Aug. 13, 1968 AKIMA KAMIYA ET AL 3,396,651

KITCHEN VENTILATING DEVICE

Filed Jan. 20, 1967

FIG. 1

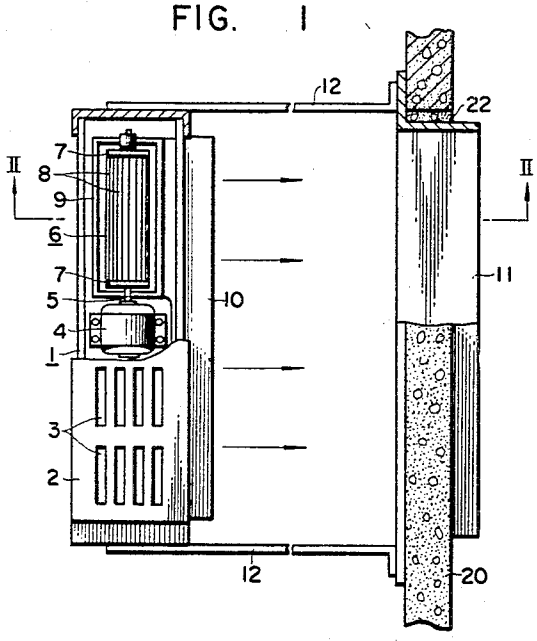


FIG. 2

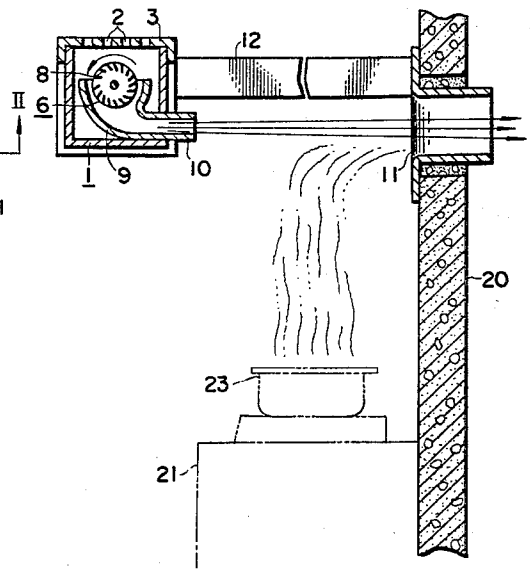
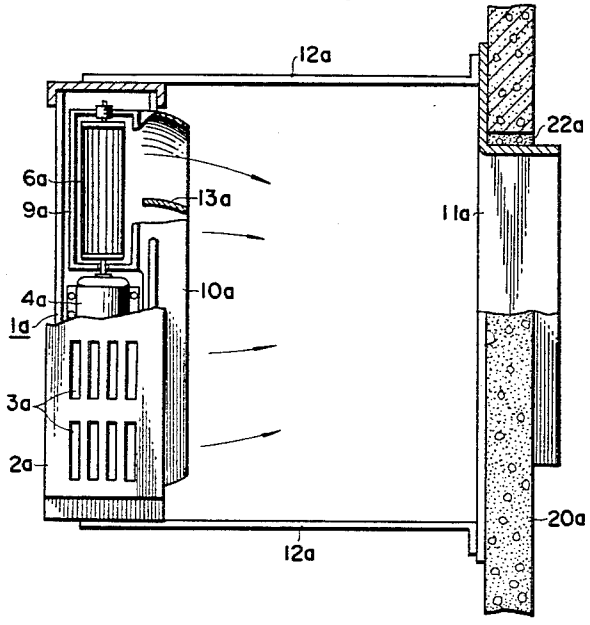


FIG. 3



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KITCHEN VENTILATING DEVICE

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2 Claims. (Cl. 98—33)

ABSTRACT OF THE DISCLOSURE

A ventilating device for use in a kitchen is disposed above a kitchen table and arranged to produce a relative wide, flat screen of air stream directed toward a vent hole on one wall of the kitchen. Steam, smoke and the like ascending during a cooking operation is entrained by the screen of air stream and is exhausted along with the air stream externally of the kitchen through the vent hole. This eliminates the necessity of providing a hood previously used for purpose of ventilation.

This invention relates to a kitchen ventilating device disposed above a kitchen table including an electric or a gas cooking-stove or stoves to exhaust steam, smoke and the like produced and ascending during a cooking operation externally of the associated kitchen.

