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L. J. JENN
ROOF EXHAUSTER

2,774,293

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FIG. 1

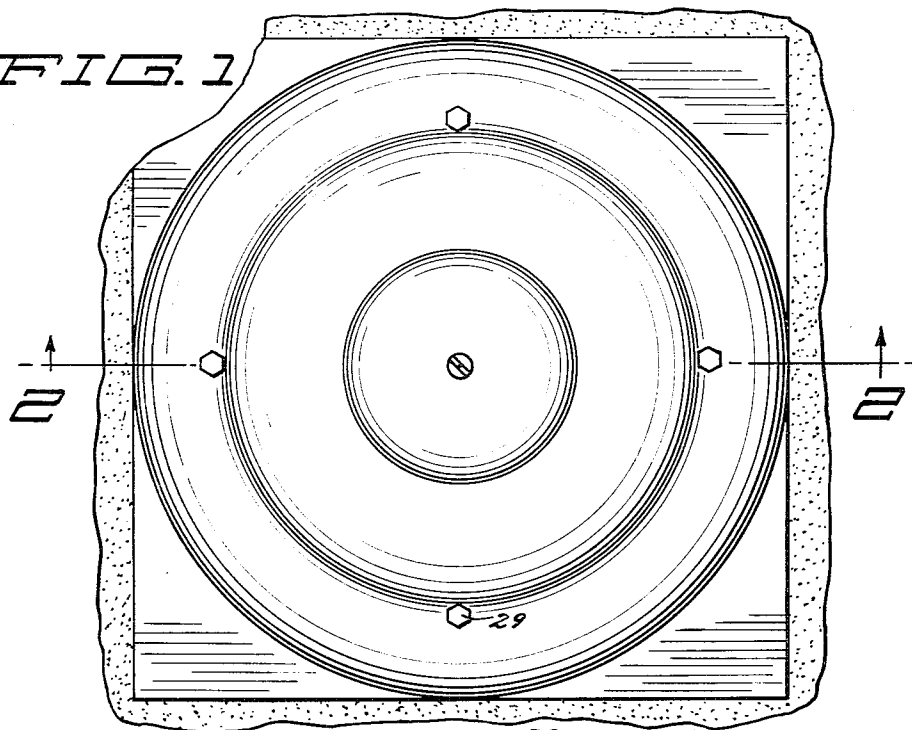
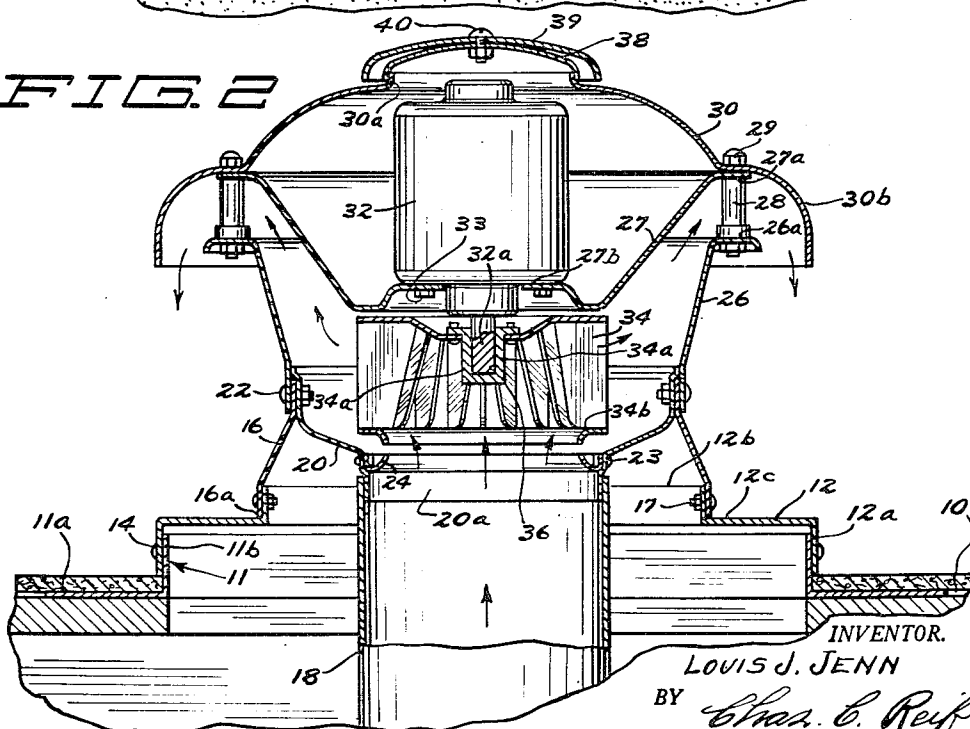


