

July 30, 1935.

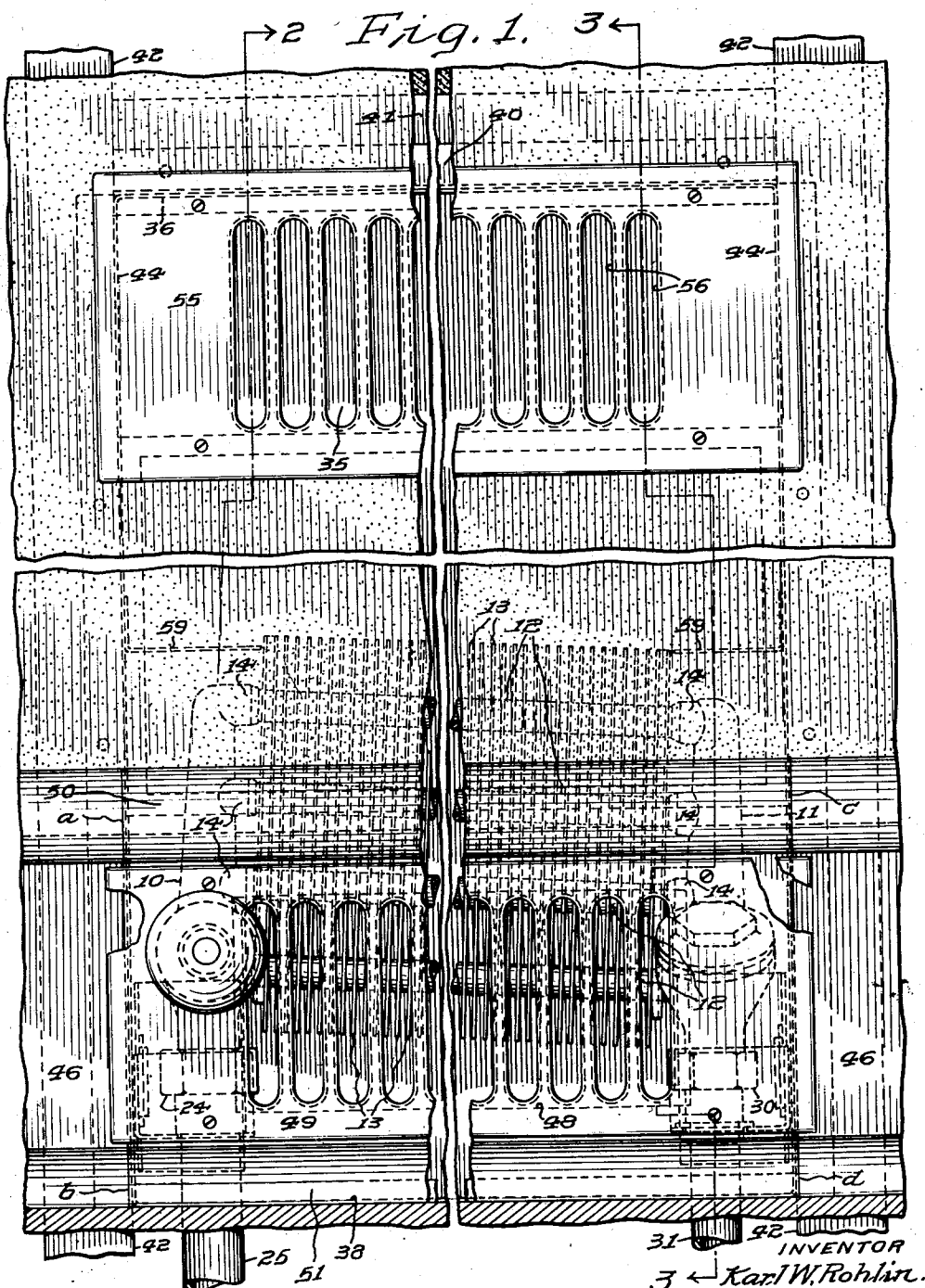
K. W. ROHLIN

2,009,705

RADIATOR

Filed July 17, 1933

4 Sheets-Sheet 1



WITNESS
F. J. Hartman.

July 30, 1935.