The conventional type of kitchen ventilating devices has been required to have a hood completely enclosing a space above the associated kitchen table and therefore disadvantageous in that one is pressed to look at it and the hood partly intercepts a light emitted from a source of light located above it to darken an area near his or her hands.

It is, accordingly, the principal object of the invention to eliminate the aforesaid disadvantages.

It is another object of the invention to provide a new and improved ventilating device for use in a kitchen whereby a screen of air stream is created above the associated kitchen table and directed externally of the kitchen to entrain an ascending stream of steam, smoke, etc., produced during a cooking operation thereby to exhaust it externally of the kitchen without the necessity of utilizing a hood of the conventional construction.

According to the invention, there is provided a ventilating device for use in a kitchen comprising an exhaust pipe attachable in an opening extending through one wall of the kitchen, a casing disposed a predetermined distance from the exhaust pipe, a fan disposed within the casing, an electric motor for driving the fan to cause the latter to produce an air stream, a guide conduit operatively coupled to the fan to define a direction to flow the air stream, and an elongated blast nozzle communicating with the guide conduit and opening in the side of the casing so as to oppose directly to the exhaust pipe, the fan when driven producing a screen of air stream moving through the blast nozzle to the exhaust pipe.

Preferably, the casing may be provided on the upper surface with a plurality of suction ports.

The exhaust pipe may be advantageously smaller in width than the blast nozzle while the blast nozzle may be provided in the interior with a plurality of deflection plates widthwise disposed in spaced relationship, their end portions being curved toward the center of the exhaust pipe.

The invention will become more readily apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a plan view of a kitchen ventilating device according to the invention in a position where it has been mounted on one wall of the associated kitchen with parts broken away.

FIG. 2 is a sectional view of the device taken along the line II—II of FIG. 1 in the direction of the arrows with a portion of a cooking-stove illustrated in phantom with parts broken away; and

FIG. 3 is a view similar to FIG. 1 but illustrating a modification of the invention.

Referring now to FIGS. 1 and 2 of the drawings there is illustrated a kitchen ventilating device constructed in accordance with the principles of the invention. An arrangement illustrated comprises a casing in the form of a right prism of square cross section generally designated by the reference numeral **1**. The casing **1** is provided on the upper surface with a cover **2** having suction ports **3** formed thereon and has a small-sized electric motor **4** disposed centrally therein. The motor **4** has a length of electric cord (not shown) connected thereto and having a portion suitably pulled out from the casing for connection with an external source of either alternating or direct current as the case may be. The motor **4** has a driving shaft **5** having one end portion projecting beyond each end thereof and directly connected to one line flow fan generally designated by the reference numeral **6** and disposed in axial alignment with the motor **4** on each side and within the casing **1**. The line flow fan **6** is of the construction commonly known in the art. Briefly, the line flow fan **6** comprises a pair of end disks **7** and **7** between which a plurality of longitudinal blades **8** in the form of a rectangle are disposed at substantially equal angular intervals about the axis of the associated fan shaft into a cylindrical structure and curved radially of that axis.

The casing **1** further has a guide conduit **9** longitudinally disposed therein by screws or any other suitable means (not shown) and operatively coupled to each of the line flow fans **6**. As best shown in FIG. 2, the guide conduit **9** has an enlarged end portion enclosing substantially the lower half as viewed in the same figure of the line flow fan **6** and curved and reduced in cross sectional area toward the other end or the lefthand end as viewed in FIG. 2. The guide conduit **9** has formed integrally with the other end elongated, flat blast nozzle **10** communicating with the guide conduit and slightly projecting beyond the longitudinal side surface of the casing **1**.

With the arrangement illustrated it will be appreciated that when the motor **4** is energized that the line flow fans **6** are rotated to suck air through the suction ports **3** and to deliver an air stream of longitudinally elongated flat rectangular cross section from the blast nozzle **10**.

The present device also comprises a relatively short exhaust pipe **11** preferably of elongated rectangle cross section adapted to be mounted in a vent hole extending through one wall of the associated kitchen so as to be positioned a predetermined distance from the device and precisely from the blast nozzle **10** and in directly opposed relationship with respect to the latter with the suction ports **3** facing the ceiling of the kitchen.

