

[54] **MOLDED PLASTIC FLUE DAMPER**
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2,911,900 11/1959 Rudy..... 98/116
3,009,473 11/1961 Hennen..... 137/601
3,334,569 8/1967 Lambie..... 98/116
3,785,272 1/1974 McNabney et al. 98/86

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[51] Int. Cl. **F23I 17/02**
[58] Field of Search..... 98/79, 85, 115 K, 116; 126/285; 137/512.1, 527, 601

[56] **References Cited**
UNITED STATES PATENTS
2,668,491 2/1954 Gerlitz 98/116 X
2,854,916 10/1958 Knutson et al..... 98/116

[57] **ABSTRACT**
A flue damper is shown mounted over the vent opening of a kitchen exhaust hood to prevent back drafts. The damper is formed of molded plastic material having a central beam supporting a pivoted plate on each side thereof. The parts include snap-together hinging means for ease of assembly. The central beam is furnished with a transverse cantilever beam serving as a stop means for supporting each pivoted plate in a normal horizontal closed position.

9 Claims, 2 Drawing Figures

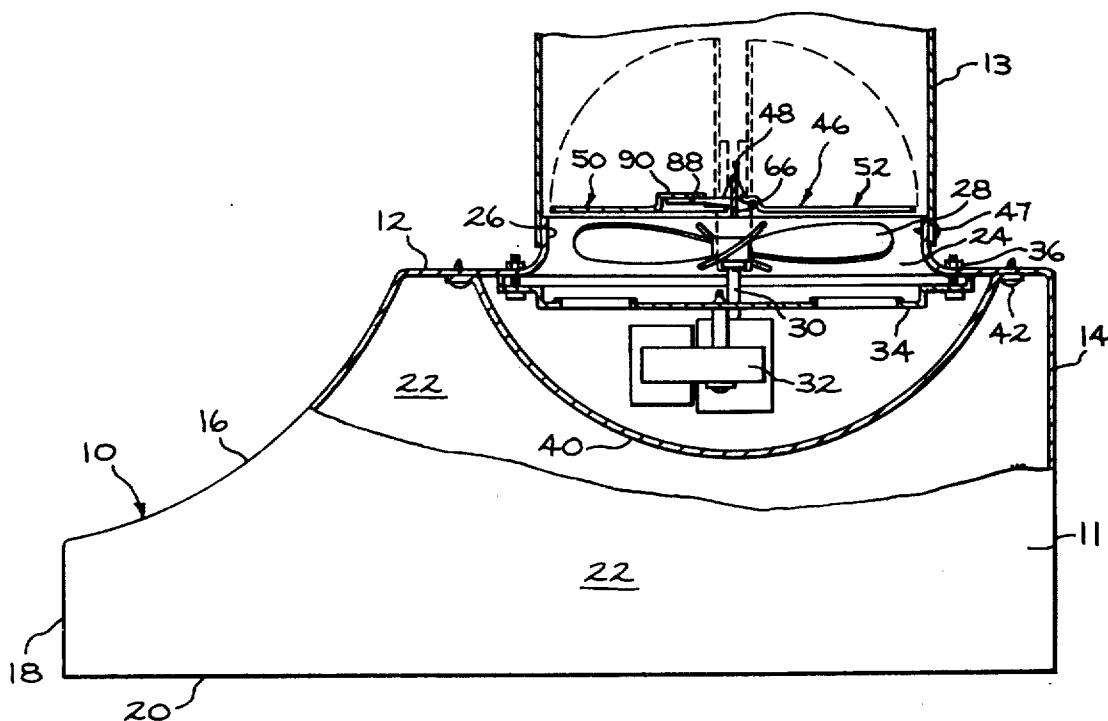


FIG. 1

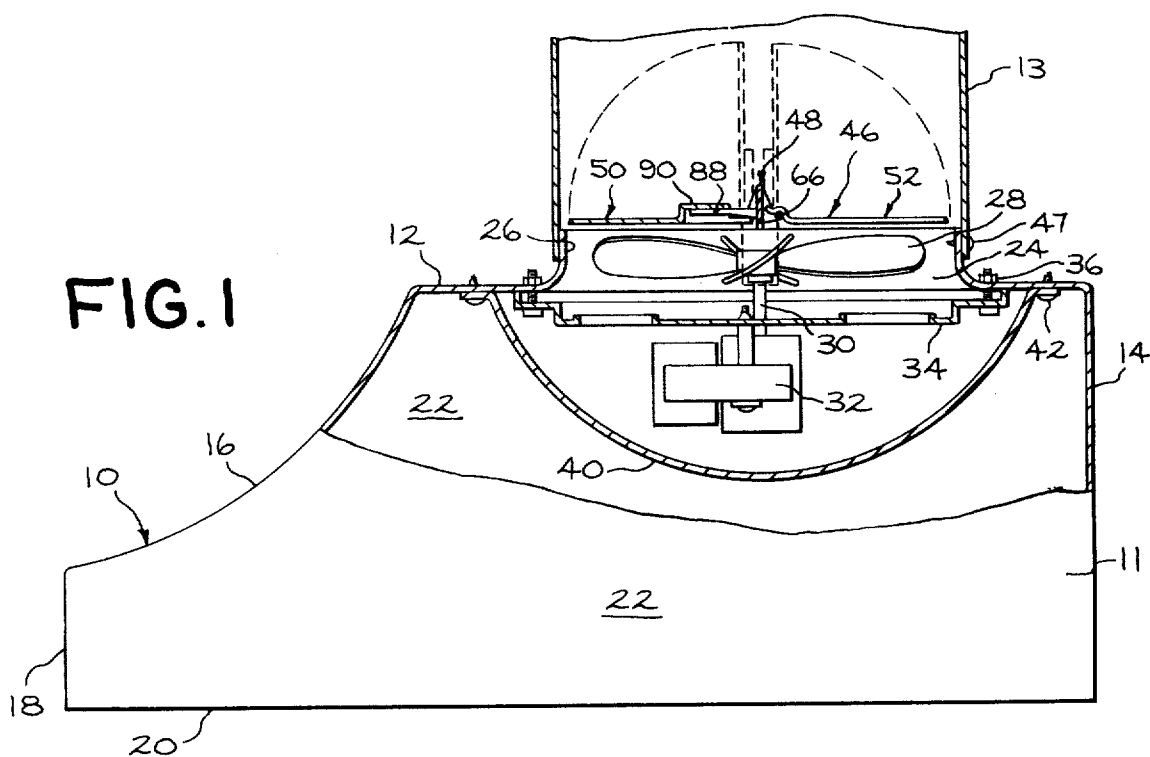
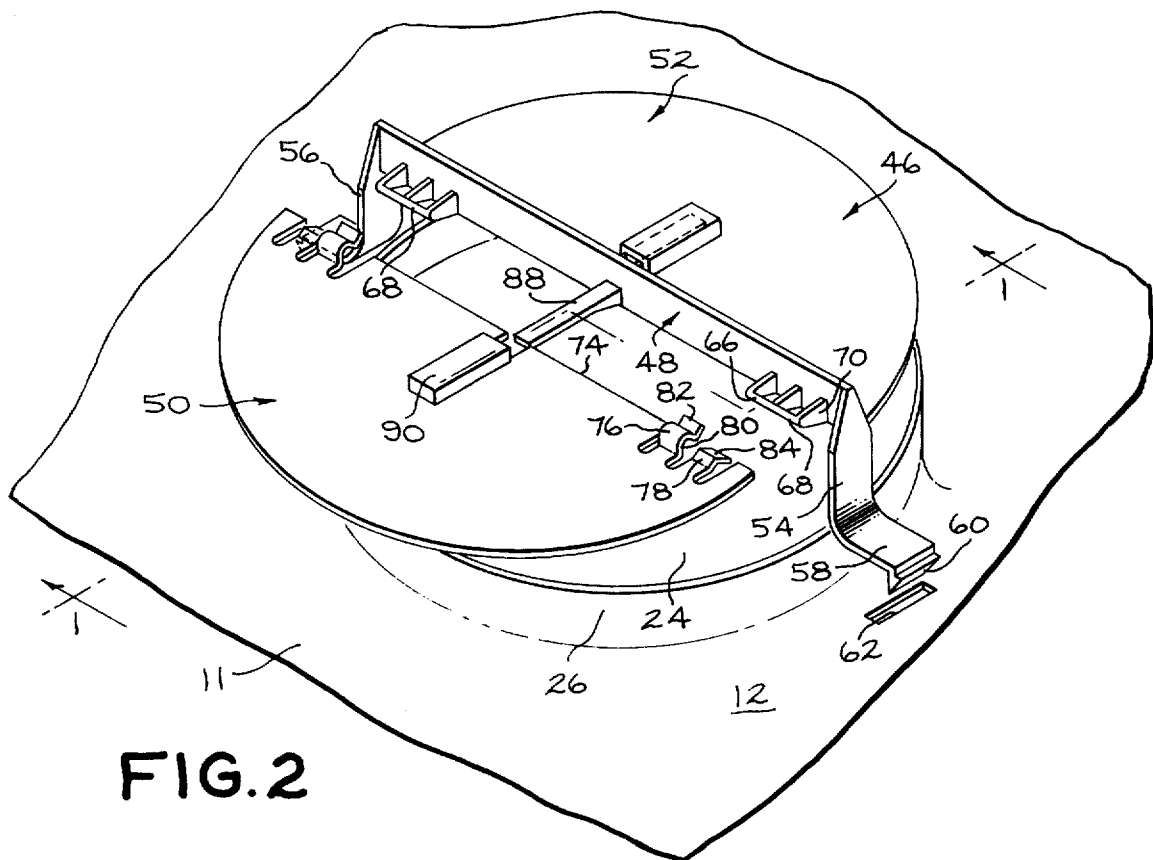


