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E. P. RADER

3,211,080

DRAFT CONTROL UNIT

Filed Dec. 20, 1963

2 Sheets-Sheet 1

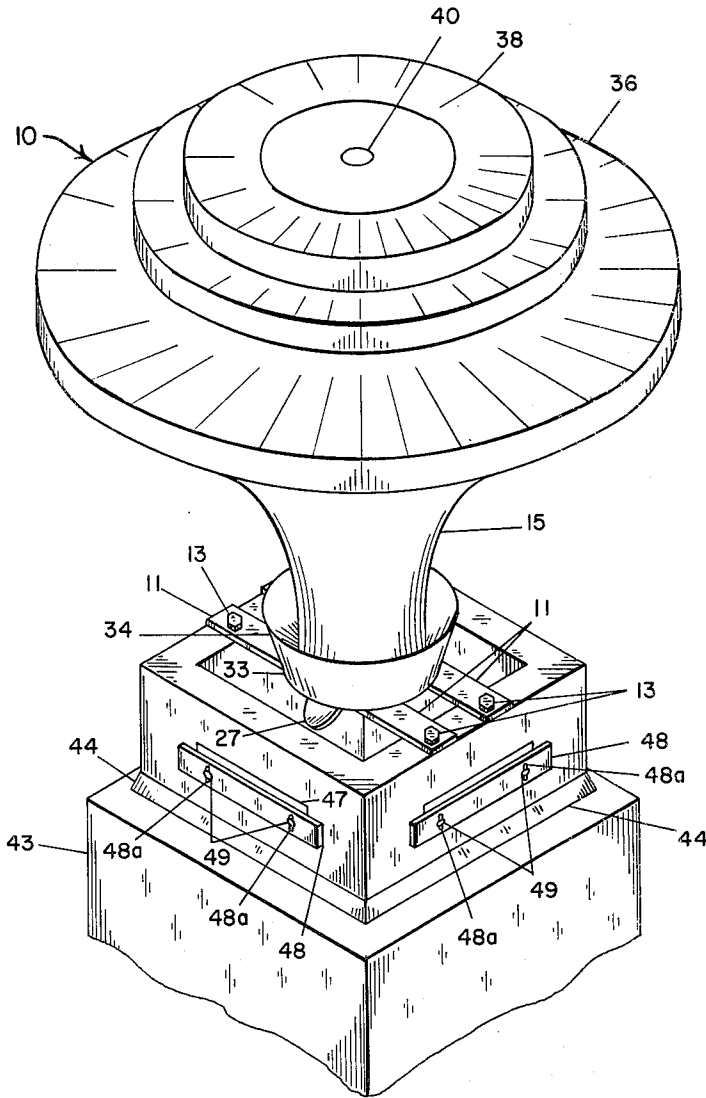


Fig. 1

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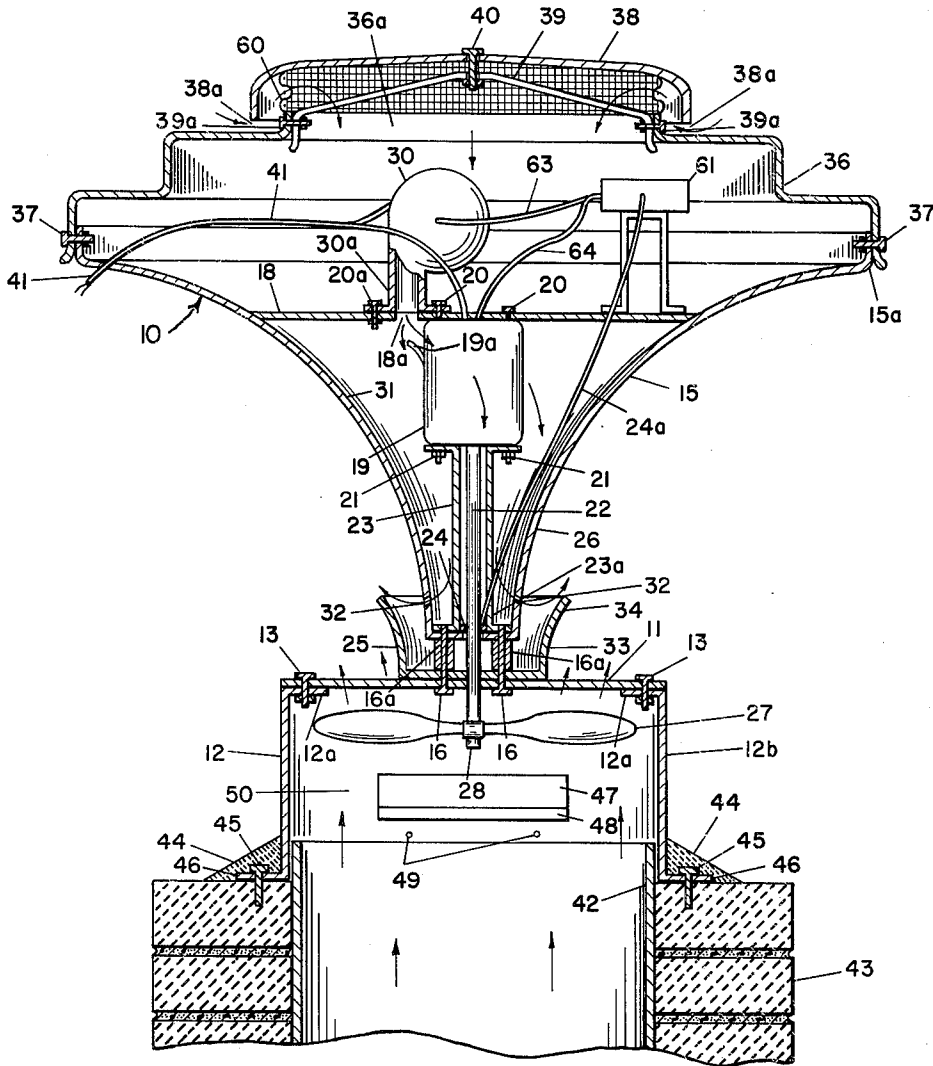
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**Fig. 2**