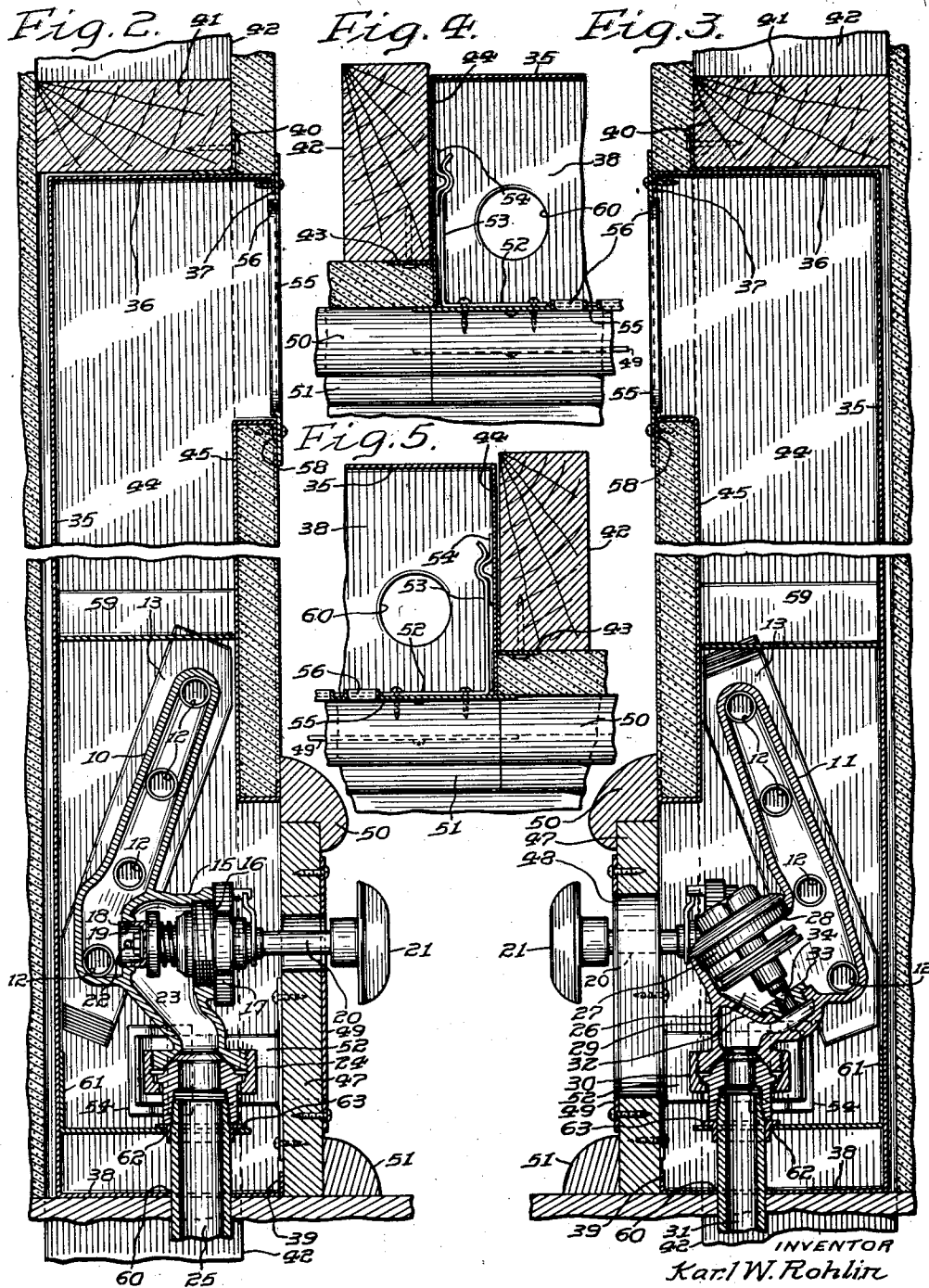
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RADIATOR

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4 Sheets-Sheet 2



WITNESS
F. J. Hartman.

BY John W. Myers
ATTORNEY

July 30, 1935.

