Nov. 15, 1932. W. SHURTLEFF 1,887,737

AIR FILTER FOR HEATING AND VENTILATING UNITS

Filed April 16, 1925 2 Sheets-Sheet 1

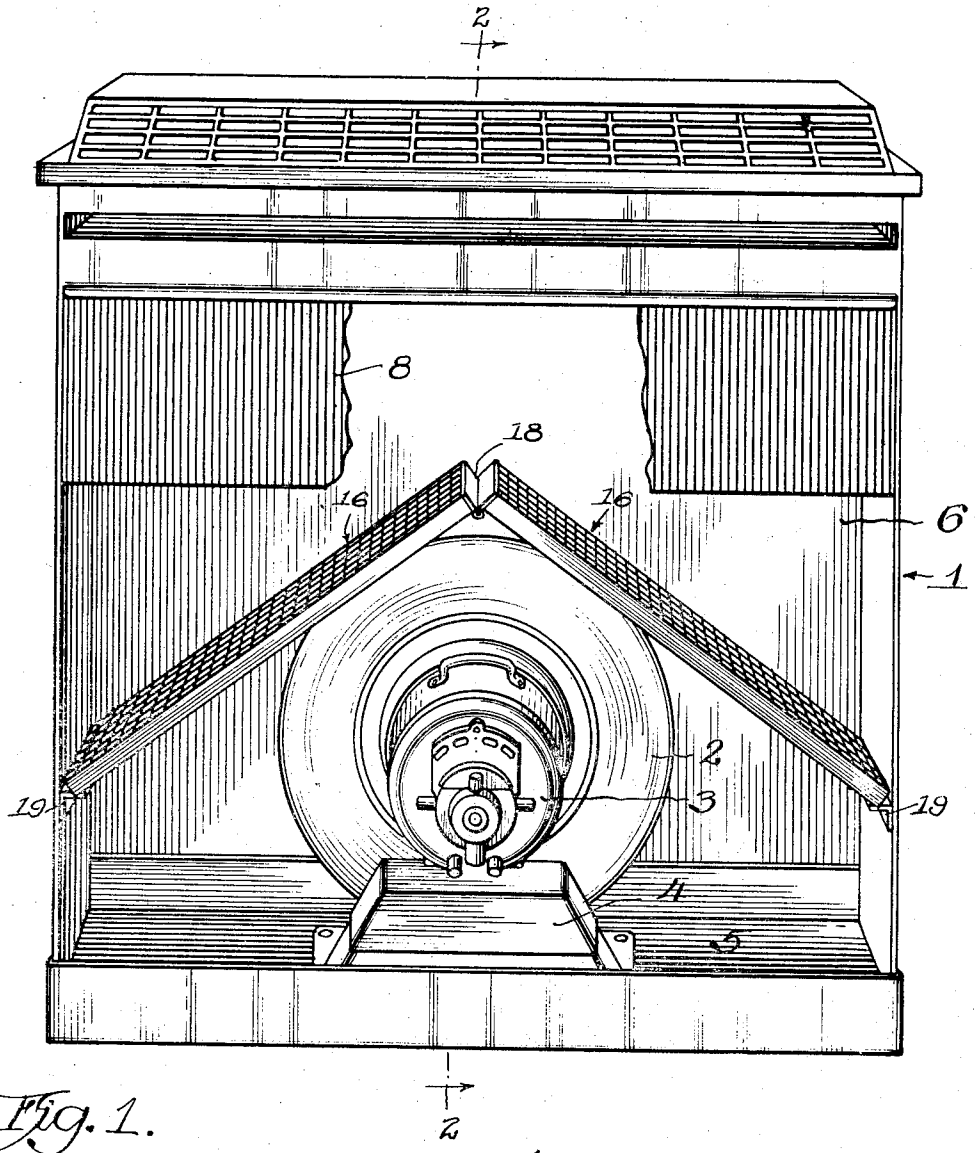


Fig. 1.

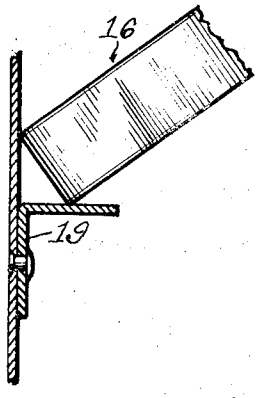


Fig. 4.