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**DRAFT CONTROL UNIT**

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5 Claims. (Cl. 98—72)

This invention relates to a draft control unit, and particularly to a unit that may be readily installed in either existing or new flues or chimneys.

In recent years there has been a trend toward the so-called ranch-style home having only a single story. Such homes normally have shorter chimneys than the traditional two-story home. By reason of the shorter chimneys there is less draft for the escape of smoke and air through the chimney, with the result that smoke from the fireplace or heating unit passes into rooms of the house, and other draft difficulties may occur. Such problems are particularly prevalent during times of high wind and high humidity. Similar smoke and draft problems are found in outdoor fireplaces, as well as in commercial or industrial establishments which now are often of the single-story type with relatively short chimney space. Like problems sometimes prevail even with larger buildings having relatively high chimneys.

An object of the present invention is to provide a draft control unit which is readily mounted on a chimney to provide a steady draft to the top of the chimney and which at the same time draws smoke up the chimney from the fireplace or heating unit without substantially drawing the heat from the room in which such fireplace is situated.

A further object of my invention is to provide a draft control unit for attachment to a chimney flue which will not interfere with the natural flow of smoke and air up the chimney when the unit is shut off.

Another object of my invention is to provide a draft control unit which can be readily attached to the top of the chimney for full capacity operation regardless of the size and shape of the chimney, and which can be conveniently serviced and repaired.

An additional object of my invention is to provide a draft control unit in which the motor and bearings are substantially protected from the heat flowing from the chimney and which at the same time prevents a substantial amount of rain and snow from entering the top of the chimney.

A still further object of my invention is to provide a draft control unit which is light in weight and may be portable or permanently attached to the chimney, and which also aids in keeping the chimney clean.

An added object of my invention is to provide a draft control unit which is useful for ventilation purposes.

Other and further objects and advantages of the invention will be obvious from the following description and the drawings, wherein:

FIG. 1 is a perspective view of my draft control unit secured to a chimney.

FIG. 2 is a vertical section view of the draft control unit of FIG. 1.

My draft control unit 10 has a suction fan blade 27 which draws hot air and smoke up the chimney 43 and discharges it to the atmosphere through the top of a draft control flue 12. Cold atmospheric air is simultaneously drawn into the draft control unit 10 through an opening 38a, preferably by an electrically driven squirrel cage blower 30, or other suitable blower means. As the atmospheric air passes downwardly through the draft control unit 10, it cools the electric motor 19 which drives the fan blade 27, and the bearings 24. The atmospheric air is discharged to the atmosphere through perforations 32 in the deflection cone 15.

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The draft control flue 12 may be permanently or temporarily attached to the chimney 43. For temporary attachment, the flue 12 may be placed in encircling relation over the chimney flue 42, with the flange 46 resting on the chimney 43, as shown in FIG. 2. Bolts 45 are inserted through openings in the flanges 46 and into the chimney 43, and are preferably covered with strips 44 of mortar or concrete, if the installation is to be permanent. The flue 12 has a flange 12a projecting inward at its top end 12b. A plurality of substantially horizontal support brackets 11 extend across the top end 12b of the flue 12 and are secured to the flange 12a by bolts 13 or other suitable means to leave the flue 12 substantially unrestricted. The brackets 11 support all of the elements of my draft control unit 10 located above the flue 12.