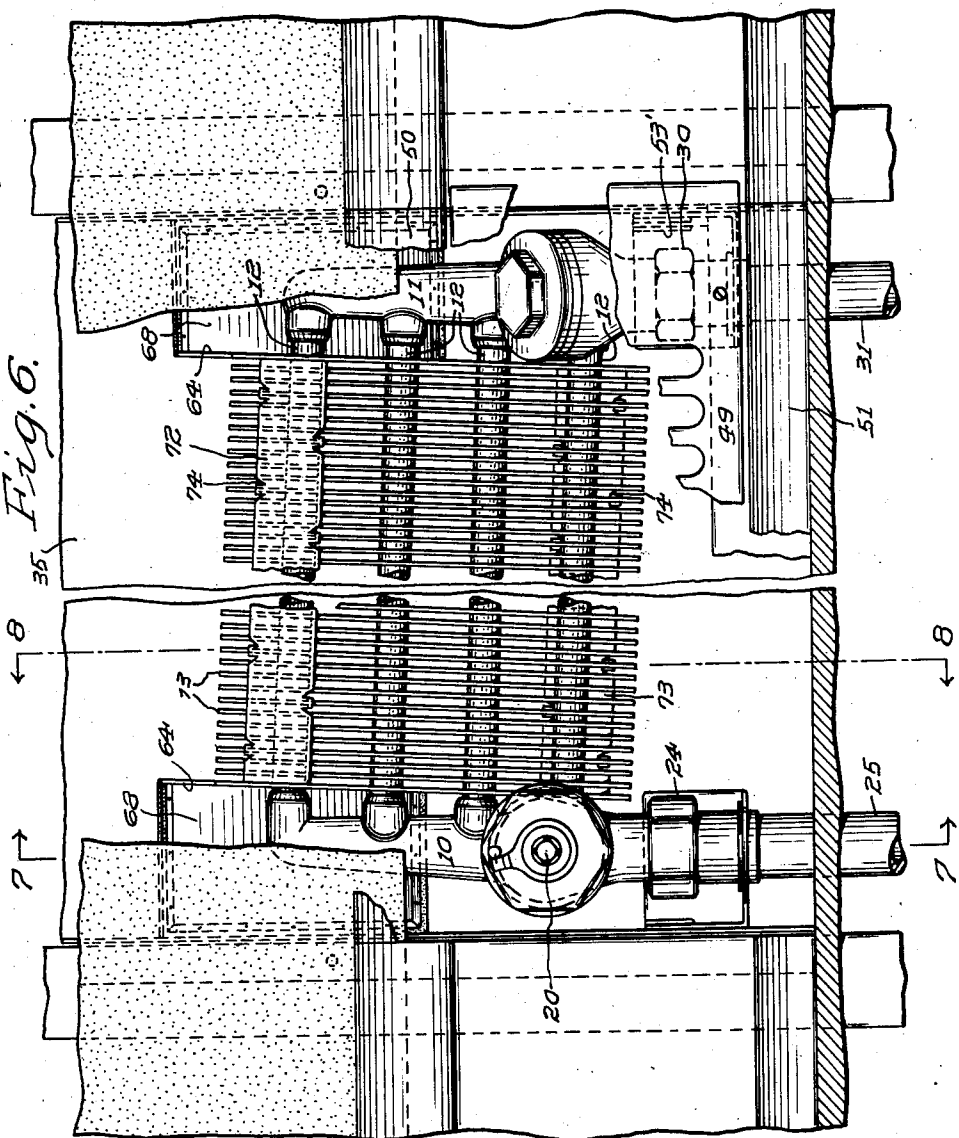
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RADIATOR

Filed July 17, 1933

4 Sheets-Sheet 3



WITNESS
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July 30, 1935.