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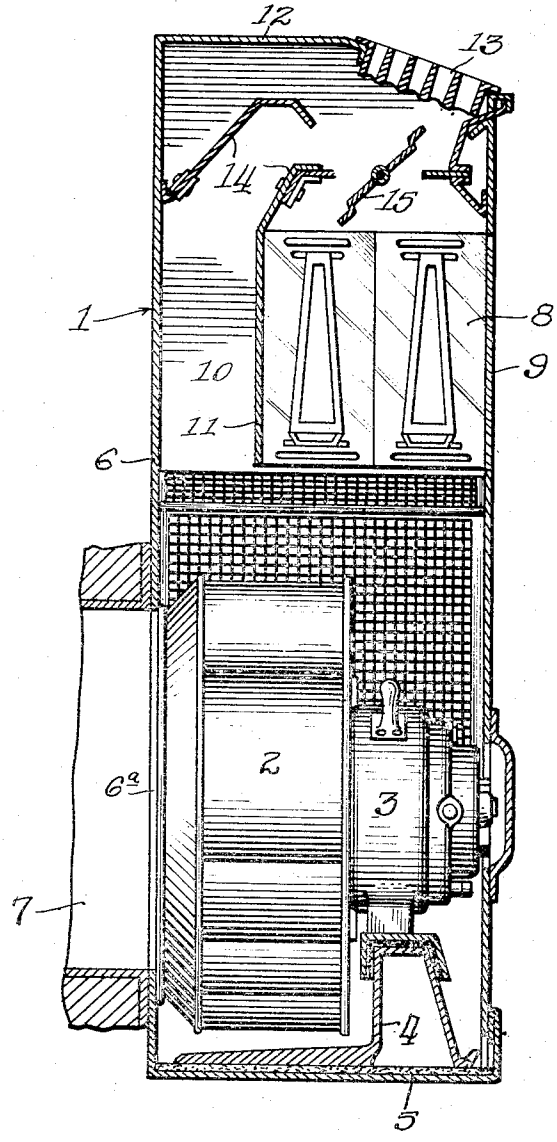


Fig. 2.

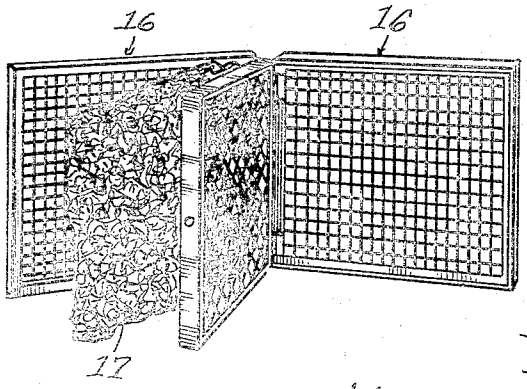


Fig. 3.

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Patented Nov. 15, 1932

1,887,737

UNITED STATES PATENT OFFICE

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AIR FILTER FOR HEATING AND VENTILATING UNITS

Application filed April 16, 1925. Serial No. 23,523. REISSUED

This invention relates to improvements in air filters for heating and ventilating apparatus, and more particularly to devices of the character described adapted to be supported within such units for removing dust and other impurities from the air drawn into the apparatus from the outside atmosphere, and discharged into the room in which the same is located.

The object of the invention is to provide an improved construction for filtering devices for the purpose described whereby an increased filtering surface is obtained and by a novel method for supporting the same within the housing of the apparatus to provide a simple and inexpensive arrangement which is readily accessible for removal and renovation of the filtering material. The ventilating and heating apparatus of a typical design illustrated in the accompanying drawings, discloses a preferred embodiment of the invention.

Referring to the drawings,

Figure 1 is a front view of the apparatus with the front wall removed.

Figure 2 is a view of the apparatus in vertical section, taken on line 2—2 of Figure 1.

Figure 3 is a perspective view of the filtering device removed, and

Figure 4 is a detail view of the filter support.

The apparatus in which the filtering device is located consists in general of an upright cabinet or housing, adapted to rest upon the floor of the room, and against the outer wall thereof. In the lower part of the cabinet is a propeller fan 2, directly connected with a motor 3, mounted on a base 4, resting on the bottom wall 5, of the cabinet. The fan faces toward the rear wall 6 of the cabinet, with its intake side registering with a circular opening 6^a therein which in turn registers with a horizontal duct 7 through the wall of the building and communicating with the outside atmosphere.

Above the fan is a radiator 8 extending horizontally the length of the cabinet along the front wall 9 thereof. Between the radiator and the rear wall 6 is a vertical passage 10 with a vertical baffle plate 11 adjacent the radiator. Above the radiator and extending along the forward edge of the top wall 12 is a discharge outlet in the form of a grille 13 slightly inclined to the horizontal so as to direct the air outwardly as well as vertically. Suitable baffle plates 14—14 and a damper 15 regulate the passage of air upwardly from the fan, provision being thus made for the passage of all of the air through the radiator, or part through the radiator and part through the passage 11, for the purpose of regulating the temperature of the air delivered into the room.

Referring now to the filtering device, the same consists of two hinged together sections 16—16 extending lengthwise of the cabinet, between the fan and the radiator, and arching over the fan. Each section 16 is a flat rectangular frame of a suitable construction, being preferably of metal with the top and bottom walls of woven wire or a coarse mesh.

As clearly shown in Figure 3, each section is made in two parts, which normally fit together, but are separable so that the layer or blanket 17 of filtering material may be removed for the purpose of cleaning or replacement. The frame sections 16—16 are hinged together at their ends, as at 18, so that they may be folded together for convenience in removing the same from the cabinet. In operative position the sections are self-supporting, that is, they form an arch with their opposite ends supported against the opposite end walls of the cabinet with their hinge edges being located just above the fan and just below the radiator. Narrow ledges 19—19 consisting of lengths of angle iron riveted to the end walls of the cabinet about midway the height of the fan, support the ends of the sections. In this way the sections support themselves at an obtuse angle to each other against the end walls. Manifestly the position of the filtering member is such that all of the air drawn into the cabinet and propelled upwardly by the fan must pass through the filter before passing through the radiator or passage 10, and thence delivered into the room.