FIG. 2



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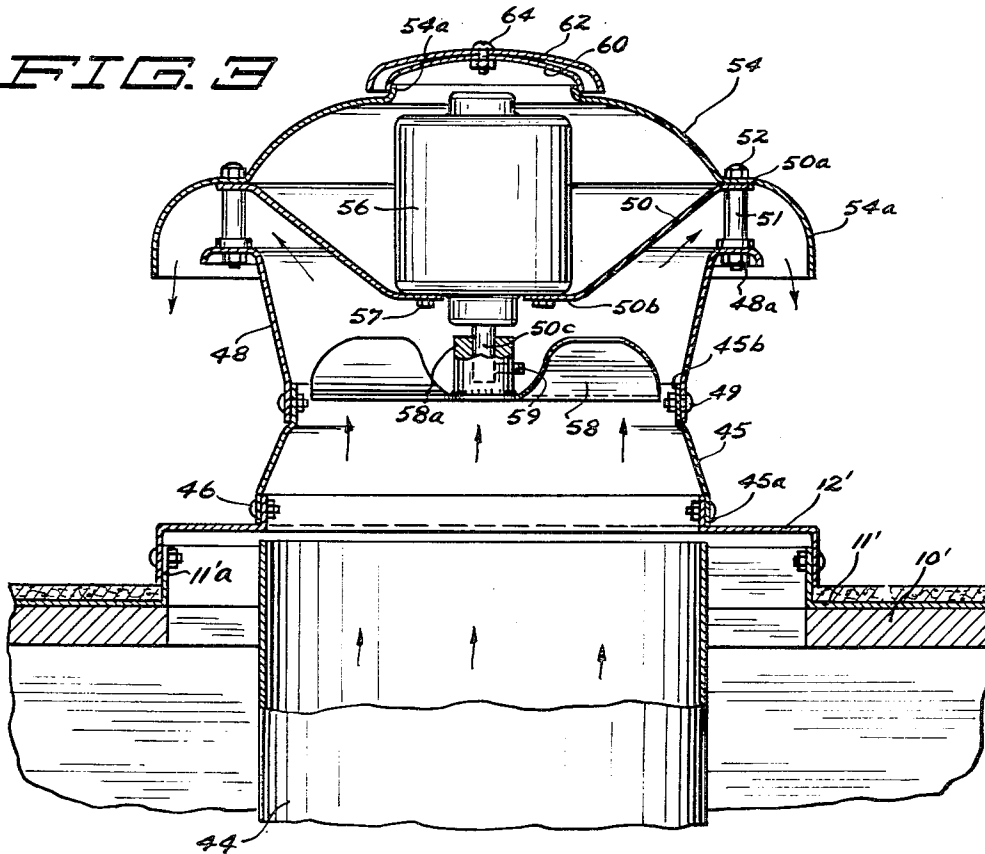
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FIG. 3



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ROOF EXHAUSTER

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8 Claims. (Cl. 98—43)

This invention relates to a ventilating device and particularly to a device supported on or adjacent the roof of a building for moving air outwardly and upwardly from the inside of the building through said roof. Such ventilating devices are commonly called roof exhausters.

The trend in modern commercial and institutional buildings is toward low rambling one story structures. Many school buildings are now designed without parapets. This type of building makes any superstructures on the roof, such as roof-mounted ventilators very conspicuous and they can spoil the pleasing or clean cut appearance striven for and intended by the architect. There is a problem therefore in keeping the design of such roof exhausters low enough to overcome the above mentioned effect. In many areas of this country the winter snows pile up to a considerable depth on the building roofs. It is therefore necessary to mount said roof exhausters on curbs of sufficient height so that the point of discharge from the same is above the snow level.

It is an object of this invention to provide a roof exhauster having a discharge outlet which is located very close to the top of the unit itself.

It is a further object of this invention to provide a roof exhauster having a motor therein, a fan connected to and driven by said motor, said motor and fan being disposed at a point as low as possible. With such a structure the air discharged is directed up and around said motor to as high a point as possible.

It is also an object of this invention to provide such a device as set forth in the preceding paragraph, together with means for directing the discharged air downwardly toward the roof.

It is still another object of the invention to provide such a roof exhauster as above set forth and one with which a centrifugal fan or a fan having an axial type of blade can interchangeably be used therewith.

