

Sept. 25, 1962

A. K. GAYLORD

3,055,285

KITCHEN VENTILATING SYSTEM

Filed Nov. 3, 1959

2 Sheets-Sheet 1

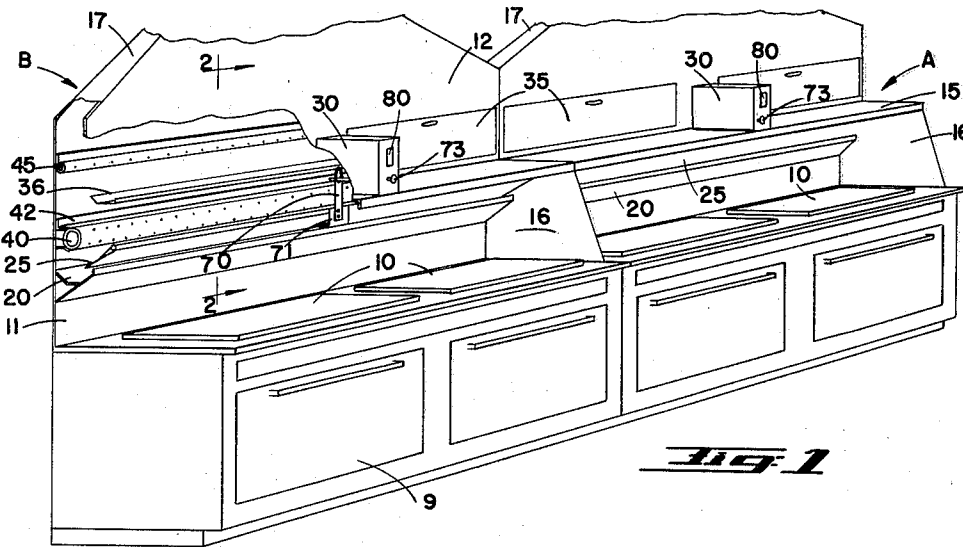


Fig. 1

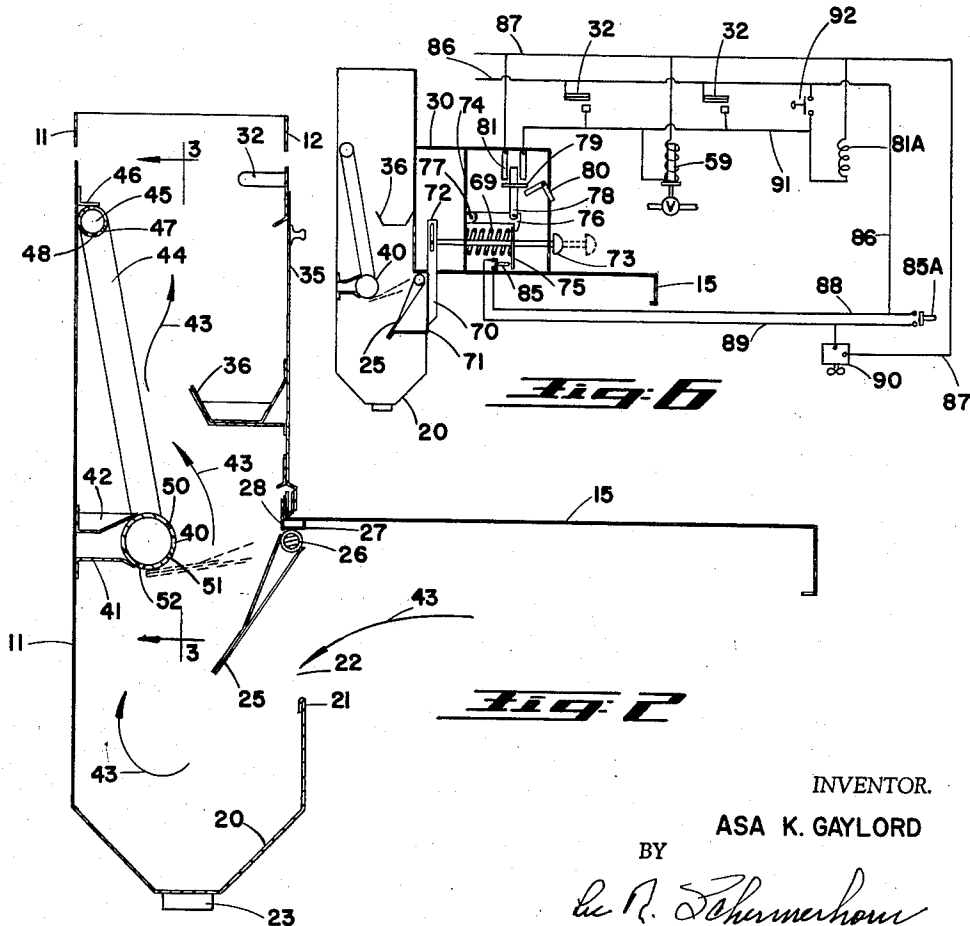


Fig. 2

INVENTOR.

ASA K. GAYLORD

BY

Ed. R. Schermerhorn
