RETRACTABLE VENTILATING HOOD

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This invention relates to a retractable kitchen ventilating hood, and more particularly to a hood having maximum carrying capacity while occupying a minimum volume, and at the same time being mechanically stable for substantial ease of use.

In a further aspect, the invention provides for limited ventilation in response to elevated temperatures when the system is telescoped to a closed position.

This invention involves a hood of the type generically disclosed in Patent 3,031,946 to Watt et al. The invention is directed to feature a retractable hood which will hold itself in a vertical position and provide for limited ventilation, even when retracted in response to elevated temperatures.

In ventilating kitchens and the like, it is desirable to minimize the space occupied by the ventilating system itself and at the same time to provide for optimum operation. The present invention is particularly directed to a retractable hood for use over a cooking area, mountable under a cabinet overlying the cooking area. A casing of rectangular shape includes a motor and a fan. A motor and a fan element is located in an intermediate transverse location in the drawer. A handle is provided on the front of the drawer over the perforated zone.

FIGURES 2, 3, 4, and 5 illustrate details of one embodiment of the invention. As shown in FIGURE 2, the hood 10 is comprised of an outer casing which is relatively thin-walled. The drawer 13 is mounted on six rollers, three on each side. As seen in FIGURE 2, rollers 44 and 46 are mounted on plates 45 and 47 respectively, plates 45 and 47 are positioned inside the hood in the lower right and upper right corners, respectively. The shafts on which the rollers are mounted are tilted inwardly at an angle of about 10°. The rollers engage the drawer 13 in relatively shallow grooves formed in the end member which includes a flat end plate 42. As best shown in FIGURES 3 and 4, the right side of the drawer is supported by the upper roller 46 and lower roller 47, and rollers 44 and 48 are mounted on plate 45 and are located near the front of the hood and on opposite sides of a vertical line passing through the axis of roller 46. Thus, two rollers support the bottom of the drawer and one roller serves as a guide at the top of the drawer. The same construction is present on the left side where lower roller 50 and upper roller 51 serve to operate in the upper and lower grooved or channeled portions of the end plate 53.

As best shown in FIGURE 4, the front cover plate 13 has handle 17 mounted thereon and a slot 18 extending there through. A heat-sensitive control element is mounted on a bracket behind the front panel 19 in the flow path of air which passes upwardly through the slot 18. Since the handle 17 slopes downwardly and outwardly from panel 19, it will deflect the air flowing upwardly over the face of the hood into the slot 18.

Immediately behind the front panel 19 is a filter element 23 mounted on sloping brackets. The filter element 23 extends across the width of the hood from the end panel member 24 to the end panel member 25 as seen in FIGURE 2. The drawer 13 is also provided with a second bracket 27 so that, if desired, a charcoal-activated filter may be mounted immediately behind the filter 23.

When the drawer 13 is opened, the zone 22 in the bottom of the drawer is open to receive upward flow of air which will then pass through the filter 23 (and a filter in bracket 27) as propelled by a squirrel-cage fan unit. As best shown in FIGURE 2, the fan unit 26 includes a pair of fan elements driven by a motor 28. The fan unit is mounted by brackets 29 onto the back wall of the
hood so that air will be exhausted through the rear of the hood. It is possible to remove the fan unit 26 from the rear wall and attach it to face upwardly so that the exhaust can be vertical from ports in the upper rear surface.

With the handle 17 serving as a vane or scoop, convection currents flow through opening 18 to impinge on the sensor 30. When convection currents reach a predetermined temperature a control switch will be closed to energize the coil 32. A switch unit 31 is for use in deflecting the air to the rear of the hood 10 and is adapted to cooperate with an operator 32 carried by the drawer 13. When the operator 32 engages the switch 31, the high speed circuit for the motor 25 is de-energized. When the drawer 13 is opened, the switch 31 energizes the motor 25 for high speed operation. The support system for drawer 13 provides for smooth action which is free from binding. The top and bottom panels 14 and 43 are secured to the front panel. Each side of the drawer is formed by an unbroken panel, formed from sheet metal. The upper channel 40 and the lower channel 41 are formed in the same sheet, so that the unbroken side panel presents a pleasing appearance when the drawer is open.

The rollers 44 and 46 are formed of nylon or Teflon, or similar material, and provide a substantially friction-free contact as the drawer moves in and out. In the closed position of the drawer 13 a provided with a detent. In one form the detent may be a positive latch 60. By this means, the operator 32 is maintained in contact with switch 31.

Control for a system where the drawer is latched, is shown in one form in FIGURE 5. In this circuit, alternating current is supplied from input terminals 70 to the motor 28, by way of a plunger-actuated switch 71. When the operator 32 is in contact with the unit 31, the switch 71 will be open so that the motor 25 will not be energized through the circuit including switch 71. However, the motor 25 may be energized at a low speed by way of a control unit 72 connected to terminals 70 by way of conductors 73.

