opening of the damper baffle and so this switch is preferably remote from the kitchen and under the control of some person who is responsible for keeping the fire extinguishing system in operative condition.

Operation of Figure 1 embodiment

When the kitchen is not operating, the control mechanism 40 and damper baffle 25 are preferably left in the condition shown in Figure 9, the damper baffle being in closed position and the fan switch 85 being open. Latch bar 67, of course, does not remain in its Figure 9 position but is dropped as soon as solenoid 70 is deenergized, to be in position to engage latch plate 64 when the latter is again pushed in. It will be apparent that the closed down condition of the system is readily effected by merely touching one of the push button switches 84 or 96 or trip lever 80 to produce the same electrical and mechanical operation which is performed in case of emergency. Thus, the entire apparatus is normally tested daily to insure its operative condition at all times, and the ventilating duct is thereby closed while the kitchen is unoccupied and is maintained closed by the action of spring 65 without depending upon the electrical power supply. The spring action also insures the opening of switch 85 so that the fan 13 is not inadvertently left running.

In starting up in the morning, the knob 61 is pushed in, closing fan switch 85 and moving the damper baffle 25 to its open position shown in Figure 8. The series of baffles 25, 27 and 28 provide a tortuous passage for the air stream in the ventilating duct, requiring the air stream to make rather sharp reverse bends, wiping the walls and the baffles to extract products of condensation in the air stream, as well as a considerable amount of greasy smoke, whenever such materials may be present. The condensed grease is thereby collected in the lower part of the ventilating duct where the temperatures are low enough to promote condensation and yet high enough during operation of the cooking units to prevent congealing of the grease on such surfaces.

The grease and steam condensates, accordingly, drain down the duct walls and are collected, but not accumulated, in one or the other of the baffle troughs 27, 28. The trough shape of these baffles prevents such drainage from dripping off the edges in the high velocity air currents which would have a tendency to break up the drops and lift the resulting droplets into the upper portion of the

duct. Drainage openings 51 and 45 are located in a portion of the duct which is shielded from the high velocity air current by shield plate 42, whereby such drainage is assured of reaching the lowermost trough receptacle 21. Condensation on the underside of baffle 50 may drain down the inner surface of panel 30, drip plate 54 and damper baffle 25 to the gutters 43. The gutters 43 collect such drainage and direct it to the central slot or gap 44 behind the shield plate 42, where the condensate may drop freely into trough receptacle 21 without interference from the high velocity air current entering the ventilating duct through the throat 20. Thus, there is no drip from the lower edge 25a of damper baffle 25 except in the relatively quiescent region where the baffle is shielded by the plate 42.

The grease and steam condensates, accordingly, are sufficiently extracted in the lower portion of the ventilating duct and drain freely into the trough 21 leaving the upper and more inaccessible parts of the duct system relatively clean so that they do not require attention. The baffles 27 and 28 are easily cleaned when necessary by removing the panels 30, and the trough receptacle 21 is made entirely accessible by raising the damper baffle 25. The ease of keeping the system clean in itself effects a material reduction in the potential fire hazard.

With reference to Figure 8 it will be observed that if material should be allowed to accumulate in the trough 21 to the level L, the trough would begin to function as a trap to impede the flow of air through the ventilating duct and thus render the ventilating system substantially inoperative. Thus, the cook is compelled to clean out the trough 21 from time to time in order to maintain satisfactory ventilation in his kitchen. This type of compulsion is found to be more effective than inspection by the management or fire marshall in reducing the fire hazard at its source. The grease level detector device 57, 58 will provide an additional safeguard against excessive grease accumulation in the trough receptacle 21, if the cook is oblivious to the diminishing ventilation.

It will be appreciated that it is not necessary for the lower edge 25a of damper baffle 25 to project below the upper edge 22 of the trough because the ability of the ventilating system to remove cooking fumes from the kitchen is reduced to the point of ineffectiveness considerably before the liquid level actually reaches the lower edge of the damper baffle. Baffle 25 deflects the air stream down into the trough, causing the air from throat 20 to be drawn transversely through the trough and so the precise height of the lower edge of the baffle is important only in regard to the degree of draft obstruction that is considered necessary in a particular kitchen to compel the cook to clean the trough. The important consideration is that the damper baffle project over the grease trough 21 in such relation to the trough that an excessive depth of material in the trough will materially impede and obstruct the air flow under the lower edge of the baffle, compelling the cleaning of the trough. Preferably, also, the damper baffle has an open position which interferes to some extent with the cleaning of the trough to compel periodic operation of the damper. The trough may be arranged, however, to be wiped out without raising the damper to closed position, if desired.