ATTORNEY

Sept. 25, 1962

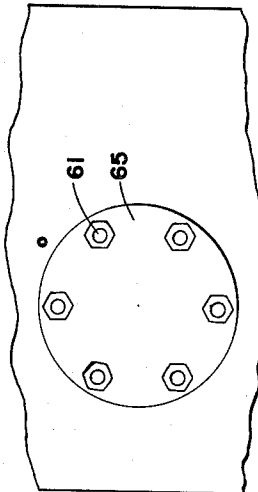
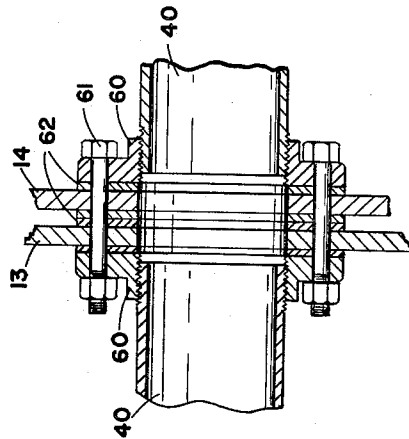
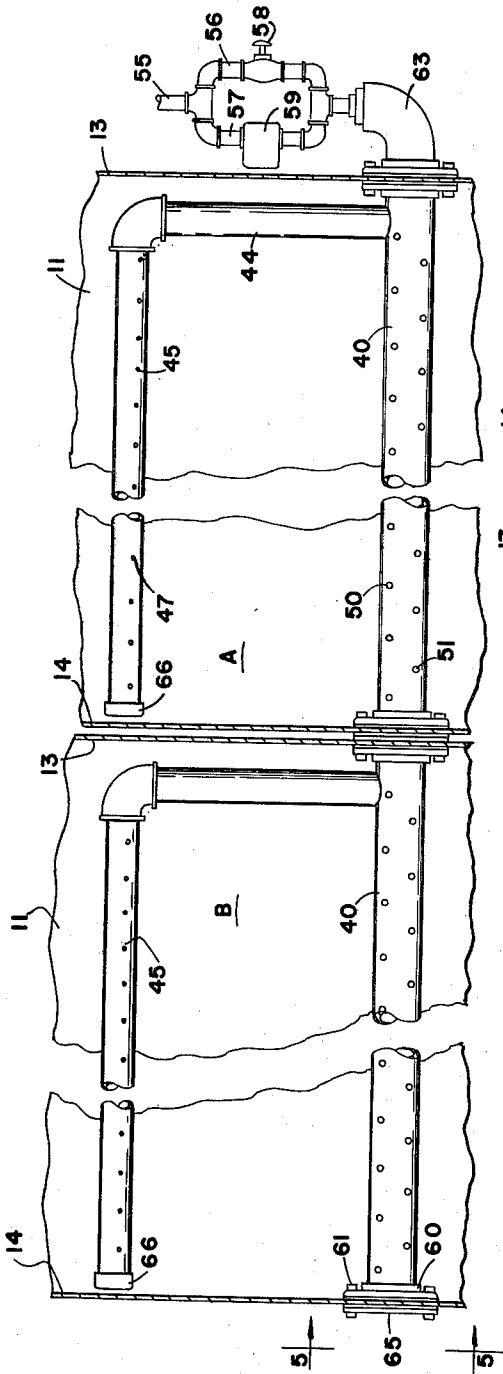
A. K. GAYLORD

3,055,285

KITCHEN VENTILATING SYSTEM

Filed Nov. 3, 1959

2 Sheets-Sheet 2



INVENTOR.