It is more specifically an object of this invention to provide a roof exhauster having a supporting bracket at its lower end adapted to be secured to the roof or to a curb secured to the roof and extending upwardly therefrom, a conduit extending from inside of the building through the roof, an annular member communicating at its lower end with said conduit and extending upwardly and outwardly therefrom, a second annular member supported by said bracket and extending upwardly, a third annular member spaced vertically above said second annular member and forming therewith a passage for air, a motor supported within said third annular member and having its lower end substantially at the bottom of said third annular member, said motor having a downwardly directed driveshaft and a fan secured to said driveshaft having its lower side closely adjacent said conduit and disposed within said first and second annular members.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to similar parts throughout the several views and in which:

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Fig. 1 is a top plan view of the device of this invention, a small portion thereof being broken away;

Fig. 2 is a central vertical section taken substantially on line 2—2 of Fig. 1, as indicated by the arrows; and

Fig. 3 is a view similar to Fig. 2 showing a modification.

Referring to Figs. 1 and 2, the roof 10 of a building is shown. A member 11 has a horizontal peripheral flange 11a disposed in said roof and the same has an upstanding cylindrical portion 11b. A curb or bracket 12 has a depending cylindrical portion 12a fitting about portion 11b and secured thereto by circumferentially spaced bolts or rivets 14. Member 12 has an upstanding cylindrical portion 12b of smaller diameter than portion 12a and secured to the latter by a horizontal portion 12c. A bracket 16 is provided and secured to member 12. While said bracket 16 could be variously supported, in the embodiment of the invention illustrated, it is shown as secured to the curb 12 and for this purpose the same has a depending cylindrical flange 16a fitting about portion 12b. Portions 16a and 12b are connected by circumferentially spaced bolts or rivets 17. A conduit 18 extends from inside of the building through the roof 10. While conduit 18 could be variously supported, in the embodiment of the invention illustrated it is shown as fitting over a flange 20a of annular member 20 to which it will be connected in any suitable manner, as by rivets or welding. Member 20 extends outwardly and upwardly and has a substantially cylindrical upper portion connected to the upper end of bracket 16 by circumferentially spaced bolts or rivets 22. A ring 24 having a vertically disposed outer flange and an upwardly and inwardly extending inner flange is connected to portion 20a substantially at the upper end of the latter by circumferentially spaced bolts or rivets 23. Said bolts or rivets extend through the vertical flange of ring 24. It will be seen that conduit 18 thus communicates with the lower end of annular member 20. A second annular member 26 is provided, the same having a depending flange surrounding the upper end of annular member 16. Annular member 16 at said upper end is disposed between the upper end portion of member 20 and the lower portion of annular member 26, and said three members are connected as shown by the bolts or rivets 22. Annular member 26 at its upper end has an outwardly extending horizontal portion 26a having an outer depending edge portion. A third annular member 27 is provided, the same extending upwardly and outwardly and having a substantially horizontal portion 27a at its outer edge. Portion 27a rests upon a number of circumferentially spaced sleeves 28 through which pass headed and nutted bolts 29, said bolts at their lower ends passing through portion 26a beneath which the nuts on said bolts are disposed. Bolts 29 also pass through a cover member 30 to be later described. Member 26 thus constitutes a bracket supporting sleeves 28 and members 27 and 30. Member 27 at its lower portion extends inwardly and horizontally for a short distance and then extends upwardly and inwardly for a short distance, the same terminating in a horizontal annular flange 27a. A motor 32 is secured to the flange 27a by the bolts 33, said motor having a hub extending downwardly through the opening in flange 27a and having a downwardly extending driveshaft 32a projecting below said hub. A fan 34 of the centrifugal type has a hub 34a which is secured to driveshaft 32a in any suitable manner, as by the key 36. Fan 34 at its lower end has a ring-like portion 34b having an inwardly and downwardly extending portion which is in substantially vertical alignment with the inner flange of ring 24.

The cover member 30 extends upwardly and inwardly to form a dome-like portion and at its upper end has an

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upwardly curved annular flange 30a. A cover member 38 of inverted dish-like form has a depending flange at its outer side secured in any suitable manner to flange 30a; as by welding. A top cover member 39, also of inverted dish-like form, extends over member 38, the same extending outwardly some distance beyond member 38 and being secured thereto by the headed and nutted bolt 40 disposed centrally of members 38 and 39. It will be seen that the conduit 18, ring 24, annular member 20, fan 34 and motor 32 are in substantially axial alignment. A means for directing the discharged air downwardly toward the roof 10 is shown as 30b, and in the embodiment of the invention illustrated, the same is formed integrally with the cover 30. While the members 11, 12, 16, 20, 26, 27, 30, 38 and 39 could be variously formed of different materials, in the embodiment of the invention shown they are conveniently formed of sheet metal.

