

March 31, 1942.

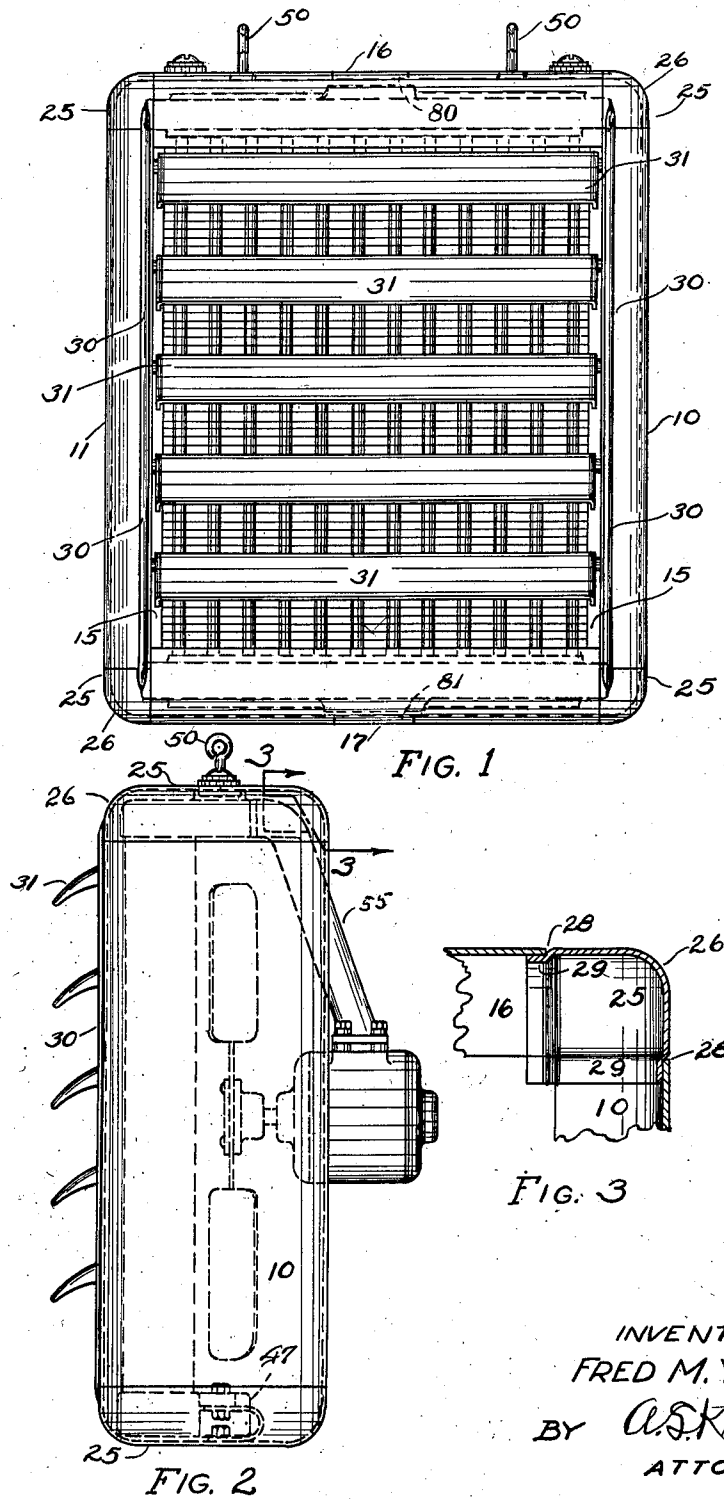
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2,278,376