ASA K. GAYLORD

BY

Lu. P. Schermerhorn
ATTORNEY

1

3,055,285

KITCHEN VENTILATING SYSTEM

Asa Kenneth Gaylord, Portland, Oreg., assignor to Gaylord Industries, Portland, Oreg., a co-partnership
Filed Nov. 3, 1959, Ser. No. 850,698
6 Claims. (Cl. 98-115)

This invention relates to a ventilator of the type having means for removing grease particles from the vapors and fumes emitted from cooking operations in a kitchen so that such grease will not condense and accumulate in the main ventilating ducts to create a fire hazard. The invention is an improvement on the Safety Ventilator Unit disclosed and claimed in my Patent No. 2,813,477.

Said patent discloses a ventilator unit containing a plurality of grease extracting baffles in the form of troughs which are arranged to drain into a main grease collecting trough or receptacle. Associated with the grease collecting receptacle is a hinged damper baffle which also has a grease extracting function in its normal open position and which may be closed either manually or automatically by a thermostat to shut off the supply of air to the duct in the event of fire. The duct is also equipped with steam cleaning nozzles which are turned on by the action of the thermostat for fire extinguishing purposes, the thermostat at the same time shutting off the ventilating fan in the duct.

The present invention relates to improvements in the grease extracting baffles, the mounting and arrangement of the steam pipes for steam cleaning and fire extinguishing purposes and an improved form of sectional construction to facilitate connecting together a plurality of identical ventilator units so that a standard unit will serve the needs of both large and small installations.

The objects of the invention are, therefore, to provide improved grease extracting baffles in a ventilator unit of the type described, an improved arrangement and mounting of the steam pipes to utilize a steam pipe as a grease extracting baffle and to provide an improved form of sectional construction.

The invention will be better understood and the foregoing and other objects will become apparent from the following detailed description of a preferred embodiment of the invention illustrated on the accompanying drawings. Various changes may be made, however, in the construction and arrangement of parts and all such modifications within the scope of the appended claims are included in the invention.

In the drawings:

FIGURE 1 is a perspective view with parts broken away showing two units of the present ventilating system in a typical kitchen installation;

FIGURE 2 is a cross sectional view taken on the line 2-2 of FIGURE 1;

FIGURE 3 is a fragmentary view taken on the line 3-3 of FIGURE 2;

FIGURE 4 is an enlarged view in section showing how the steam pipes are connected together between adjacent units;

FIGURE 5 is an enlarged fragmentary view taken on the line 5-5 of FIGURE 3; and

FIGURE 6 is a sectional view of one ventilator unit including the damper control mechanism and a schematic wiring diagram including the electrical components of an interconnected control mechanism in a second unit.

FIGURE 1 shows a typical kitchen installation having a row of ovens 9 and fry plates or grills 10 arranged along a wall. In some kitchens these cooking units are arranged in an island at a distance from the wall. The present ventilating system is adaptable to different kitchen arrangements and also to other types of cooking units,

2

such as soup kettles, broilers and salamanders, including down draft ventilating ducts for such units disposed under the kitchen floor in place of the rising ducts shown.

The cooking units in FIGURE 1 are served by two identical ventilator units designated A and B. Each ventilator unit comprises a vertical sheet metal back wall 11 placed against or mounted on the kitchen wall, a vertical sheet metal front wall 12, a right end wall 13 and a left end wall 14 (FIGURE 3). Front wall 12 terminates in a lower edge at a distance above the cooking units where it connects with the rear edge of a forwardly extending horizontal shelf 15 which forms a hood over the cooking units. End walls 13 and 14 have forwardly extending wings 16 supporting the shelf 15 and providing vertical end walls for the hood formed by the shelf.

A lower grease trough or receptacle 20 is mounted on back wall 11 above the cooking units. The trough 20 extends the length of the ventilator unit between end walls 13 and 14 and has a forward lip 21 spaced beneath the under side of shelf 15 to form an air inlet opening 22 under the shelf. The cooking smoke and fumes are drawn into this inlet opening by a suction fan in the main ventilating duct, not shown, which has branches connecting with a tapered transition section 17 on each ventilating unit as shown in my prior patent in the case of a single ventilating unit.

The grease trough 20 is equipped with a drain outlet 23. In some installations this outlet is left open and permanently connected with a drain pipe while in others it may be equipped with a valve. In some installations the outlet 23 is capped and not used, the trough 20 being wiped out periodically by access through the inlet opening 22.