A push-button 74 is provided at the front of the drawer to actuate the control unit 72 for energization of a latch release solenoid 75. When solenoid 75 is energized, the latch 60 will be lifted, permitting the drawer to open under the operation of a spring 61, shown in FIGURE 4. The temperature-sensing element 30 positioned behind the slot 18 is also connected to the control unit 72, as by way of conductors 76.

When the temperature reaches a preset level, as controlled by the unit 72, alternating current from conductors 73 will be applied, by way of channel 77, which includes a dropping resistor, to the motor 28 to operate the fan at a relatively low speed. The control unit 72 may also actuate the solenoid 75 to release the drawer when the temperature sensed by the element 30 exceeds a predetermined level. In a practical case, the level at which the motor 28 would start to operate with the drawer closed would be considerably lower than the level at which the latch 60 would release the drawer causing it to be opened for application of full voltage to the motor 28 to drive the same at high speed.

When it is desired to simplify the structure somewhat, the latch 60 and the push button 74 may be eliminated in favor of a simple gravity-controlled detent for the drawer unit 13 so that when the drawer is pushed to a closed position, the detent will produce force sufficient to actuate the push button unit 31. The drawer thus is held closed and the motor 28 is de-energized.

In accordance with a further aspect of the invention, a chemical fire extinguisher 78 is mounted inside the hood to spray the area under the hood when the temperature of the air flowing through the hood reaches a temperature substantially above that at which the latch 60 is actuated. As shown, the unit 78 is controlled by unit 72 but it may be self-controlled. The invention provides a retractable ventilating hood in which the drawer portion has unbroken side wall panels mounted on relatively friction-free support means with a vented front panel through which convection currents may pass to energize a control means for fan motor control.

It will now be recognized that simple filtering as by a filter 23 of metal foil, may be employed. The unit may also include a charcoal filter mounted in holder 27 so that the return air may flow from the fan 25 through ducts in the side panel 15. As an alternative, a direct return to flow into the room in which the hood is located. In such a case, a ductless hood would be provided and could readily be convertible from a ducted to a ductless environment at the time of installation. A telescoping duct leading from fan 25 and extending through the side panel structures would provide flow paths for the filtered air.

In supporting the drawer, it will be preferable that at least on roller at each top inside corner be provided. In some installations, it has been found desirable to install a dual roller system in both the top and bottom corners for support and control of the drawer.

Having described the invention in connection with certain specific embodiments thereof, it is to be understood that further modifications may now suggest themselves to those skilled in the art and it is intended to cover such modifications as fall within the scope of the appended claims.

What is claimed is:

1. A ventilating device which comprises:

(a) a five-sided casing having a rectangularly open front for operation above a cooking area,
(b) fan means supported in said casing for discharge of air through the rear portion of said casing,
(c) a filter drawer in said casing having a front panel with a perforate zone therein,
(d) a power control means for said fan means including a control element in said drawer adjacent to said perforate zone to drive said fan means at a low speed when the temperature of convection current flowing through said perforate zone exceeds a predetermined level, and
(e) a separate circuit responsive to the opening of said drawer to drive said fan at high speed.

2. The combination set forth in claim 1 in which the front panel of said drawer has an elongated slot extending the width of said drawer with a handle overlying said slot and forming a baffle for directing convection currents into said slot.

3. The combination set forth in claim 1 in which said drawer is normally restrained within said casing by a resilient bias member, and a temperature-sensing element in the path of convection currents flowing to said perforate zone actuates said power control means and releases said drawer when said convection currents reach a predetermined temperature.

4. The combination set forth in claim 3 in which the temperature-sensing means and said power control means are preset to release said drawer at a higher temperature than the temperature at which said fan is initially energized.

5. The combination set forth in claim 1 in which the side panels of said drawer are planar with the top and bottom edges of said panels having shallow longitudinal channels, and angularly oriented disk rollers mounted on the bottom and the top of said casing to travel in said channels for low friction movement of said drawer into and out of said casing.

6. A ventilating device which comprises:

(a) a casing of generally rectangular shape adapted to be mounted above a cooking area,
(b) a fan supported in said casing to discharge air through the rear portion of said casing,
(c) a drawer slidably mounted in said casing with a filter element at an intermediate transverse location
therein and having a front panel closing said casing with a perforate zone therein,
(d) an energizing circuit for said fan including a circuit control element adjacent said perforate zone for energizing said fan at a low level when the temperature of convection current flowing through said perforate zone exceeds a predetermined level, and
(e) means responsive to opening of said drawer to actuate said fan at a high level.