A heat resistant deflection cone 15 encloses the blower 30 and the motor 19. It preferably has an asbestos lining 31. It is mounted with its neck 26 at the bottom and its base 15a at the top. Perforations 32, through which is discharged the cold air that cools the motor 19, are located in the neck 26. Secured within the cone 15 by any suitable means is a plate 18 having an opening 18a. The motor 19 is attached to the bottom of the plate 18 by the bolts 20 and nuts 21. The blower 30 is mounted on the top of the plate 18 and forces atmospheric air downward through funnel 30a and opening 18a to the motor 19 and bearings 24. The funnel 30a and attached blower 30 may be preferably secured to the plate 18 by one of the bolts 20 and a bolt 20a.

A motor drive shaft 22 extends downwardly from the motor 19 and through a bearing shaft support 23. Both the shaft 22 and the bearing shaft support 23 extend within the neck 26 of the cone 15. The support 23 is secured to the motor 19 by the bolts 20 and the nuts 21. Bearings 24 are preferably placed near the bottom 23a of the bearing shaft support 23 to rotatably support the shaft 22. An oil well 61 may be mounted within the cone 15 to supply oil to the bearings 24 through line 24a, to the blower 30 through line 63, and to the motor 19 through line 64. When so used, the oil well 61 greatly reduces the number of times the draft control unit 10 must be opened to lubricate the bearings 24, the motor 19 and the blower 30.

The deflection cone 15, the bearing shaft support 23 and upwardly opening cup 25 having a deflector plate 33 and an upturned edge 34 are secured to each other and the brackets 11 by the bolts 16. The bolts 16 preferably are inserted into openings in the brackets 11 from the bottom of the brackets. In order, the bolts 16 extend through the brackets 11, the cup 25, the spacers 16a, the cone 15, and the bearing shaft support 23.

The deflection cone 15 has a removable hood 36 which is secured by bolts 37 to the base 15a of the cone. The opening 36a in the top of the hood 36 is spanned by a hood brace 39 which is secured to the hood by bolts 39a. A removable cap 38 is secured by a bolt 40 to the hood brace 39. If desired, a screen 60 may be positioned at the opening 38a between the hood 36 and the cap 38 by bolts 39a to filter the atmospheric air, which is drawn through the opening 38a by the blower 30 to cool the motor 19 and the bearings 24. Hood 36 and cap 38 together constitute a cover for deflection cone base 15a. If the unit is otherwise protected from the elements, the cover is not required.

Electric wires 41 extend from the motor 19 and the electrically operated blower 30 to a conventional speed control switch (not shown) used for starting or stopping motor 19. The switch may have any convenient location. Such a switch may be operated manually, or it may be wired to the heating unit to turn on automatically when

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the heating unit is in operation and to shut off when the heating unit stops its operation.

Flue 12 preferably has a plurality of cold air inlets 47 each having intake adjusting plates 48 to reduce the temperature of the hot air rising from flue 42 before the air reaches the fan blade 27 and the deflection cone 15. Only one such inlet 47 is shown in FIG. 2. The intake adjusting plates 48 have vertical elongated slots 48a which permit them to slide upward and downward on bolts 49 to adjust the amount of cold air required in air mixing chamber 50. While the cold air inlets 47 may be omitted, I have found that such air-cooling is an important feature of my invention, especially for permanent installations. The introduction of the cool air through the inlets 47 helps to prevent overheating of the fan blade 27, the bearings 24, the deflection cone 15, the cup 25 and other parts of my device. The resulting longer life for the parts means decreased maintenance and repair costs.

Examples of typical uses of my draft control unit 10 are the prevention of smoke inside the premises when a fire is started in a fireplace, the creation of a better draft when lighting a fire in a picnic fireplace outdoors, and the production of a proper draft for a heating plan when certain climatic conditions, such as high humidity or high winds exist. As previously stated, the motor 19 and the blower 30 may be wired directly to the heating unit of a building whereby it may be started automatically to provide a better draft when the heating unit is in operation, as when a coal stoker or burner is actuated.

When the motor 19 of my draft control unit 10 is in operation, the suction fan blade 27 rotates on motor shaft 22 and draws hot air and smoke up the flue 12 of the chimney 43. The fan blade 27 also draws cool air into flue 12 through the cold air inlets 47. The cool air mixes with the rising hot air in air mixing chamber 50 before the rising air comes in contact with fan blade 27 and deflection cone 15. At the same time the blower 30 draws cool air through the opening 38a into the draft control unit 10. That cool air travels through the funnel 30a and the opening 18a to the motor 19, where it cools the motor. Baffles 19a may be attached to the motor 19 to direct the cool air inside the motor casing, thereby aiding the cooling of the motor.

Such cool air is also blown to neck 26 of the deflection cone 15 to cool the bearings 24. It then leaves the cone 15 through the perforations 32. As the air passes through the perforations 32, it is deflected upwardly by the cup 25. It therefore does not interfere with the discharge of the hot air and smoke rising through the flue 12.