A damper baffle 25 is mounted on a horizontal shaft 26 journaled in suitable bearings on the under side of shelf 15 above the lip 21 of the trough 20. The slight gap between shaft 26 and the under side of shelf 15 is closed by a plate or strip 27 on the damper baffle when the latter is open, as shown in solid lines in FIGURE 2. Plate 27 also serves as a stop to limit the opening movement so that the lower edge of the damper baffle will repose at approximately the level of lip 21 in a position projecting substantially into the trough. Thus, if the trough should be allowed to fill with grease, the ventilation of the kitchen will be reduced sufficiently to compel emptying of the trough before a serious fire hazard is created.

When the damper baffle 25 is closed to its broken line position in FIGURE 2, it engages a seal plate 28 on the lower edge of front wall 12 to close the gap between shaft 26 and the under side of shelf 15.

Damper baffle 25 may be opened and closed manually and it may also be closed automatically in case of fire by means of control mechanisms 30 and thermostat 32 as will presently be explained with reference to FIGURE 6.

Immediately above the shelf 15 the front wall 12 is provided with clean-out openings which are normally closed by removable panels 35. Each panel 35 is equipped with a grease extracting baffle 36. Baffle 36 is preferably made in the form of a trough to catch any condensed steam or grease running down the inside of front wall 12 so that such liquid materials will not drip on damper baffle 25. The baffle troughs 36 are approximately horizontal but slope longitudinally sufficiently to drain such liquid materials into the lower trough 20. The drain point is preferably shielded from the rising air current in the duct so that the drip will not be caught in the air stream and re-deposited in the upper part of the duct work. Between the two panels 35 in each ventilating unit shown in FIGURE 1 there is a relatively quiescent zone behind control box 30 which may be utilized for such

3

drain purpose. However, the baffle troughs may drain adjacent one or both of the end walls 13, 14 if desired.

The foregoing features are all illustrated and described in detail in my prior patent in connection with a single ventilator unit. In the present construction, a main horizontal steam pipe 40 is arranged to form a stationary grease extracting baffle between the pivoted damper baffle 25 and the removable baffle trough 36. The pipe 40 is supported in part by a continuous sheet metal bracket 41 on its under side and in part by a continuous sheet metal trough 42 on its upper side, as shown in FIGURE 2. Trough 42 may be sloped and sectionalized the same as baffle trough 36 in order to drain into receptacle 20 in a region which is shielded from strong updraft. The front edges of the bracket and trough are spot welded at intervals to the pipe 40 and the rear edges are vertically flanged for connection to the back wall 11 by spot welding or other suitable means. Pipe 40 is thus projected out into the air passage to form one of three grease extracting baffles, causing the air stream carrying steam, fumes or smoke to follow a tortuous upward path around these baffles as well as damper base 25 as indicated by the arrows 43. As the air stream is deflected in opposite directions around these baffles one after another, the grease and water droplets are thrown out of the air stream by centrifugal force so that the upper part of the ventilating duct is kept relatively free of inflammable grease deposits and other condensation products.

As shown in FIGURE 3, a branch pipe 44 connects the main steam pipe 40 with a secondary horizontal steam pipe 45 above the baffle trough 36. Pipe 45 is supported on the back wall 11 by a sheet metal angle strip 46 which is spot welded to the pipe and wall. Pipe 45 is equipped with a first set of nozzle orifices 47 directed toward baffle trough 36 and a second set of nozzle orifices 48 directed toward the trough 42. Main pipe 40 is equipped with nozzle orifices 50 directed toward the under side of baffle trough 36, nozzle orifices 51 directed toward the inside of damper baffle 25 and nozzle orifices 52 directed toward the lower portion of back wall 11 and receptacle 20. Preferably, the orifices 52 are beyond the reach of damper baffle 25 so that the latter does not obstruct these orifices in its closed position, as shown in FIGURE 2.

Referring again to FIGURE 3, the main steam pipe 40 is connected with a steam supply pipe 55, although hot water or a suitable chemical cleaning fluid may be used in place of steam, if desired. In any event, the cleaning fluid selected should also be effective as a fire extinguisher since the nozzle pipes 40, 45 are utilized for fire extinguishing purposes as well as cleaning purposes. For purely fire extinguishing purposes when no cleaning function is desired, the pipe 55 may supply a suitable fire quenching gas such as carbon dioxide.