The front wall 9 of the cabinet is ordinarily removable to permit access to the fan and

motor, and hence the filtering member can be readily withdrawn, when it is necessary to clean the filtering material, the hinged sections making it a simple matter to accomplish. Furthermore, the two hinged sections make it possible to arch the frames over the fan, not only affording a convenient and simple method of supporting the device, but securing the added advantage of increased filtering area due to the inclination of the two sections to the horizontal.

There are several advantages in the construction and method of mounting the filter in the cabinet to which attention may be directed.

It is customary in filtering devices of this character to saturate the filtering material with a suitable kind of oil, for the purpose of facilitating the filtering action, and as a result there is more or less dripping of the excess oil from the filter. With the arched form of filter, the oil works toward the lower ends of the frames, and thence down the inside walls of the cabinet, and not onto the fan and motor as would be the case if the screen extended longitudinally across the cabinet.

Furthermore, the hinged frame construction and arched arrangement of the sections, avoids the necessity for accurately dimensioning the filter to fit the cabinet, since any slight variations are taken up in the angular displacement of the sections when the screens are inserted into the cabinet. In other words, the filters adjust themselves to the cabinet, and require only a flange at each end to support them. Ease of removal and replacement is also another important advantage that is due to the arched construction.

I claim as my invention:

1. In a heating and ventilating unit of the character described, the combination with a housing having an inlet adjacent its bottom and an outlet adjacent its top; a fan in the bottom of said housing adapted to draw air from the adjacent opening and to discharge said air upwardly; of means in the upper end of said housing providing a heating chamber and a passageway, both of which extend from one side to the other of said housing, said passageway and heating chamber being open at the upper ends to discharge through the outlet in the upper portion of the housing and being open at the lower ends and disposed in spaced relation with respect to said fan; radiators disposed in said heating chamber and confined thereto; a filtering unit removably supported in said housing and comprising hinged frames arranged at an obtuse angle to each other to form an arch over said fan, the ends of said frames being supported against the opposite side walls of said housing, said filtering unit spanning the distance between the defining walls of the housing and entirely separating said fan from the heating chamber and passageway, whereby an increased area of filtering surface is provided for filtering all of the air prior to its passage through the heating chamber or passageway in the upper portion of said housing.

2. In a heating and ventilating unit of the character described, the combination of a housing having an inlet adjacent its bottom and an outlet adjacent its top, a fan in the bottom of said housing adapted to draw air from the adjacent opening and to discharge said air upwardly; of means in the upper end of said housing providing a separated heating chamber and a passageway, said passageway and heating chamber discharging through the outlet in the upper portion of the housing and having their open ends disposed in spaced relation to said fan and in position to receive air discharged therefrom, radiators disposed in said heating chamber, a filtering unit removably supported in said housing and comprising hinged frames arranged at an obtuse angle to each other to form an arch over said fan, the ends of said frames being supported against the opposite side walls of said housing, said filtering unit spanning the distance between the defining walls of the housing and entirely separating said fan from the heating chamber and passageway, whereby an increased area of filtering surface is provided for filtering all of the air prior to its passage through the heating chamber or passageway in the upper portion of said housing.

3. In a heating and ventilating unit of the character described, the combination of a housing having an inlet adjacent its bottom and an outlet adjacent its top a fan in the bottom of said housing adapted to draw air from the adjacent opening and to discharge said air upwardly; of means in the upper end of said housing providing a separated heating chamber and a passageway, said passageway and heating chamber discharging through the outlet in the upper portion of the housing and having their open ends disposed in spaced relation to said fan and in position to receive air discharged therefrom, radiators disposed in said heating chamber, a filtering unit removably supported in said housing and comprising frame members arranged to form an arch over said fan, the ends of said frames being supported against the opposite side walls of said housing, said filtering unit spanning the distance between the defining walls of the housing and entirely separating said fan from the heating chamber and passageway, whereby an increased area of filtering surface is provided for filtering all of the air prior to its passage through the heating chamber or passageway in the upper portion of said housing.

4. A heating and ventilating unit comprising an enclosing casing having an inlet

chamber at its bottom, a discharge chamber at its top, heating and by-pass chambers between the top and bottom chambers; a blower disposed in a chamber below the heating and by-pass chambers and adjacent the inlet chamber; and a filter arranged in the casing below the heating chamber whereby fresh air entering the inlet chamber may pass through the filter before entering the heating chamber.

5. A heating and ventilating unit comprising an inclosing casing having an inlet chamber, a discharge chamber, heating and by-pass chambers; a blower chamber; and filtering means disposed in the path of the air through the unit and adapted to clean the air during its passage to the heating and by-pass chambers.

Signed at Moline, Ill., this 9th day of April 1925.

WILFRED SHURTLEFF.