When a fire occurs, either on the range top or in the trough 21, it is prevented from spreading into the duct system by the automatic operation of one of the temperature responsive elements 37 or by the manual operation of one of the switches 84, 96, if the fire is discovered before the thermostatic devices have time to function. The energization of solenoid 70 by any one of these means immediately releases the latch bar 67 allowing spring 65 to raise the damper baffle to closed position. With its air supply cut off by the prompt closing of damper 25, any incipient fire in the ventilating duct is quickly smothered and any fire in the cooking units or in trough 21 may be kept out of the ventilating duct. By the use of

steam nozzles 36, the ventilating duct and its baffles are easily cleaned by merely operating a valve, and in case of fire, the action of the steam will smother the fire more quickly than merely shutting off its supply of oxygen at the bottom of the duct.

Modifications illustrated in Figures 12 to 16

Figures 12 and 13 illustrate a ventilator embodying the principles of the invention for use on a salamander or broiler 110, capable of producing greasy fumes or smoke. The ventilating duct has an upper portion 111 equipped with the fan 13 of Figure 10. This portion of the duct includes a back wall 112 and a front wall 113 which may carry one or more of the temperature responsive switch units 37. The lower portion of the duct comprises inclined walls 114 and 115 and an inlet throat 120.

Connected with the wall 114 is a grease trough receptacle 121 having a lip 122 defining one side of the inlet throat 120. A damper baffle 125 is mounted on a shaft 126 carried by the upper wall 115 for rotation between the open position shown and a closed position. In the open position of the damper baffle, the lower edge projects substantially into the trough 121 to deflect a current of air entering the throat 120 through the bottom of the trough. In closed position the damper baffle engages one side of the trough to close the ventilating duct against the current of air. The damper baffle is operated by a lever 41a projecting upwardly through a slot 127 in the top wall 115 for actuation by the damper mechanism 40. In its open position a portion of the damper baffle closes the space between shaft 126 and the top wall 115 and in its closed position this space is closed by a resilient fin 128.

The entering air, after being deflected through trough 121 by damper baffle 125, is again intercepted by another pair of grease extracting baffles 130 mounted on the bottom wall 114. These baffles are spaced from each other and from the side walls of the duct to provide gaps 131 for the drainage of grease and other condensation materials. Steam nozzles 36 are mounted in the duct for cleaning and fire extinguishing purposes. The top wall 115 is preferably mounted on hinges 133 so that it may be lifted to provide access for wiping out the inner wall surfaces, baffles and trough 121.

Figures 14 to 16 illustrate a downdraft ventilator having the grease trap in the basement where it can readily be drained into a suitable receptacle. A hood 200 interconnects upright side walls 201 over the top of the cooking unit 10 to direct the air into the vertical duct 202. The air is drawn through grease trap 203 and duct 204 by suction fan 13. The previously described damper operating mechanism 40 is mounted on one side of the trap 203 to move the crank arm 205 on shaft 206. Directly beneath the end of vertical duct 202 is a grease trough or receptacle 221 removably secured in place by bolts and wing nuts 222 engaged with outstanding ears 223 on the receptacle. Liquid condensate materials may be drained from the receptacle by merely opening valve 224.

Damper baffle 225 is mounted on the shaft 206 and is provided with a stop 226 to hold the baffle in the desired lower or open position. Upon response of the mechanism 40 to one of the instrumentalities shown in Figure 10, the mechanism 40 is actuated to rotate shaft 206 and swing the damper baffle 225 up to its broken line position, shown at 225a, to engage and form an air seal with inwardly projecting flange plates 227. These flange plates form a small baffle at 228 to direct the downward air flow against the damper baffle 225, whereby the air stream is required to make sharp reverse bends and wipe the baffles and confining wall surfaces for the extraction of smoke and liquid condensate material, which substances will then drop into the receptacle 221. Damper baffle 225 deflects the air stream into and through the grease receptacle. If the receptacle is not emptied frequently, the grease level will rise therein until it materially restricts the air flow around the lower edge

of damper baffle 225, thereby rendering the ventilating system ineffective and requiring the grease receptacle to be emptied.

Steam nozzles 36 may be operated as in the previous embodiments for purposes of cleaning or fire extinguishing.

From the foregoing illustrations it will be apparent to persons skilled in the art that the principles of the invention may be applied to still other types of installations involving similar problems.