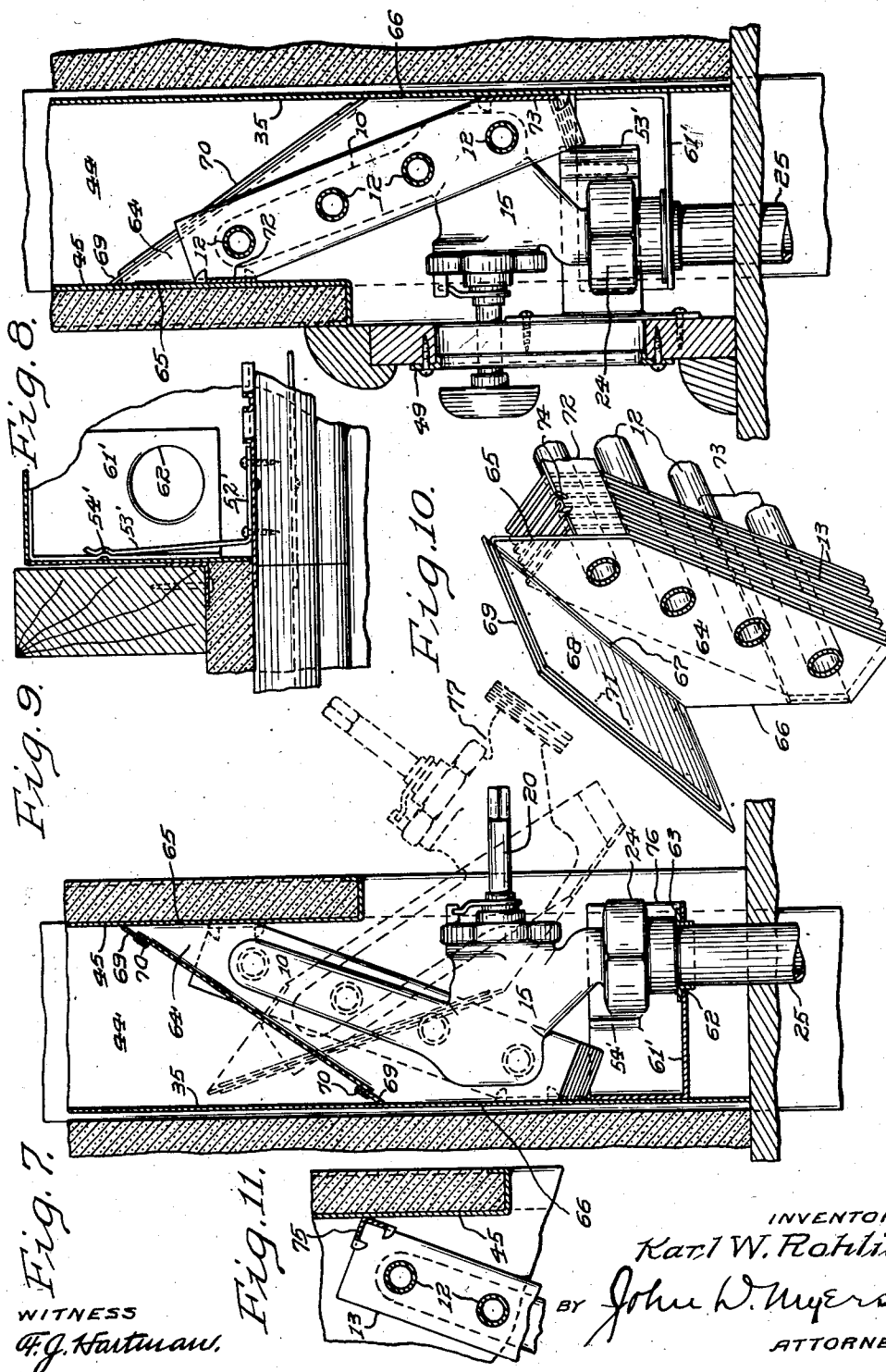
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RADIATOR

Filed July 17, 1933

4 Sheets-Sheet 4



WITNESS
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UNITED STATES PATENT OFFICE

2,009,705

RADIATOR

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Application July 17, 1933, Serial No. 680,690

25 Claims. (Cl. 257—136)

The invention relates to radiators used for heating purposes and involves an improvement in radiators of the type which comprises a supply header, a return header, interconnecting tubes
5 between the supply header and the return header, and a plurality of fins supported upon the tubes between the headers, this type of radiator being commonly positioned within an enclosure and designated as convection radiation.

10 The present tendency in the construction of heating systems in dwelling houses, apartments, hotels and office buildings is to install the radiators within recesses in the walls of the building, thereby concealing the radiation from view
15 and avoiding the loss of space which is otherwise taken up by exposed radiation. The usual practice with respect to concealed radiation is to install the radiators in recesses located beneath the windows. In making installations of this
20 character, difficulty has been encountered owing to the fact that many of the radiators heretofore known have been so constructed that their depth is too great to permit them to be entirely concealed within any recess which may be provided
25 therefor in an ordinary wall. Difficulty has also been encountered with such installations for the reason that the radiators heretofore known have been so constructed that they could not readily be connected to or disconnected from the
30 supply and return pipes of the heating system. A further objection to the concealed radiation heretofore employed, particularly convection radiation, has been that both the inlet and outlet valves have been inaccessible so that the adjustments
35 required to be made in such valves could not be made without considerable dismantling of the installation.