In operation, motor 30 will be driven and this will rotate fan 34. Fan 34 will direct air outwardly and this air as indicated by the arrows in Fig. 2 will pass upwardly in the passage formed between members 26 and 27. This air will move to the upper end of said passage and will then be deflected downwardly toward roof 10, as indicated by the arrows. The air will thus be drawn up through conduit 18 to and through the fan and will be forced from the inside of the building to the outer side thereof. It will be seen that the discharge outlet is located very close to the top of the device. This is accomplished by dropping the motor 32 and the directly connected fan 34 to as low a point as possible in the unit. The air discharged is thus directed upwardly and around the motor to as high a point as possible and then moved outwardly and directed downwardly toward the roof. The cover 30 which deflects the air downwardly also makes a weatherproof and windproof structure.

In Fig. 3 a slightly modified structure is shown. The roof 10' is shown and a member 11' similar to member 11 is shown. A curb 12' substantially identical with member 12 is shown. A conduit 44 is shown which extends from within the building upwardly through the roof 10'. Member 11' has a horizontal flange similar to flange 11a and has an upwardly extending cylindrical portion 11'a similar to flange 11b. Casing 12' has the vertically extending upper and lower flanges similar to flanges 12a and the upper vertical flange on member 12.

A member 45 illustrated as an annular member has a lower cylindrical flange 45a extending about the upper vertical flange of member 12' and the same is secured to said latter flange by circumferentially spaced bolts or rivets 46. Member 45 extends upwardly and inwardly and has at its upper end a vertically extending cylindrical flange 45b. Another member 48 is provided having a lower cylindrical flange fitting about flange 45b and being connected thereto by circumferentially spaced bolts 49. Member 48 extends upwardly and outwardly and at its upper end has a horizontally extending flange portion 48a, the outer edge portion of which is curved downwardly. A third annular portion 50 is provided, the same extending upwardly and outwardly from its inner portion and having a horizontal flange 50a at its upper outer end. Said flange 50a rests upon a number of circumferentially spaced sleeves 51 which rest at their lower ends upon the top of flange 48a. Headed and nutted bolts 52 extend through the sleeves 51 and through flanges 50a and 48a, the nuts thereon being disposed below flange 48a. Bolts 52 also extend through a cover member 54 to be later described. Member 50 at its lower inner portion is provided with an annular horizontal flange 50b. A motor 56 rests upon flange 50b and is secured thereto by circumferentially spaced bolts 57. Motor 56 has a hub extending through the opening in flange 50b and has a driveshaft 50c extending downwardly from said hub. A fan 58 of the axial type blade

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form has a hub 58a secured to shaft 50c in any suitable manner, as by the set screw 59. Fan 58 is shown as disposed within the lower portion of member 48.

Cover member 54 extends upwardly and inwardly in dome-like form and has a central upturned annular flange 54a at its upper end. A cover member 60 of inverted dish-like form has an outer depending flange secured in any suitable manner, as by welding, to the flange 54a. An outer cover 62 also of inverted dish-like form is disposed over cover member 60 and its outer downwardly curved portion extends some distance outwardly from member 60. Member 62 is secured to member 60 by a central headed and nutted bolt 64. It will be seen that members 50 and 48 form a passage therebetween and means for directing the air from said passage downwardly is provided. In the embodiment of the invention illustrated, said means 54a is formed integral with member 54.

In operation, motor 56 will be driven and this will rotate fan 58. Fan 58 will direct the air outwardly and upwardly as indicated by the arrows and said air will be drawn upwardly through conduit 44, through the fan, and will be directed upwardly through the passage between the members 48 and 50. It will then be deflected downwardly toward the roof 10' by the outwardly and downwardly curb portion 54a.

It will be seen that the type of fan shown in Fig. 3 could also be used in the structure shown in Figs. 1 and 2. The type of fan shown in Fig. 2 could also be readily used in the structure shown in Fig. 3. In certain installations the type of fan shown in Fig. 3 will move up to double the amount of air moved by the type of fan shown in Fig. 2, such as when used without duct work or another low static pressure application.

From the above description it will be seen that I have provided a roof exhauster particularly adapted to be mounted on one story structures. The height of the unit has been kept to a minimum and the motor and fan dropped to a very low point. The discharged air as stated passes upwardly around the motor and is then directed downwardly toward the roof. A very low and compact structure is thus produced. In many applications the use of the curb 12 or 12' is unnecessary and members 16 and 45 can be connected directly to the top of the roofs 10 or 10'. Attention is called to the fact that the motor 46 extends somewhat upwardly of the point of air discharge.