The connection between supply pipe 55 and main pipe 40 preferably has two branches 56 and 57. The branch 56 may be opened at any time by a manual valve 58 while the branch 57 is controlled by a solenoid valve 59. Solenoid valve 59 is controlled by thermostats 32 and control units 30 to turn on the fire extinguishing fluid concurrently with the automatic closing of the damper baffles 25 in the event of fire, as described hereinafter.

FIGURE 4 illustrates how the main pipes 40 are connected together between two adjacent ventilator units A and B. The adjacent pipe ends are equipped with threaded flanges 60 having holes for the bolts 61 which pass through holes in the end walls 13, 14. Annular gaskets 62 are interposed between the end walls 13 and 14 and also between each of these walls and the adjacent flange 60. When the bolts 61 are tightened, a fluid-tight connection is established through the adjoining walls whereby any number of ventilator units may be connected together. The elbow 63 is similarly connected on the supply end.

The remote end of the main pipe 40 in the last ventilator unit to be added is closed by a gasketed solid plate 65. The upper steam pipes 45 do not extend through

4

the end walls 13, 14. Each of these pipes is limited to a single ventilator unit and its remote end is closed by a cap 66.

When one of the damper baffles 25 is closed, either manually or automatically by the over-heating of a thermostat 32 in case of fire, the damper baffle swings up into contact with the lower side of pipe 40 as shown in broken lines in FIGURE 2. The inlet end of the ventilating duct is thereby effectively closed, seal plate 28 closing the gap between the damper baffle and shelf 15 and continuous bracket 41 closing the space between the pipe 40 and back wall 11. The control boxes in the several ventilating units may be interconnected by suitable wiring so that in the event of fire in one unit all the damper baffles are closed, the suction fan is shut off and fire extinguishing fluid is injected in all units.

FIGURE 6 illustrates one of the control mechanisms 30 and electrical system for controlling the damper baffles 25 in the two ventilator units A and B in FIGURE 1. The damper baffle is rotated by an upstanding arm 70 mounted on a bracket 71 on the damper baffle. Bracket 71 substantially closes the opening 22 for a distance of several inches creating a quiescent zone in the lower part of the duct which may be utilized for draining the baffle trough 36 as hereinabove mentioned. The upper end of arm 70 extends through an opening in shelf 15 and is equipped with a slot 72 engaged by a pin in the inner end of a slidable control rod 73. Control rod 73 slides in an opening in a wall 74 and is equipped with a latch collar 75. A spring 69 is compressed between wall 74 and latch collar 75 to urge the control rod and damper baffle toward closed position as shown in broken lines.

The damper baffle 25 is normally held in the open position shown in solid lines by a latch bar 76 which is pivotally mounted at 77 on wall 74. Latch bar 76 may be raised by means of a lift pin 78 to disengage its hooked end from collar 75 and release the control rod. Lift pin 78 is equipped with a collar 79 engageable by a pivotal bell crank manual release lever 80. The upper end of lift pin 78 forms a magnetic core which is movable within a normally deenergized solenoid coil 81. Thus, the lift pin 78 will raise latch bar 76 and release the damper baffle to spring closing action either in response to manual pressure applied to the exteriorly projecting portion of manual release lever 80 or in response to energization of solenoid 81. The damper baffle is opened and latched in its open position shown in solid lines by merely pushing in the projecting end of control rod 73.

It is also within the scope of the invention to provide spring lift means for latch bar 76 wherein the latch bar is held in depressed latched position against such spring tension by a solenoid so that the latch bar will automatically be raised to effect closing of the damper baffle by spring 69 in the event of electrical power failure in the control system. In such arrangement the solenoid is normally energized during use of the ventilator and is deenergized by thermostat or push button switch for closing the damper baffle.

When the damper baffle is latched open as shown in FIGURE 6, the latch collar 75 also engages and closes a spring opening type of push button switch 85. The numeral 85a designates a corresponding switch in the similar control mechanism 30 of an adjoining ventilator unit. The switches 85 and 85a are connected in parallel in one line 86 of an electric power supply having another line 87. Line 86 is connected to a common wire 88 between the two switches, and the other common wire 89 between the two switches is connected to suction fan 90 which is mounted in the main ventilating duct as hereinabove described. Thus, the opening of either one of the damper baffles 25 in the two ventilator units A and B will start the suction fan 90 by closing one of the switches 85, 85a. Fan 90 will continue to operate as long as at least one of the damper baffles is open.