One of the principal objects of this invention, therefore, is the provision of a light-weight convection radiator so constructed that it may be
40 entirely concealed within a space of relatively slight depth, such as a recess beneath a window in the wall of a room. A further object of the invention is the provision of a radiator in which both the steam supply valve and the trap valve are embodied in the heat radiating unit. A further
45 object is the provision of a radiator in which the steam supply valve and the trap valve are readily accessible from the front of the radiator. A still further object of the invention is the provision of a radiator comprising a unitary supply
50 header and valve, and a unitary return header and steam trap. A still further object is the provision in a steam radiator of a supply header and steam supply valve so arranged with respect to

each other as to avoid the gurgling noise which is frequently produced in radiators with improperly located steam supply valves. It is a still further object of the invention to provide a steam
5 radiator having a steam trap so combined with the return header as to insure the flow of condensate from the radiator. It is also an object of the invention to provide a heat radiating unit in which the tubes interconnecting the headers
10 are inclined from one header to the other in order to insure the proper drainage of condensate. The invention also has for an object the provision of a heat radiating unit and an enclosure therefor, both so designed as to enable the unit to be bodily
15 inserted and removed through the air inlet of the enclosure. The invention has for a further object the provision of means on the walls of the enclosure for locating and supporting the radiating unit with respect thereto. Further objects
20 are the provision of a novel baffle for preventing the passage of air upwardly between the fins and the side walls of the enclosure, a novel baffle and protecting means for the corners of the fins, and novel means for removably securing the
25 grille, over the air inlet of the enclosure. Still other objects and advantages of the improvement will be apparent from the accompanying description and drawings.

In order that the invention may be fully understood, reference may be made to the accompanying drawings in which:

Fig. 1 is a front elevational view, broken apart, showing my improved radiator installed in a cabinet located in a recess in the wall of a room;

Fig. 2 is a broken, vertical, sectional view taken
35 on the line 2—2 of Fig. 1;

Fig. 3 is a broken, vertical, sectional view taken on the line 3—3 of Fig. 1;

Figs. 4 and 5 are horizontal, sectional views showing the manner in which the opposite ends
40 of the air inlet grille are retained in position on the front of the cabinet;

Fig. 6 is a broken, front elevational view, with parts broken away, showing a modified form of baffle device for preventing the passage of air
45 upwardly between the terminal fins of the radiating unit and the side walls of the enclosure;

Fig. 7 is a vertical, sectional view taken on the line 7—7 of Fig. 6, and showing, in dotted lines, the manner in which the radiator unit is inserted
50 in and removed from the enclosure;

Fig. 8 is a vertical, sectional view taken on the line 8—8 of Fig. 6;

Fig. 9 is a horizontal, sectional view similar to
55

Figs. 4 and 5, but showing a modification of the means for retaining the inlet grille in position;

Fig. 10 is a perspective view showing the modified form of end baffle device and its relation to the fins and tubes; and

Fig. 11 is a detailed, sectional view showing a modified form of baffle strip for fins without beveled corners.

In the embodiment of my invention as disclosed herein, I employ a radiator comprising a supply header 10, a return header 11, a plurality of interconnecting tubes 12 between the supply header and the return header, and a plurality of fins 13 supported in spaced relation from each other upon the tubes 12.

Both the supply header and the return header are preferably of tubular form and are provided on opposing sides thereof with connecting means 14 within which the tubes 12 are secured. The headers are substantially L-shaped with the base of the L extending substantially at right angles to the plane of the tube connecting means 14, the base portion of the L constituting a valve casing.