UNIT HEATER

Filed Oct. 8, 1937

3 Sheets-Sheet 1



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UNIT HEATER

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3 Sheets-Sheet 2

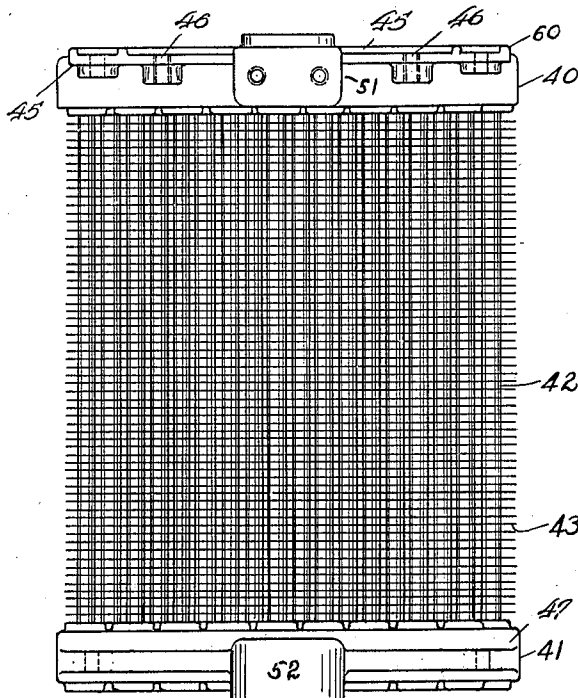


FIG. 4

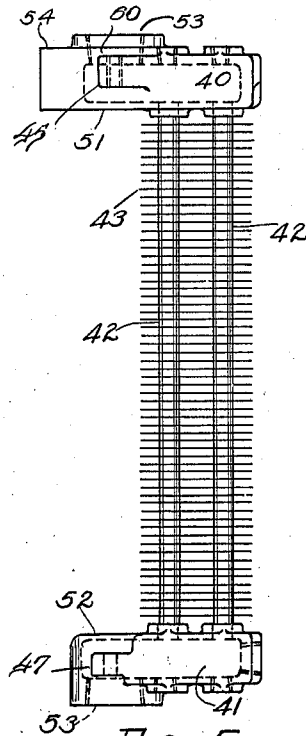


FIG. 5

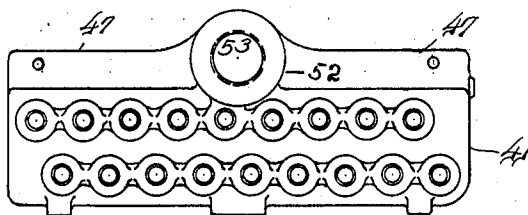


FIG. 6

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3 Sheets-Sheet 3

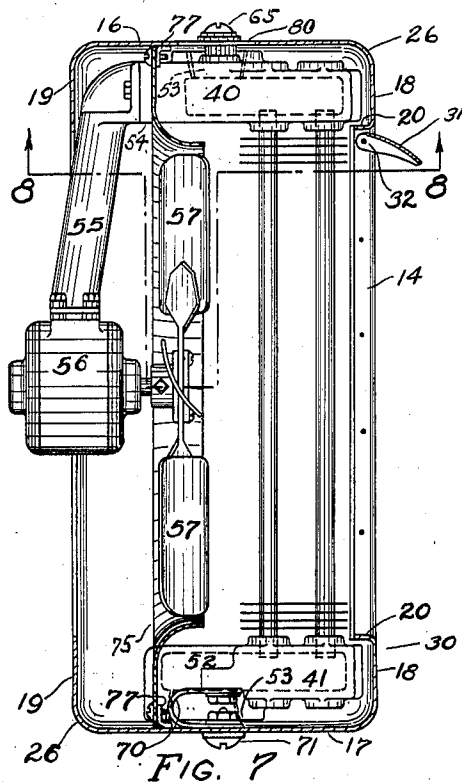


FIG. 7

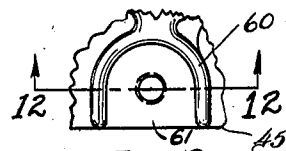


FIG. 9

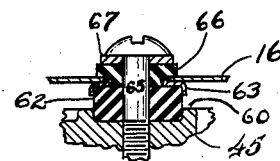


FIG. 10

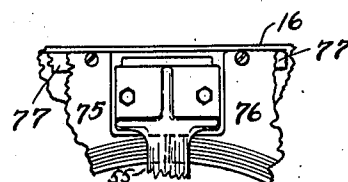


FIG. 11

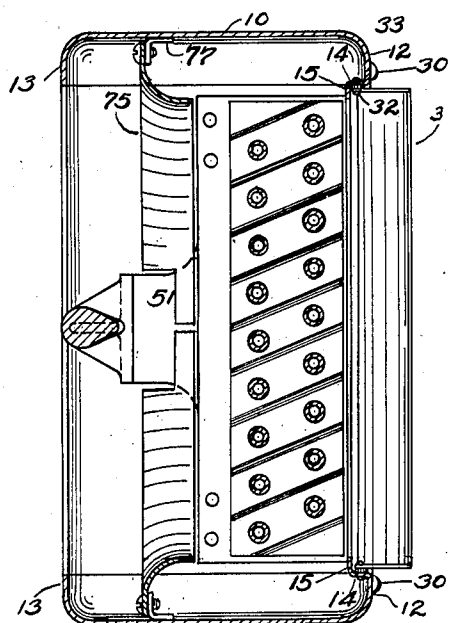


FIG. 8

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2,278,376

UNIT HEATER

Fred M. Young, Racine, Wis.