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 ventilating system for a cooking unit, a grease trough receptacle, an air duct communicating with and extending upwardly from said receptacle and arranged to drain liquid products of condensation into said receptacle, means for moving a current of air through said duct, a freely movable damper baffle mounted in said duct and having an open position in which the lower edge of the baffle depends substantially into said receptacle to deflect said current of air through the receptacle, said damper baffle having a closed position extending across said duct to close said duct, means to hold said damper baffle normally in said open position, and a temperature responsive element in said duct operatively connected with said damper baffle to effect the movement of the damper baffle to said closed position for closing said duct in case of fire therein.

2. In a ventilating system for a cooking unit, a grease trough receptacle, an air duct communicating with and extending upwardly from said receptacle and arranged to drain liquid products of condensation into said receptacle, a motor driven fan for moving a current of air through said duct, a freely movable damper baffle mounted in said duct and having a normally open position with a lower edge depending substantially into said receptacle to deflect said air current through the receptacle, and means responsive to the temperature of the air in said duct to deenergize the fan motor and move said damper baffle into a position to close said duct against said current of air.

3. In a ventilating system for a cooking unit, a grease trough receptacle, an air duct having a pair of opposite walls extending upwardly from said receptacle for conveying a current of air and arranged to drain liquid products of condensation from said walls into said receptacle, said receptacle being connected with one of said walls, a movable damper baffle mounted on the other of said opposite walls to depend substantially into said receptacle to deflect said current of air through said receptacle, mechanical means to move said damper baffle to a position closing said duct to prevent the movement of air there-through, and electrical means responsive to the temperature of the air in said duct to actuate said mechanical means, said mechanical means after actuation holding said damper baffle closed independently of said electrical means.

4. In a ventilating system for a cooking unit, a grease trough receptacle, an air duct communicating with and extending upwardly from said receptacle and arranged to drain liquid products of condensation into the receptacle, means for moving a current of air through said duct, a movable damper baffle mounted in said duct and having an open position with the lower edge of the baffle depending substantially into said receptacle to deflect said current of air through the receptacle, spring operated means for moving said damper baffle to a position extending across said duct to close said duct against said current of air, a closed latch for restraining the operation of said spring operated means normally holding said damper baffle in said open position, a solenoid for releasing said latch, and means responsive to the air temperature in said duct for energizing said solenoid.

5. In a ventilating system for a cooking unit, a grease

trough receptacle, an air duct communicating with and extending upwardly from said receptacle and arranged to drain liquid products of condensation into said receptacle, a fan for moving a current of air through said duct, a baffle in said duct extending partially thereacross and having a lower edge depending substantially into said receptacle to deflect said current of air through the receptacle, spring operated means for closing said duct and stopping the operation of said fan, a latch for restraining said spring operated means, a solenoid for releasing said latch, means responsive to the temperature of the air in said duct for energizing said solenoid, and a manual switch for energizing said solenoid.

6. In a ventilating system for a cooking unit, a grease trough receptacle, an air duct communicating with and extending upwardly from said receptacle and arranged to drain liquid products of condensation into said receptacle, means for moving a current of air through said duct, a freely movable damper baffle mounted in said duct and having an open position in which the lower edge of the baffle depends substantially into said receptacle to deflect said current of air through the receptacle, said damper baffle having a closed position to close said duct, a temperature responsive element in said duct and operatively connected with said damper baffle to effect the movement of said damper baffle to said closed position for closing said duct against said current of air in case of fire therein, a removable wall panel in said duct adjacent said temperature responsive element, and a baffle on said panel extending into said duct.

7. In a ventilating system for a cooking unit, a grease trough receptacle, an air duct communicating with and extending upwardly from said receptacle and arranged to drain liquid products of condensation into said receptacle, means for moving a current of air through said duct, said duct having a pair of opposite walls, a baffle in said duct on one of said walls, a movable damper baffle on the other of said walls having an open position in which the lower edge of the baffle depends substantially into said receptacle to deflect said current of air through the receptacle and around both of said baffles in reverse bends to extract solid and liquid particles from said air stream, said damper baffle having a closed position in engagement with said first baffle to close said duct, and means operable while said ventilating system is in service for moving said damper baffle from said open position to said closed position.

8. In a ventilating system for a cooking appliance, a grease trough, an inclined air duct having a bottom wall connected with said trough and sloping upwardly from the trough to drain liquid products of condensation on said bottom wall into the trough, said duct having a top wall comprising a hinged cover member, a damper baffle hingedly mounted on said cover member so that the lower edge of the damper baffle extends substantially into said trough to deflect an air current in said duct through said trough when the damper baffle is in open position, means urging said damper baffle to a closed position engaging said trough to close said air duct, a latch holding said damper baffle in said open position, and a thermostat in said duct for releasing said latch.