In order to mount the above described device in a kitchen, that wall **20** thereof contacting a cooking-stove **21** illustrated in phantom in FIG. 2 is provided on the upper portion with a vent hole **22** complemental in shape to the exhaust pipe **11**. Then the exhaust pipe **11** is attached in the hole **22** and the device is mounted to the exhaust pipe **11** in the wall **20** through a pair of brackets **12** in such a position that the device is disposed above the cooking stove **21** while at the same time the blast nozzle **10** is aligned with the exhaust pipe **11** and spaced away from the latter by a predetermined distance. It is noted that the brackets **12** are disposed so as not to cover a space above the cooking stove **21** and between the cas-

ing **1** and the exhaust pipe **11**. It is effective and desirable that the ventilating device is located near to the cooking stove **21** and extend beyond which the device will interfere with a cook.

Under these circumstances, the motor **4** can be energized to cause the line-flow fans **6** to deliver a wide stream of air through the blast nozzle **10** in the manner as previously described. This stream of air forms an air screen substantially horizontally moving from the nozzle **10** through the exhaust pipe **11** to the exterior of the kitchen as designated by the arrows in FIGS. 1 and 2. This moving air screen can entrain an ascending air stream including steam, smoke and the like originating from a container **23** such as a pan or a pot on the cooking stove **21** during a cooking operation and exhaust it through the exhaust pipe **11** externally of the kitchen. In this case one portion of the steam and smoke may pass upwardly through the air screen. Such a portion of steam and smoke is sucked into the suction ports **3** formed on the upper surface of the casing **1** and then delivered through the blast nozzle **10** until it is exhausted externally of the kitchen.

From the foregoing it will be appreciated that the invention eliminates the necessity of disposing any conventional hood above the cooking stove. Therefore if an illuminant is disposed above the cooking stove, it can not only effectively illuminate the cooking stove without any interference but also it decreases in contamination due to steam and smoke produced during a cooking operation. Further, because of a line flow fan used, wide stream of air can be easily created.

Referring to FIG. 3 there is illustrated a modification of the invention. As shown in FIG. 3, the exhaust pipe **11***a* is shorter in width than the blast nozzle **10***a* while the blast nozzle is provided in the interior with a plurality of deflection plates **13***a* widthwise disposed in spaced relationship, their end portions being curved toward the center of the exhaust pipe **11***a* whereby an air screen delivered from the blast nozzle **10***a* is decreased in width adjacent the exhaust pipe **10***a*. With one line flow fan disposed on each side of the motor **4**, a break may occur between a pair of air screens created by both fans. The deflection plates **13***a* serve to prevent the occurrence of such a break. In the other respects the arrangement is identical to that illustrated in FIGS. 1 and 2 and the components corresponding to those shown in the previous figures are designated by the same reference numerals suffixed with the reference character *a*.

While the invention has been illustrated and described with reference to a few preferred embodiments thereof,

it is to be understood that various changes and modifications may be resorted to without departing from the spirit and scope of the invention. For example, the line flow fans **6** may be driven by the electric motor **4** through belt means. Also while the blast nozzle **10** has been described as being integral with the guide conduit **9** they may be constructed as separate units.

What we claim is.

1. A ventilating device for use in a kitchen without need of a hood comprising, a widthwise elongated exhaust duct attachable in an opening extending through one wall of the kitchen, an elongated casing disposed a predetermined distance from said exhaust pipe, a pair of spaced brackets connecting said casing to said exhaust duct, said pair of brackets being disposed to provide a space formed between said casing and said exhaust duct free of obstruction, an electric motor disposed within said casing, a line flow fan disposed within said casing driven by said electric motor, a guide conduit covering said fan to determine a direction in which said line flow fan produces an air stream, and a blast nozzle communicating with said guide conduit and opening in the longitudinal side of said casing so as to be disposed directly opposite to said exhaust duct, whereby when said line flow fan is driven, a screen in the form of a wide flat air stream is formed and moved through said blast nozzle toward said exhaust pipe and outwardly thereof.

2. A ventilating device as claimed in claim **1**, including a plurality of line flow fans, one line flow fan of said plurality is disposed on each side of said electric motor, and said blast nozzle is provided in the interior with a plurality of deflection plates widthwise disposed in spaced relationship and having end portions curved toward the center of said exhaust duct.

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