FIG. 2



MOLDED PLASTIC FLUE DAMPER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to automatic, back draft, flue dampers that are usable in ventilating systems.

2. Description of the Prior Art

Flue dampers have been widely used for many years to prevent back drafts down the flue while creating the least amount of obstruction to the free flow of air or other gas through the flue in the proper direction. Most flue dampers are made of metal having pivoted plates that are either counterbalanced or of lightweight material such as aluminum. However, they are heavy enough that they do reduce by a measurable percentage the volume of air or other gas passing through the flue. Another characteristic of metal dampers is that they tend to be noisy, especially when the damper is returned to its closed position, and this noise may be objectionable in certain environments.

In view of the increased cost of labor and materials, more attention is being focused on simplified methods of assembly, and simplified methods of mounting components by eliminating separate fastening means and hence the labor and materials required in using them.

The principal object of the present invention is to provide a flue damper fabricated of separate parts that are capable of being snapped together to form simple hinging means for the pivoted plates of the damper.

A further object of the present invention is to provide a flue damper of the class described with snap-in mounting means for the damper assembly so that no hand or power tools are necessary in order to assemble the unit together, or to mount the unit in its operative position.

A still further object of the present invention is to provide a flue damper of the class described which is substantially noiseless in operation and of such lightweight that it does not create a substantial obstruction to the free flow of air or other gas through the flue.

SUMMARY OF THE INVENTION

The present invention, in accordance with one form thereof, relates to a flue damper comprising a support beam and at least one flat plate on one side of the beam. There is a snap-together hinging means between the beam and the flat plate so that the plate may pivot between a horizontal closed position and a vertical open position. A stop means is positioned beneath the pivoted plate for supporting the plate in the generally horizontal closed position.

BRIEF DESCRIPTION OF THE DRAWINGS

This invention will be better understood from the following description taken in conjunction with the accompanying drawings, and its scope will be pointed out in the appended claims.

FIG. 1 is a right side elevational view of a kitchen exhaust hood with parts broken away at the top of the hood and others in cross-section to show a mixed flow high-pressure fan positioned in the exhaust vent of the hood, there being an automatic built-in back draft damper of the present invention positioned above the fan within the vertical flue duct that carries the exhaust air to the outside of the kitchen.

FIG. 2 is a fragmentary, partially exploded view of the flue damper of the present invention positioned

over the vent opening in the top wall of the kitchen exhaust hood showing a central support beam raised above its normal mounting position, with one pivoted plate at the right side positioned in its normal closed position and a second pivoted plate at the left side separated from the central beam to better illustrate the snap-together hinging means as well as the transverse cantilever stop means for each pivoted plate.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning now to a consideration of the drawings and in particular to FIG. 1, there is shown a kitchen exhaust hood 10 which is substantially an inverted steel shell or box-like housing 11 that is adapted to be mounted over an electric or gas range or a built-in cooktop (not shown) for collecting the smoke, grease, vapors and heat rising from the range or cooktop and filtering them out or discharging them to the outside of the kitchen. Such a hood housing 11 is shown with a top wall 12, a rear wall 14, and a downwardly sloped front wall 16 that terminates in a short vertical front wall section 18. The entire bottom 20 of the hood housing 11 is open. To complete the box-like housing 11 there are opposite side walls 22 that are generally parallel with each other and spaced apart a distance of between 30 and 36 inches.