9. In a ventilating system for a cooking unit, a ventilating duct for conveying a current of air, said duct having a lower portion arranged to drain liquid products of condensation from more elevated portions, a grease trough receptacle connected with one side of said lower portion, a baffle mounted on an opposite side of the duct above said receptacle and having a lower edge depending substantially into said receptacle, means for shielding a portion of said baffle and receptacle from said current of air, a gutter on said baffle to collect drainage from said opposite side of the duct, means for draining said gutter into said shielded portion of said receptacle, a baffle projecting from said one side of the duct above said receptacle, said last baffle comprising a trough to collect drain-

age from said one side of the duct, and means for draining said trough into said shielded portion of said receptacle.

10. In a ventilating system for a cooking unit, a ventilating duct for conveying a current of air, said duct having a lower portion arranged to drain liquid products of condensation from more elevated portions, a grease trough receptacle connected with said lower portion and arranged to accumulate said condensation, a damper baffle mounted above said receptacle for movement between open and closed positions, said damper baffle having a lower edge depending substantially into said receptacle in open position and arranged to deflect said current of air through said receptacle, said damper baffle in closed position extending across and closing said duct against said current of air, means for holding said damper baffle in said open position, means urging said damper baffle toward said closed position, temperature responsive means in said duct operably connected with said holding means to release said damper baffle for movement from said open to said closed position, and manual release means operably connected with said holding means.

11. In a ventilating system for a cooking unit, a ventilating duct for conveying a current of air, said duct having a lower portion arranged to drain liquid products of condensation from more elevated portions, a grease trough receptacle connected with said lower portion and arranged to accumulate said condensation, a damper baffle mounted above said receptacle for movement between open and closed limit positions, said damper baffle having a lower edge depending substantially into said receptacle in open position and arranged to deflect said current of air through said receptacle, said damper baffle in closed position extending across and closing said duct against said current of air, means for holding said damper baffle in said open position, means urging said damper baffle toward said closed position, means for releasing said holding means, temperature responsive means in said duct for actuating said release means, and a liquid level detector in said receptacle for actuating said release means.

12. In a ventilating system for a cooking unit, a ventilating duct for conveying a current of air, said duct having a lower portion arranged to drain liquid products of condensation from more elevated portions, fluid nozzles in said duct, a grease trough receptacle connected with said lower portion and arranged to accumulate said condensation, a damper baffle mounted above said receptacle for movement between open and closed positions, said damper baffle having a lower edge depending substantially into said receptacle in open position and arranged to deflect said current of air through said receptacle, said damper baffle in closed position extending across and closing said duct against said current of air, means for holding said damper baffle in said open position, means urging said damper baffle toward said closed position, and means for releasing said holding means and connecting said nozzles with a supply of cleaning and fire extinguishing fluid.

13. In a ventilating system for a cooking unit, a ventilating duct for conveying a current of air, said duct having a lower portion arranged to drain liquid products of condensation from more elevated portions, fluid nozzles in said duct, a grease trough receptacle connected with said lower portion and arranged to accumulate said condensation, a damper baffle mounted above said receptacle for movement between open and closed positions, said damper baffle having a lower edge depending substantially into said receptacle in open position and arranged to deflect said current of air through said receptacle, said damper baffle in closed position extending across and closing said duct against said current of air, means for holding said damper baffle in said open position, means urging said damper baffle toward said closed position, and temperature responsive means in said duct for releasing said damper baffle to said closed position and connecting said nozzles with a supply of cleaning and fire extinguishing fluid.

14. In a ventilating system for a cooking unit, a ventilating duct for conveying a current of air, said duct having a lower portion arranged to drain liquid products of condensation from more elevated portions, a grease trough receptacle connected with said lower portion and arranged to accumulate said condensation, a damper baffle mounted above said receptacle for movement between open and closed positions, said damper baffle having a lower edge depending substantially into said receptacle in open position and arranged to deflect said current of air through said receptacle, said damper baffle in closed position extending across and closing said duct against said current of air, spring means urging said damper baffle to said closed position, a latch for holding said damper baffle in said open position, a solenoid for releasing said latch, a circuit having a switch for energizing said solenoid, and a movable trip member mounted in cooperative relation with said switch and latch, said trip member having an initial movement to close said switch and a further movement to engage and release said latch by mechanical action in case said solenoid fails to operate.

15. A safety kitchen ventilator comprising a duct for conveying a current of air, a plurality of grease extracting baffles in said duct, fluid cleaning and fire extinguishing nozzles in said duct, a thermostat in said duct, means for mounting one of said baffles for movement as a damper to close said duct against said current of air, means holding said movable baffle in open grease extracting position, means urging said baffle toward closed position, and means controlled by said thermostat for releasing said damper holding means and turning on a supply of fluid for said nozzles.