Application October 8, 1937, Serial No. 168,042

1 Claim. (Cl. 257—137)

My invention relates to unit heaters of the class, being particularly adapted to be suspended from the ceiling, and has for its object, generally stated, to provide a heater that is simple, efficient, neat in appearance, and one which may be manufactured at low cost.

I accomplish the foregoing objects by means of a novel housing structure, novel core structure and novel means for supporting the housing by the core and for supporting the fan motor on the upper header of the core.

To these and other useful ends my invention consists of parts, combinations of parts or their equivalents as hereinafter set forth and claimed and shown in the accompanying drawings in which:

Fig. 1 is a front elevation of my improved unit heater.

Fig. 2 is a side elevation of the unit as shown in Figure 1.

Fig. 3 is a fractional section of the housing frame taken on line 3—3 of Figure 2.

Fig. 4 is a rear elevational view of the core with the fan and its support removed.

Fig. 5 is a side elevation of the core as shown in Figure 4.

Fig. 6 is a bottom view of the lower header.

Fig. 7 is a side elevation of a unit having the housing and fan shroud cut-away so as to clearly illustrate the position of the core, fan shroud, fan and motor.

Fig. 8 is a transverse section taken on line 8—8 of Figure 7 having the fan removed.

Fig. 9 is a fractional view of the top header illustrating the seat adapted to receive the cushion device for securing the top header to the top panel of the housing.

Fig. 10 is a section of one of the cushion fastenings, illustrating in detail the header fastenings to the top panel of the housing.

Fig. 11 is a fractional view of the two halves of the fan shroud illustrating how they are secured to the top and bottom panels of the housing and also illustrating how the two edges of the fan shroud are cut-away in order to make room for the motor support.

As thus illustrated, my improved unit heater consists of a novel housing having a depth which provides room for the core, the fan and part of the motor as illustrated in Figures 2 and 7, whereby the fins only are exposed from a front view of the unit, thus forming a rectangular outlet about the size of the finned portion of the core for the passage of air from the core.

The housing comprises vertical side members 10 and 11, each formed as indicated in Figure 8 by inwardly projecting flanges 12 and 13. On the outlet side of members 10 and 11 I provide rearwardly extending portions 14—14 having inwardly extending flanges 15—15 (see Figure 8).

The ends of members 10 and 11 and their flanges are formed straight and at right-angles to the body of the member for a purpose which will hereinafter appear.

Top and bottom members 16 and 17 of the housing are formed similar to members 10 and 11 each having inwardly extending flanges 18 and 19, members 18 having rearwardly extending flanges 20—20. Thus when members 10, 11, 16 and 17 are positioned as illustrated in Figure 1 a frame having a rectangular shape is provided, the ends of the frame members being secured together as follows:

I provide four corner pieces 25 formed to complete the housing as illustrated in Figures 1, 2 and 3. It will be noted in the various figures that the front and rear flanges of the top, bottom and side members of the housing are formed by an easy curve. The outer corners of members 25 are curved to register with the outer corners of the other housing members as at 26. Members 25 are provided with a depression as at 28—28 forming flanges 29—29 which are adapted to act as supports for the ends of members 10, 11, 16 and 17 as clearly illustrated in Figure 3. Thus when the members are assembled as indicated in the various figures, a frame is provided having curved outer corners and edges and being provided with right-angle inner air passage corners at the front and rear of the housing as clearly illustrated in Figure 1. Members 29 are long enough to provide a substantial seat for the frame members and convenient means for securely fastening the frame together, thus providing a strong frame or housing having a neat and pleasing appearance.

It will be seen that the exposed joints between members 25, 16 and 17 are on the same vertical plane as members 14, and that the joints between all of the members will add to the appearance of the frame instead of detracting as in other devices of the class. I may however, in some designs elect to form members 25 integral with members 10 and 11, in which case no horizontal contact line between these members will be shown and the frame will consist of four separate pieces rather than eight.

In order to further improve the appearance of the unit I provide moulding strips 30—30 being positioned on members 12 adjacent the inner edges thereof and extending a distance over members 25. These moulding strips are preferably nickle or vanadium plated.

It is customary to provide air directing blades on heaters of the class. I provide a suitable number of blades 31, each being pivotally secured to flanges 14 by means of bolts 32. The bolts have preferably spring supported nuts whereby the blades may be adjusted and held in any desired position.

I provide a core unit as clearly illustrated in Figures 4, 5 and 6 comprising an upper header 40 and a lower header 41 and a suitable number of finned tubes 42 forming an operating connection between the headers. The fins are preferably of the strip type which are designated by numeral 43, each having flanged openings through which the tubes extend and by means of which the fins may be suitably bonded to the tubes.