Located in the top wall 12 of the hood housing 11 is a circular vent opening 24 that is provided with an up-turned flange or collar 26. This opening 24 is usually formed at or near the center of the hood as measured from one side to the other, although other locations could be used at the preference of the manufacturer or user. Positioned within this vent opening 24 is a mixed flow, high-pressure fan 28 that is mounted on a vertical shaft 30 of a fan motor 32. This fan motor 32 is assembled to a mounting bracket 34 which underlies the vent opening 24 and is fastened in place to the underside of the top wall 12 by means of fastening bolts 36.

Positioned beneath the fan motor 32 is a dome-shaped grease filter 40 which fits over the motor and the mounting bracket 34 and is attached to the underside of the top wall 12 by means of fastening screws 42. This grease filter 40 is of standard construction and it may be formed of a plurality of sheets of expanded aluminum which are first expanded and then crushed to form a filter medium for trapping the grease rising up from the range or cooktop located beneath the hood housing 11. The grease, vapors, smoke and heat are drawn by the fan 28 up through the hood to be discharged to the outside of the kitchen. Other filter mediums have not been shown, but it will be understood by those skilled in this art that smoke and odor filters could be installed in the hood of activated charcoal or fiber glass filtering mediums for capturing other pollutants entrapped in the air passing through the hood.

The present invention relates to a flue damper 46 that is mounted on the hood housing 11 over the vent opening 24 as is seen in FIG. 1. Rising up from the vent opening 24 is a vertical flue duct 13 which telescopes over the collar 26 and may be held in place by use of sheet metal screws 47 or as an alternative by the fact that the hood is mounted in place to the underside of wall-hung cabinets (not shown) and the flue duct is mounted independently of the hood, such that neither the hood or the flue duct 48 may move relative to the other.

The flue damper 46 may best be understood with relation to the perspective view of FIG. 2. The flue damper that is shown comprises three parts. First, a central support beam 48 and a flat plate 50 and 52 pivoted to each side of the beam. These three parts 48, 50 and 52 are preferably molded of a plastic material having a high strength to weight ratio such as polypropylene or a proprietary material available from DuPont and sold under the trade name Minlon, which is believed to be a mineral filled nylon material. Such materials should be capable of withstanding temperatures in a range between about 250°F and 300°F.

The support beam 48 is a thin elongated member which spans the vent opening 24 and has vertical strut members 54 and 56 at opposite ends which are spaced apart a distance only slightly more than the outer diameter of the collar 26 of the vent opening 24, such that the strut members extend down the sides of the collar. Each strut member has an outwardly directed foot 58 which serves as a support means for the beam 48. The outer end of each foot 58 is provided with a downwardly extending tapered spring tab 60 which is adapted to snap into a close fitting slot 62 such that tab 60 becomes captured and serves as a holding means for the support beam 48. This holding means can be overcome by applying an upward force to the beam which would cause the tab 60 to snap out of the slot 62. However, a good reliable vibration-free holding means is provided by this tab and slot arrangement of elements 60 and 62.

As mentioned previously, each plate 50 and 52 is adapted to be pivoted to one side of the support beam 48. For this purpose, a snap-together hinging means 66 is provided. This hinging means 66 includes a pivot bar 68 at each end of the support beam 48, and at each side thereof. Hence, there are four pivot bars. Each pivot bar 68 is outwardly spaced from the side of the beam and held generally parallel to the beam by a series of three side projections 70 that create a divided pivot bar 68.

Each flat plate 50 and 52 is a semi-circular member having a diagonal straight edge 74 which is provided with a pair of spring tabs 76 and 78 at each end thereof for cooperation with the divided pivot bar 68. The spring tab 76 has a raised tab having a semi-cylindrical bearing portion 80 for engaging over the top side of one half of the divided pivot bar 68. This tab 76 also has an upwardly inclined front face 82 that tends to ride on the pivot bar 68 and cause the tab 76 to spring up as the plate 50 or 52 is being fastened to the support beam 48. Cooperating with the raised tab 76 is the downwardly inclined tab 78 which has a downwardly inclined front face 84 that cooperates with the other half of the divided pivot bar 68. The distance between the lower end of the inclined face 82 of the first tab 76 and the upper end of the inclined face 84 of the second tab 78 is a distance that is less than the diameter of the pivot bar 68 such that these spring tabs must be separated slightly before the tabs will slip over the pivot bar. This creates a gripping action of the tabs 76 and 78 around the pivot bar such that the two plates 50 and 52 will not become separated inadvertently from the support beam 48.