The numeral 81a designates a solenoid in the other control mechanism 30 corresponding to the solenoid 81. The solenoids 81 and 81a and the solenoid winding of the solenoid valve 59 each have one terminal connected to supply line 87. The other terminal of each of these solenoids is connected to a common wire 91. Wire 91 may be connected with the other supply line 86 by the closure of either one of the normally open thermostatic switches 32 or a remote control push button switch 92. Switches 32 close automatically in response to flame temperature in the ventilator. Switch 92 is preferably mounted in the kitchen remote from the ventilator units A and B or else outside the kitchen where it would be readily accessible in case of fire in the ventilators or cooking equipment.

When common wire 91 is connected with supply line 86 by any one of the switches 32 or 92, the three solenoids are energized simultaneously to close both damper baffles and open valve 59 in FIGURE 3. Any fire in the ventilating ducts is then rapidly quenched by the release of fire extinguishing fluid from pipes 40 and 45 in each ventilator unit and the shutting off of the supply of oxygen from the kitchen to support combustion. The closing of both damper baffles 25 causes the switches 85 and 85a to open and deenergize the suction fan 90.

When it is desired to close a damper baffle 25 on a single one of the ventilator units and it is not desired to inject cleaning or fire extinguishing fluid into the ventilator, the damper baffle is closed by depressing the manual operating lever 80 of the proper control unit. This will result in closing only the damper baffle connected with that particular control mechanism without stopping suction fan 90 or opening solenoid valve 59 and without energizing the solenoids 81, 81a.

It will be apparent that the control system shown in FIGURE 6 is adapted to be expanded to include any desired number of ventilator units beyond the two shown.

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. A grease extracting baffle in the exhaust duct of a kitchen ventilator, said baffle comprising an elongated baffle plate, means on one edge of said baffle plate for mounting said plate in outstanding position on one of the inside walls of the duct, and a spray pipe having nozzle orifices at intervals therealong connected with the opposite edge of said baffle plate and forming the projecting edge of the baffle.

2. In a kitchen ventilator having an exhaust duct with staggered grease extracting baffles on its opposite walls defining a tortuous path for grease-laden air through the duct, a baffle construction comprising a trough-shaped

bracket adapted to be connected along one edge to one of said walls, and a spray pipe extending along and connected with the opposite edge of said bracket, said pipe forming the projecting edge of said baffle and having nozzle orifices at intervals therealong directed toward said baffles on the opposite wall.

3. In a kitchen ventilator, an exhaust duct section having broad back and front walls and narrow end walls, and grease extracting baffles extending across said back and front walls and projecting into the duct in staggered relation to form a tortuous path for the extraction of grease from grease-laden air flowing through the duct, at least one of said baffles comprising a trough-shaped bracket connected along one edge with one of said broad walls, and a spray pipe extending along and connected with the opposite edge of said bracket, said pipe forming the projecting edge of said baffle and having nozzle orifices at intervals therealong directed toward the baffles on the opposite wall.

4. The structure defined in claim 3, said duct section having an inlet opening in the wall opposite said one baffle, a damper baffle hinged along one edge of said opening parallel with said one baffle and having an open air deflecting position, said damper baffle having a closed position in engagement with said spray pipe closing said duct against the entrance of air.

5. A plurality of duct sections as defined in claim 3 disposed side by side, said end walls having openings in register with said pipes, flanged fittings on the ends of said pipes within said duct sections at said end walls, and bolts through said end walls of adjacent duct sections interconnecting said flanged fittings to secure said duct sections together and put said pipes into communication with each other from one duct section to the next.

6. In a kitchen ventilating system, a plurality of ventilator units, a suction fan arranged to draw air through said units, a fire extinguishing fluid system in said units, thermostats in said units, a damper in each unit, a control mechanism in each unit for closing the damper in its unit, a control system interconnecting said control mechanisms for closing all of said dampers and operating said fire extinguishing system by the actuation of any one of said thermostats, manually operable means in said control mechanisms for closing the respective dampers individually without operating said fire extinguishing system, and means for operating said fan when any damper is open and stopping said fan when all the dampers are closed.

References Cited in the file of this patent

UNITED STATES PATENTS

2,350,735	Egge	June 6, 1944
2,813,477	Gaylord	Nov. 19, 1957