16. In a kitchen ventilator having a duct for conveying a current of air, a grease extracting baffle in said duct, means mounting said baffle for movement as a damper to a position closing said duct against said current of air, said baffle thereby having an open position and a closed position, a member connected with said damper for moving said damper between said open and closed positions, a spring urging said member toward closed damper position, a handle for moving said member to open damper position, a latch for holding said member in open damper position, a solenoid latch release mechanism, a switch for energizing said solenoid, and a movable manual trip member mounted in cooperative relation with said switch and latch release mechanism, said trip member having a first range of movement to close said switch for operating said solenoid to release said latch and a second range of movement to mechanically engage and actuate said latch release mechanism if said solenoid fails to operate.

17. In a kitchen ventilator, a vertical duct for conveying a current of air, said duct having a pair of opposite vertical walls of a horizontal width greatly exceeding the spacing of the walls, an air inlet for said duct extending substantially the width of said walls, baffles on said opposite walls projecting into the duct at different elevations to deflect said current of air in a tortuous path for extracting condensation products therefrom, each of said baffles being formed as a trough along the lower portion thereof extending substantially across the width of said walls and arranged to collect liquid condensation products from said walls without dripping from said baffles through said current of air, each of said baffle troughs being sloped longitudinally thereof to drain condensation products therefrom at a predetermined point and having a drain passage at said point, and means arranged to catch the drain from said troughs.

18. A kitchen ventilator as defined in claim 17 wherein said baffle troughs slope longitudinally thereof from both side ends of said walls toward the center of said walls to the condensation drain point, and said means to catch the drain from the troughs comprising a single receptacle within the duct which is accessible for cleaning.

19. A ventilator as defined in claim 18 including means for shielding each of said drain points at the center of said walls from said current of air whereby the drain from

13

said troughs is further protected against entrainment in said current of air.

20. A kitchen ventilator for removing grease-laden fumes and the like from cooking appliances in a kitchen comprising a ventilating duct, grease extracting baffles in said duct, means mounting one of said baffles for movement as a damper to extend across and close said duct against the passage of air therethrough, means urging said damper baffle toward said closed position, a latch for holding said damper baffle in open, grease extracting position, manual trip means outside of said duct for releasing said latch, and a manual operator outside of said duct for opening said damper after said latch has been tripped.

21. A kitchen ventilator for removing grease-laden fumes and the like from cooking appliances in a kitchen comprising a ventilating duct, grease extracting baffles in said duct, fluid cleaning and fire extinguishing nozzles in said duct, a thermostat in said duct, a damper in said duct, means urging said damper toward a closed position closing said duct against the passage of air therethrough, means holding said damper in open position to permit passage of air through the duct, and means controlled by said thermostat for releasing said damper holding means and turning on a supply of fluid for said nozzles.

22. In a kitchen ventilator having an air duct equipped with a damper, means urging said damper toward a closed position closing said duct against passage of air therethrough, a latch for holding said damper in open position to permit passage of air through the duct, a solenoid release mechanism for said latch, a switch for energizing said solenoid, a movable manual trip member mounted in cooperative relation with said switch and latch release mechanism, said trip member having a first range of movement to close said switch and energize said solenoid for

14

releasing said latch and a further range of movement to mechanically engage and actuate said latch release mechanism if said solenoid fails to operate, and a manual operator for opening said damper.

23. A kitchen ventilator for removing grease-laden fumes and the like from cooking appliances in a kitchen comprising a ventilating duct, an exhaust fan in said duct driven by an electric motor for drawing a current of air through the duct, a grease trough incorporated in one side of said duct, a grease extracting damper baffle pivotally mounted on an opposite side of said duct above said trough for movement between open and closed positions, said damper baffle having a lower edge depending substantially into said trough in open position and arranged to deflect said current of air through the trough, said damper baffle in closed position extending across and closing said duct against said current of air, means outside of said duct for opening and closing said damper baffle, and a switch actuated by movement of said damper baffle to energize said fan motor when the damper baffle is open and to deenergize said fan motor when the damper baffle is closed.

References Cited in the file of this patent

UNITED STATES PATENTS

1,926,433	Cartmell	Sept. 12, 1933
2,120,490	Drummond	June 14, 1938
2,392,038	Gaylord	Jan. 1, 1946
2,564,074	Musante	Aug. 14, 1951
2,633,929	Farr	Apr. 7, 1953
2,642,152	Dohrer	June 16, 1953

FOREIGN PATENTS

697,328	Great Britain	Sept. 23, 1953
---------	---------------	----------------