The valve casing 15 projecting laterally from the lower end of the supply header 10 is provided with an opening 16 in its outer wall for the reception of a steam control valve 17 having a valve sleeve 18 thereon longitudinally adjustable in a passageway 19 between the lower end of the body portion of the supply header and the laterally projecting valve chamber. The valve sleeve 18 is provided with a valve spindle 20 which may extend through a suitable opening to the outside of the radiator cabinet where it is provided with a hand wheel 21 or other operating means. In the construction disclosed, it will be noted that, while the steam control valve 17 is arranged within the supply header to admit steam to the lower end thereof, it is so combined with the header as to be readily accessible and easily removable for such replacement of parts as may be necessary. This is of particular importance with respect to the sleeve 18, which is interchangeable in order that a sleeve with orifices 22 of the proper size may be fitted to each individual radiator.

Extending downwardly from the valve casing 15 is a connecting member 23 forming a part of a union 24 by means of which the supply header may be connected to the steam supply pipe 25. As shown in Fig. 2 of the drawings, the passageway 19 between the tubular body portion of the supply header and the valve chamber 15 is positioned slightly above the bottom portion of the lowermost tube connecting means 14 in order to insure the flow of steam into the supply header without passing through the water which condenses within the radiator.

The interconnecting tubes 12 between the supply header and the return header incline downwardly from the supply header to the return header to such extent as to insure the flow of condensate toward the return header. As illustrated in the drawings, the inclination of the tubes 12 may be secured by connecting them at substantially right angles to the headers and elevating the supply header slightly above the return header when the radiating unit is in position for use. With this arrangement of the headers and the interconnecting tubes, the fins 13 may be arranged substantially at right angles to the tubes so that when the radiating unit is in position for use the faces of the fins are slightly inclined to the vertical, thereby insuring

intimate contact therewith of the air current which circulates upwardly over the unit.

The base portion of the L of the return header constitutes a laterally projecting enlargement on the lower end thereof and provides a chamber 26 for the steam trap 27. The outer wall of this chamber has an opening 28 therein through which the trap 27 may be inserted and in which it is removably secured. A downward projection 29 on the trap chamber 26 constitutes a part of a union 30 by means of which the return header may be connected with the return pipe 31 of the heating system. The trap chamber is separated from the chamber within this downward projection by a substantially horizontal wall 32 having an opening therein provided with a valve seat 33 co-operating with the tapered valve 34 of the steam trap. It will be noted that the valve seat 33 is so positioned that the lower edge of the port thereof is at a lower level than the bottom portion of the outlet end of the lowermost tube, thus insuring drainage of condensate from the radiator through the port into the return pipe. It will also be noted that, with the arrangement which I have provided, the steam trap 27 is readily accessible from the front of the return header and consequently readily accessible from the front of the radiator, so that any adjustments or replacements required to be made in the trap may be made without dismantling the installation beyond the removal of the lower grille of the enclosure as hereinafter described.

The particular form of radiator which I have disclosed herein has been designed to be enclosed within a cabinet or enclosure, and when the radiator is concealed within a recess in the wall of a room I prefer to utilize an enclosure made from sheet metal and comprising a back wall 35 having its upper end bent forwardly to provide a top wall 36 with the forward edge thereof turned downwardly to form a flange 37. The lower end of the rear wall 35 may be bent forwardly to form the bottom wall 38 of the enclosure, and the forward edge of the bottom wall may be turned upwardly to provide a flange 39 as shown in Figs. 2 and 3. In order to provide means whereby the cabinet may be secured in position in the recess, an angle member 40 may be welded or otherwise secured to the outside of the upper wall 36 of the cabinet, the upstanding portion of this angle member being secured by nails or screws to the cross-piece 41 between the studs 42 in the wall of the room. Similar angle members 43 are secured to the side walls 44 of the cabinet, and the outwardly extending portions thereof may be secured by nails or screws to the front faces of the studs 42 as shown in Figs. 4 and 5.

Inasmuch as it is one purpose of installations of this character to conceal the radiation from view as much as is practicable, I have constructed the front of the cabinet so as to detract as little as possible from the ordinary appearance of the wall of the room. I accomplish this by providing a channel-shaped member 45 extending across the front of the cabinet and secured at its opposite ends to the side walls 44 of the cabinet. This channel-shaped member is constructed in such a manner as to receive plaster and thus simulate the other portions of the wall of the room.