As the base 15a of the deflection cone 15 may extend beyond the periphery of the chimney flue, a substantial amount of rain, snow and other objects are prevented from falling into the chimney flue. In warm weather my device may help to ventilate the building by circulation of the air.

When the draft control unit is in operation, the fireplace damper may be regulated as to be almost closed. The draft control unit then draws the smoke upward through the chimney flue 42 without substantial removal of heat from the room where the fireplace is located.

Because of the open area between the flue 12 and the deflection cone 15, there is no interference with the natural draft up the chimney flue 42 when my unit is shut off. A spark screen may be placed over the upper opening of flue 12 or the chimney flue 42 to catch any sparks that may be drawn up the chimney flue. The upward suction of air developed by my unit aids in keeping the chimney flue 42 clean of soot and dirt. Also, since my unit is mounted on top of the chimney flue 42, it is easy to make repairs to or adjustments of my draft control unit, particularly in view of the readily movable hood 36 and cap 38.

It will be understood that my invention is not to be limited to the specific embodiment hereinabove described, but includes all changes and modifications coming within the scope of the following claims. For example, because

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fan blade 27 is not within chimney flue 42, the size and capacity of the fan blade is not limited to the size of the chimney flue 42. The lower portion of the flue 12 may be varied to fit the size and particular shape of the chimney flue 42, and the portion of the flue 12 in which the fan blade 27 is housed may be enlarged to provide room for a fan blade 27 longer than the narrowest measurements of the chimney flue 42, thereby providing substantially greater suction capacity than if the fan blade were situated within, say, a rectangular chimney flue 42 in which the short dimensions are relatively narrow.

I claim:

1. A draft control unit with a flue comprising, a deflection cone having a neck, a base and a base cover having an air passage therethrough, a plate secured to and within said cone, a motor secured to said plate, said deflection cone having at least one perforation in its neck, a bearing shaft support and bearing carried by said motor, a motor shaft extending from said motor through said bearing shaft support and bearing and through the neck of said deflection cone, a suction fan blade secured to said motor shaft exteriorly of the deflection cone, brackets for attachment of said deflection cone to the flue whereby said suction fan blade is situated within the flue, means for actuating said motor, and blower means for introducing air into said cone through the air passage in the base cover to cool said motor and for exhausting said air to the atmosphere through said perforation.

2. A draft control unit with a flue comprising, a deflection cone having a neck, a base and a base cover having an air inlet, a plate secured to and within said cone, a motor within said cone secured to said plate, a motor shaft extending from said motor through the neck of said deflection cone, a suction fan blade secured to said motor shaft exteriorly of the deflection cone, means for attaching said deflection cone to the flue whereby said suction fan blade is situated within the flue with a substantially unrestricted passageway between the deflection cone and the flue to permit the free upward and outward flow of air therethrough, said passageway being below said motor, means for actuating said motor, and independent blower means secured to said plate for drawing atmospheric air into said cone through said inlet and onto said motor.

3. The draft control unit as specified in claim 1 wherein the perforation in the neck of said cone is below said motor.

4. A draft control unit with a flue comprising, a deflection cone having a neck, a base, and a base cover having an air passage therethrough, a plate secured to and within said cone, a motor secured to said plate, a bearing shaft support and bearing carried by said motor, a motor shaft extending from said motor through said bearing shaft support and bearing and through the neck of said deflection cone, a suction fan blade secured to said motor shaft exteriorly of the deflection cone, brackets for attachment of said deflection cone to the flue whereby said suction fan blade is situated within the flue, said deflection cone having at least one perforation in its neck below said motor and adjacent said bearing, means for actuating said motor, and blower means for introducing air into said cone through the air passage in the base cover to cool said motor and said bearing and for exhausting said air to the atmosphere through said perforation.

5. A draft control unit with a flue comprising, a deflection cone having a neck, a base, and a base cover having an air inlet, a plate secured to and within said cone, a motor secured to said plate, a motor shaft extending from said motor through the neck of said deflection cone, a suction fan blade secured to said motor shaft exteriorly of the deflection cone, means for attaching said deflection cone to the flue whereby said suction fan blade is situated within the flue with a substantially unrestricted passageway between the deflection cone and the flue to permit the free upward flow of air therethrough, said deflection

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cone having a plurality of outlet perforations in its neck, means for actuating said motor, blower means for introducing cooling air into said cone through the air inlet in the base cover to cool said motor and for exhausting said cooling air to the atmosphere through said outlet perforations, and an upwardly opening deflection cup mounted exteriorly of said cone adjacent said outlet perforations, said deflection cup forming with the neck of said cone a second passageway independent of said first passageway for channeling the exhausted cooling air upwardly exteriorly of the deflection cone.

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