The device has been amply demonstrated in actual use and is now being commercially manufactured.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which, generally stated, consists in a device capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. In a roof exhauster adapted to be supported by the roof of a building or a curb extending upwardly from said roof having, in combination, an annular member extending upwardly and outwardly, a conduit connected to the lower end of said annular member and extending downwardly into said building means for supporting said annular member from said roof or curb, a second annular member extending upwardly and outwardly from said first mentioned annular member and supported thereby, a third annular member spaced from said second annular member supported therefrom, extending downwardly therein and forming therewith an upwardly extending passage for air from said conduit said third annular member having a bottom with an opening therein, a motor supported on said bottom and closing the same, said motor having a depending driveshaft and a fan disposed above said conduit and secured to said shaft for forcing air upwardly through said passage.

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2. In a roof exhauster structure comprising a member supported on said roof and a conduit extending downwardly through said roof, the combination of a bracket secured at its lower end to said member and extending upwardly therefrom, an annular member secured at its upper end to said bracket and extending downwardly and inwardly, secured to and in alinement with said conduit, a second annular member secured at its lower end to the upper end of said bracket and extending upwardly therefrom, a third annular member supported at its upper end by the upper end of said second annular member and extending downwardly and inwardly so as to be spaced inwardly therefrom and forming an annular passage therewith, a motor supported by said third annular member and disposed largely therein and a fan above said conduit driven by said motor and disposed partially within said second annular member and directing air upwardly through said conduit and annular passage.

3. The structure set forth in claim 2, said fan, motor, conduit and third annular member being substantially coaxial.

4. The structure set forth in claim 2, and a member having a flange extending outwardly and downwardly from the upper end of said third annular member at the upper end of said passage for deflecting air from said passage downwardly.

5. In a roof exhauster structure having a member secured to a roof having a vertical opening extending through said roof and a conduit extending vertically and alined with said opening, the combination of a bracket secured to said member and extending upwardly therefrom, a second member secured at its lower end to said conduit and secured at its upper end to said bracket, said second member being annular in form, an annular member secured at its lower end to the upper end of said second member and extending upwardly and outwardly, a second annular member having sides extending upwardly and outwardly, spaced from and partially within the sides of said first mentioned annular member and forming therewith an annular passage through which air from said conduit is directed, said second annular member supported by said first annular member and having a bottom portion, a motor supported on said bottom portion and disposed largely within said second annular member, a fan disposed below and driven by said motor and disposed above said conduit, and a cover above said motor and extending outwardly to the upper end of said second annular member.

6. A roof exhauster to be supported by a roof having in combination, a member secured to a roof having an attachment portion, a bracket secured at its lower end to said portion and extending upwardly and inwardly therefrom, a conduit extending upwardly through said roof, an annular member secured to the upper end portion of said conduit and extending outwardly and upwardly from said conduit and secured at its upper end portion to the upper end portion of said bracket, a second

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member of inverted frusto-conical form secured at its lower end to the upper end of said annular member and extending upwardly and outwardly therefrom, a second annular member of inverted frusto-conical form thus having upwardly and outwardly flaring sides spaced from the sides of said second member to form a passage through which air from said conduit passes, means for supporting said second annular member, said second annular member having a horizontal bottom portion, a motor supported upon said portion, a fan disposed below said motor and driven thereby to draw air upwardly through said conduit and passage, means at the upper end of said passage for directing air passing therethrough downwardly and a cover for said motor.

7. In a roof exhauster structure including a member supported on said roof and a conduit extending vertically through said roof, the combination of a second member secured to said conduit and extending upwardly and outwardly therefrom, an annular member extending upwardly from said second member and secured thereto at its lower end, a third member of inverted frusto-conical form supported by said annular member and disposed largely therein, the sides thereof forming an annular passage for the passage of air from said conduit, said third member having a bottom portion, a motor supported on said bottom portion and substantially closing the same, a fan below said motor above said conduit and driven thereby for drawing air upwardly through said conduit and annular passage, said annular passage being open to the atmosphere at its upper end.

8. A roof exhauster adapted to be supported by a roof having in combination, a member having an upstanding annular portion, an upwardly extending conduit secured to the lower end of said member, upper and lower spaced members forming an upwardly and outwardly extending annular passage therebetween for receiving air from said conduit, said lower spaced member being supported on said upstanding portion of said member, means for supporting said upper member on said lower member, said upper member having a bottom portion, a motor supported on said bottom portion, a fan disposed below and driven by said motor and being disposed above said conduit, a member forming a cover for said motor overlying said upper spaced member and being secured thereto, and means for directing air from said passage downwardly.

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