To assist in retaining the ordinary appearance of the wall construction, I preferably extend the usual base-board 46 of the room across an air inlet opening extending transversely across

the lower portion of the front of the cabinet, the section 47 of base-board immediately in front of the cabinet being separated from the main base-board along the lines *a-b* and *c-d* as shown in Fig. 1. The central area 48 of this section of base-board is cut away and over the cut-away portion the inlet grille 49 is secured by means of screws as indicated. Strips of molding 50 and 51 are secured to the upper and lower edges of the section of base-board 47 in order to further simulate the usual appearance of the wall of the room.

For the purpose of retaining the removable section of base-board and the inlet grille mounted thereon in position over the opening in the lower front of the cabinet, and in order that these parts may be readily removable to give access to the steam supply valve and the steam trap or to permit the removal of the entire radiating unit, an angular spring clip 52 is secured to each end of the removable base-board section, the flexible portion 53 of this spring clip being formed with a depression therein for engagement with a corresponding retaining member 54 integral with, welded or otherwise secured to the inner face of each side wall 44 of the cabinet. With this construction it is only necessary to remove the hand wheel 21 on the supply valve spindle, whereupon the base-board section 47 may readily be removed to give access to the supply valve and the steam trap, or to permit the bodily removal of the radiating unit, these parts being substantially concealed when the grille is in position.

In order to provide an outlet for heated air at the top of the cabinet, I have provided a grille 55 comprising an elongated plate provided with slots 56 or other suitable openings therein and covering the space between the channel member 45 and the upper wall 36 of the cabinet. This grille may be secured in position by means of screws passing therethrough into the downwardly turned flange 37 on the upper wall 36 of the cabinet and screws passing therethrough into a flange 58 on the upper wall of the channel member 45.

Inasmuch as the room air enters the cabinet through the opening covered by the lower grille 49, passes upwardly over the radiator fins and leaves the cabinet through the upper grille 55, it is advisable to provide some means whereby the upwardly flowing current of air within the cabinet may be confined to the space occupied by the fins. As shown in Figs. 1, 2 and 3, I provide a baffle plate 59 in each end of the cabinet, in the form of a flat plate extending from the side wall to the upper end of the adjacent fin, and of such a length as to extend from the plastered channel member 45 on the front of the cabinet to the rear wall 35 of the cabinet. These plates may be secured in position in any suitable manner such as by welding them to the walls of the cabinet, or by securing them upon the heat radiating unit as shown in the modified construction hereinafter described, and in the form shown in Fig. 1 the outer end of each may be bent into contact with the side wall of the cabinet and secured thereto.

For the purpose of properly positioning the cabinet with respect to the pipe connections to the supply riser and return riser of the heating system, suitable openings 60 are provided in the bottom wall of the cabinet through which these connections project. In addition, gusset supports 61 may be secured to the walls of the cab-

inet inwardly of the lower portion of the air inlet 48, and preferably within the angles between the rear wall 35 and the end walls 44, adjacent the unions between the radiator headers and the connections to the supply and return risers. The horizontally projecting portion of each of the gusset supports 61 is provided with an opening 62 to receive the connections to the risers, and the nipple of the union may be arranged to rest thereon by means of shims 63 as shown in Figs. 2 and 3. It will be apparent therefore that such an arrangement of the gusset supports 61 provides a practical means integral with the enclosure for locating the position of the connections to the supply and return pipes even where the bottom wall of the enclosure is omitted as in the form of enclosure shown in Figs. 6, 7 and 8, also for supporting the lightweight radiating unit in its position of use.

In Figs. 6, 7, 8 and 10, I have shown a modification of the baffle device for insuring the passage of the current of air from the air inlet of the enclosure upwardly between the fins of the radiating unit. This modified form of baffle comprises an irregularly shaped supporting plate 64 mounted upon the tubes 12 adjacent each of the headers 10 and 11. The forward edge of this supporting plate is preferably parallel to and arranged in the plane of the forward edges of the fins 13, and the lower edge of the plate is preferably parallel to and arranged in the plane of the lower edges of the fins. The upper end of the supporting plate is tapered as indicated at 65 for the purpose of conforming to the channel member 45 or other portion of the front wall of the enclosure, and the rear lower corner of the supporting plate is likewise beveled as shown at 66 in order that it may conform to the rear wall 35 of the enclosure.