Headers 40 and 41 are provided with rearwardly extending projections 51 and 52, each being provided with a screw threaded opening 53 for the reception of the inlet and outlet pipes. Member 51 is provided with an extension 54 having a suitable surface to which the motor support 55 is secured as illustrated in Figure 7. The motor 56 is secured to the bottom of this support by means of rubber or composition cushions as illustrated and has fan blades 57. It will be noted that the housing is preferably deep enough to extend over the larger part of the fan motor and its support.

The core assembly as thus described, may be supported either by the inlet pipe or eye bolts 50—50 as will hereinafter appear. The method of securing the upper header to housing member 16 is as follows:

Header 40 is provided with rearwardly extending members 45 preferably for its entire length, into which eye bolts 50 may be screwed as at 46—46. Near the rear corners of this extension I provide cushion seats having flanges 60, the rear end being left open as at 61. Thus when the core is in position within the housing, the composition cushion washer 62 may be inserted between members 45 and 16. Member 62 is provided with and is partially embraced by a cupped washer 63 which is also flanged so as to be embraced by openings in member 16, these openings being considerably larger than bolt 65 which acts to secure the header to the housing. This bolt is provided with a cushion washer 66 and a steel washer 67 whereby the bolt may be made taut and the necessary pressure placed on the washers. Thus it will be seen that there is no metal contact between header 40 and member 16 and that the connections between these members are practically on a line with the center of gravity.

It is desired that the lower header 41 be free to move vertically but prevented from swinging transversely relative to the housing or to prevent the housing from swinging independent of the header. For this purpose I provide preferably U-shaped brackets 70, the upper end being secured to the rearwardly extending flange 47 on header 41 by means of a bolt as clearly indicated in Figure 7. The other end of bracket 70 is secured to member 17 by means of a suitable bolt 71. Thus it will be seen that header 41 is free to move vertically independent of the housing.

I may elect to use a connection between members 70 and 17 similar to the cushion connection between members 40 and 16 whereby there will be no metal contact between the core unit and the housing. However, as shown the noises set up by the fan motor could not reach the housing without passing through the motor support 55, header 40, tubes 42, header 41 and bracket 70, and it is thought therefore, that a cushion connection at the bottom of the core is unnecessary.

I provide a novel fan shroud as follows: This shroud is made in two parts 75 and 76 and is preferably positioned and shaped as illustrated in Figures 7 and 8. The parting line is vertical and the connections to the housing members are made through L irons 77 which are secured to members 10, 11, 16 and 17. Members 75 and 76 are cut-away as indicated in Figure 11, to thereby make room for the motor supported as clearly indicated in Figures 7 and 11. Thus it will be seen that by removing the bolts used for securing the shroud members to member 77, the shroud may be removed without removing the motor and its support.

It will be seen that I have provided a simple unitary core assembly having a fan motor secured thereto and a simple unitary housing; that the housing corner members 25 may be used on various sized units; that members 16 and 17 may be used on various length units; thus the manufacture of the housing is simplified and it is strong, light and efficient.

It will be noted that there is no strain put on the housing because of the manner of securing the core unit to the housing which in turn is supported directly by eye bolts or by the inlet pipe. In fact, the entire assembly is free from strain and vibrational noises either set up by the action of the air, the fan blades or the motor.

By referring to Figure 7 it will be noted that an opening 80 is provided in member 16 which is concentric with screw threaded opening 53 and considerable larger than this opening. Clearly, therefore, the inlet pipe will not be contacted by member 16. Member 17 is provided with exactly the same opening 81 and in the same position relative to openings 53 in member 52. These openings are indicated by dotted lines in Figure 1.

It will be noted by scrutinizing Figure 1 and as illustrated by dotted lines, that openings are provided in member 16 which are concentric with the body of eye-bolts 50 and being considerably larger so there is no contact between members 16 and 50. Thus there is no metal contact between the housing and the core except members 70.

Having thus shown and described my invention, I claim:

A unit heater of the class described, comprising in combination, a housing having a heat exchange core therein, said core comprising upper and lower headers having finned tubes forming an operating connection therebetween, said headers each having rearwardly extending centrally positioned extensions, upwardly and downwardly directed inlet and outlet openings in said extensions, a fan motor having a supporting connection to the rear end of the upper header extension, said upper header having near its rear corners rearwardly extending members having means to yieldingly secure the header to the top panel of said housing, said lower header having rearwardly extending projections near its rear corners and being yieldingly connected to the bottom panel of said housing, said second yielding connections comprising U-shaped brackets, one free end of each bracket being rigidly connected to the header and the other free end being rigidly connected to the housing.

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