The normal closed position of the flue damper would find the two pivoted plates 50 and 52 in a generally horizontal position as is seen in FIG. 1. A stop means 88 in the form of a transverse cantilever beam, as best seen

in FIG. 2, extends outwardly from each side of the support beam 48 to underlie each plate 50 and 52 and serve to support the plates in their horizontal position. It is realized that other stop means may be provided depending upon the particular circumstances of the design. One improvement in this invention is to place the two transverse cantilever beams 88, 88 off-center from each other so that they are not in the same transverse plane to insure that the pivoted plates 50 and 52 cannot be assembled upside down on the support beam 48. Because these pivoted plates 50 and 52 are located in a plane slightly beneath the transverse cantilever beam 88, a raised tunnel 90 is formed on each pivoted plate 50 and 52 to accommodate the transverse cantilever beam 88 as will be appreciated in the showing of FIG. 1. The illustration of the flue damper 46 in FIG. 1 is taken on line 1—1 of FIG. 2.

Not all kitchen exhaust hoods have circular vent openings such as opening 24 that was described above. Some vent openings are rectangular in shape and in such a vent the present invention would be applied by using a single rectangular shaped pivoted plate in cooperation with a molded plastic frame having a raised flange along one side of the frame. In other words, there wouldn't be a central support beam such as beam 48. Instead there would be a support beam but it would be formed by a vertical flange along one side of the frame and it would be provided with the snap-together hinging means 66 provided between one of the two plates 50 and 52 and the support beam 48. In effect, it would be substantially one half of the showing of the flue damper as illustrated in the drawings of this application.

Modifications of this invention will occur to those skilled in this art, therefore it is to be understood that this invention is not limited to the particular embodiments disclosed but that it is intended to cover all modifications which are within the true spirit and scope of this invention as claimed.

What is claimed as new and desired to be secured by Letters Patent of the U.S. is:

1. A flue damper comprising a stationary support beam and a generally flat, light-weight, hinged plate on at least one side of the beam, and a pair of spaced snap-together hinging means between the beam and the plate so that the plate may pivot freely with respect to the beam between a horizontal closed position and a vertical open position, each of said snap-together hinging means between the support beam and the hinged plate comprising a horizontal pivot bar on one member and releasible spring means on the other member for slipping around the pivot bar and forming a loose, generally frictionless, hinge connection, the beam including stop means beneath the plate for supporting the plate in a generally horizontal closed position, such that when an upward airflow is caused to bear against the underside of the hinged plate this plate will assume a generally vertical open position, and when the direction of airflow is reversed or the airflow discontinued then the hinged plate will naturally return to its normal horizontal closed position.

2. A flue damper as recited in claim 1 wherein the hinging means for the plate includes a pivot bar at each end of the support beam that is outwardly spaced from the side of the beam and generally parallel thereto, said hinging means also including spring means adjacent

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one edge of the plate at each end thereof for engaging and holding onto the pivot bar.

3. A flue damper as recited in claim 2 wherein the said stop means for the hinged plate includes a transverse cantilever beam extending outwardly from the support beam.

4. A flue damper as recited in claim 3 wherein the support beam and the hinged plate are molded of a plastic material having a high strength to weight ratio such as polypropylene, such material also being capable of withstanding temperatures between about 250°F and 300°F.

5. A flue damper as recited in claim 1 wherein the support beam has a flat plate hinged to each side of the beam, the said snap-together hinging means being substantially the same for each plate.

6. A flue damper as recited in claim 5 wherein each end of the support beam is provided with a generally vertical strut member having an outwardly directed foot with a spring means on its underside that is adapted to become engaged in a close fitting opening

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in a support plate on which the foot is braced.

7. A flue damper as recited in claim 6 wherein the hinging means for each plate includes a pivot bar at each end of the support beam that is outwardly spaced from the side of the beam and generally parallel thereto, said hinging means for each plate also including spring means adjacent one edge of the plate at each end thereof for engaging and holding onto the pivot bar.

8. A flue damper as recited in claim 7 wherein the said stop means includes a transverse cantilever beam for each plate extending outwardly from the support beam, said transverse beams being located off-center from each other so that pivoted plates may not be assembled upside down.

9. A flue damper as recited in claim 8 wherein the several parts are molded of a plastic material having a high strength to weight ratio such as polypropylene, such material also being capable of withstanding temperatures between about 250°F and 300°F.

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