7. A kitchen ventilating hood which comprises:
(a) an elongated casing sized to fit under a kitchen cabinet with an open front and an exhaust opening in the upper rear portion thereof,
(b) a drawer sized to fit in said casing having side panels, the upper and lower edges of which have shallow longitudinal channels therein, said drawer having a perforated front panel, a closed top panel, a bottom panel open across the front portion thereof and a filter back panel,
(c) a pair of rollers mounted in each front bottom corner of said casing with the rollers of each pair spaced apart along said corners for registration in the bottom grooves in said side panels,
(d) at least one roller mounted near each upper front corner of said casing to register in the top grooves in said side panels,
(e) a heat-sensitive element mounted inside said drawer in the flow of air through said perforate zone,
(f) a fan mounted in said casing behind said drawer coupled to said exhaust opening, and
(g) means for controlling said fan in response to the output of said element.

8. The combination set forth in claim 7 in which means are provided for controlling the position of said drawer in response to said element.

9. A kitchen ventilating hood which comprises:
(a) an elongated casing sized to fit under a kitchen cabinet over a cooking area with an open front and an exhaust opening in the rear portion thereof,
(b) a filter drawer sized to fit in said casing having a perforate bottom panel, a front panel, and imperforate side panels, the upper and lower edges of the side panels having shallow longitudinal grooves therein,
(c) a pair of rollers mounted in each bottom front corner of said casing with the rollers of each pair spaced apart along said corners for registration in the bottom grooves of said side panels,
(d) at least one roller near each front upper corner of said casing to register in the top grooves of said side panels,
(e) a fan mounted in said casing behind said drawer coupled to said exhaust opening, and
(f) means for energizing said fan when said drawer is open.

10. The combination of claim 9 in which the rollers in the top corners are located at a depth position intermediate the depth positions of the rollers in the bottom corners.

11. The combination of claim 9 in which the shafts for said rollers are tilted at an angle to the plane of said bottom panel.

12. A kitchen ventilating hood which comprises:
(a) an elongated casing sized to fit under a kitchen cabinet over a cooking area with an open front and an exhaust opening in the rear portion thereof,
(b) a filter drawer sized to fit in said casing having a perforate bottom panel, a front panel, and imperforate side panels, the upper and lower edges of the side panels having shallow longitudinal grooves therein,
(c) a pair of rollers mounted in each bottom front corner of said casing with the rollers of each pair spaced apart along said corners for registration in the bottom grooves of said side panels,
(d) at least one roller near each front upper corner of said casing to register in the top grooves of said side panels,
(e) a heat-sensitive element mounted in said drawer, and
(f) a fan mounted in said casing behind said drawer coupled to said exhaust opening, and
(g) means for controlling said fan in response to the output of said element.

13. A kitchen ventilating hood which comprises:
(a) an elongated casing sized to fit under a kitchen cabinet over a cooking area with an open front and an exhaust opening in the upper rear portion thereof,
(b) a filter drawer sized to fit in said casing having a perforate bottom panel, a perforate front panel, and imperforate side panels, the upper and lower edges of the side panels having shallow longitudinal grooves therein,
(c) a pair of rollers mounted in each bottom front corner of said casing with the rollers of each pair spaced apart along said corners for registration in the top grooves of said side panels,
(d) at least one roller near each front upper corner of said casing to register in the top grooves of said side panels,
(e) a heat-sensitive element mounted in said drawer in the flow of air through perforations in said front panel,
(f) a fan mounted in said casing behind said drawer coupled to said exhaust opening, and
(g) means for controlling said fan in response to the output of said element.

14. The combination of claim 13 in which a spray unit is mounted in said drawer and is responsive to a predetermined temperature in said drawer to emit a fire depressant material.

15. A kitchen ventilating hood which comprises:
(a) an elongated casing sized to fit under a kitchen cabinet over a cooking area with an open front and an exhaust opening in the upper rear portion thereof,
(b) a filter drawer sized to fit in said casing having a perforate bottom panel, a perforate front panel, and imperforate side panels, the upper and lower edges of the side panels having shallow longitudinal grooves therein,
(c) a pair of rollers mounted in each bottom front corner of said casing with the rollers of each pair spaced apart along said corners for registration in the bottom grooves of said side panels,
(d) at least one roller near each front upper corner of said casing to register in the top grooves of said side panels,
(e) a heat-sensitive element mounted in said drawer in the flow of air through perforations in said front panel,
(f) a fan mounted in said casing behind said drawer coupled to said exhaust opening, and
(g) means for energizing said fan at a low level in response to said element reaching a first temperature and to release said detent means to energize said fan at a high level in response to said element reaching a second and higher temperature.

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