The upper downwardly inclined edge 67 of the supporting plate 64 has affixed thereon, in substantially right angular relation thereto, a baffle plate 68 extending across the space between the supporting plate and the adjacent side wall 44 of the enclosure. A strip of flexible packing material 69 is secured along the top, bottom and outer edges of the baffle plate 68 so as to extend substantially beyond these edges, as shown in Figs. 7 and 10. The flexible strip 69 may be secured to the free edges of the baffle plate by means of an overlying metal strip 70 riveted to the baffle plate or welded thereto through suitable openings in the inner edges of the flexible strip, as indicated at 71. As will be understood, the use of the flexible strip 69 enables the baffle plate to conform to the front, rear and side walls of the enclosure without necessitating the exact fitting of the plate, and the structure is particularly useful with the radiating unit and enclosure described herein, wherein the unit is designed to be inserted into the enclosure through the opening in the bottom of the front wall and removed therethrough.

It will be understood, of course, that such a baffle device is provided in each end of the enclosure, and, as shown in Fig. 6, the supporting plate 64 for each is arranged on the radiator tubes 12 in parallel relation to the fins 13. By thus enclosing the space between the terminal fin and the adjacent side wall 44 of the enclosure, currents of air upwardly in the enclosure between the terminal fin and the adjacent side wall are prevented.

In order to provide sufficient fin surface at the upper forward corners and the lower rear corners

of the fins, and to assist the passage of the current of air upwardly between the fins, it is preferable to bevel these corners and secure baffle strips 72 and 73 lengthwise of the radiating unit along the beveled corners. As shown in Figs. 6, 7, 8 and 10, the baffle strips 72 and 73 extend throughout the length of the radiating unit, between the supporting plates 64 for the baffle devices at the ends thereof, and they are secured in position by providing oppositely arranged slits 74 at spaced intervals on the edges thereof and bending the material between opposing slits inwardly into clamping engagement with the fins. In addition to serving as baffles for directing the air upwardly between the fins, the strips 72 and 73 constitute protecting means for preventing the corners of the fins from being damaged when the unit is being installed in and removed from the enclosure.

In some cases it may not be desirable to bevel the corners of the fins in the manner heretofore described. Where the corners of the fins are not beveled, a baffle strip 75 of the type shown in Fig. 11 may be provided between the corners of the fins and the adjacent wall of the enclosure. In this case, the corner baffle strips 75 likewise extend throughout the length of the radiating unit between the supporting plates 64 for the end baffle devices, and are right angular in cross section, or of such other shape as to conform to the corners of the fins, and the edges of the angularly bent portions of the strips may be secured to the side and end edges of the fins by slitting the edges of the strips and bending the material between opposing slits into clamping engagement with the fins in the manner heretofore described.

In Figs. 1 to 5, I have shown means for removably securing the grille 49 over the air inlet of the enclosure, comprising spring clips 52 provided with a flexible portion 53 having a depression formed therein for engagement with a retaining member 54 secured to the inner face of the side wall 44 of the enclosure. In Figs. 6 to 9, I show a modified form of retaining means wherein the clip 52' is provided with a flexible portion 53' having a depression therein which engages with an inwardly depressed portion 54' in the upstanding flange 76 whereby the gusset support 61' is secured to the side wall 44 of the enclosure. By forming the depressed portion 54' in the gusset support, the provision of a separate retaining member such as shown in Figs. 1 to 5 becomes unnecessary.

As shown in the drawings, the heat radiating unit, comprising the headers, tubes, fins, valves, and union connections, is positioned within the enclosure inwardly of the air inlet which extends transversely of the lower portion of the front wall, and this unit is readily accessible upon the removal of the hand wheel or other valve manipulating means 21 and the grille 49. While the width of the fins is substantially less than the depth of the enclosure from front to rear, the inclination of the unit from front to rear whereby the upper ends of the front edges of the fins are located in proximity to the front wall of the enclosure, and the lower ends of the rear edges of the fins are in proximity to the rear wall of the enclosure, provides a structure in which the current of air moving upwardly through the enclosure necessarily passes between the fins. Furthermore, the inclination of the faces of the fins with respect to the vertical causes the upwardly moving air to come into intimate contact with the fins in its passage thereover. In addition, the

vertical and horizontal displacement of the tubes with respect to each other provides a structure whereby the fins are evenly and uniformly heated throughout their extent, thus providing a radiating unit in which all the air entering the inlet of the enclosure and passing therethrough and out of the outlet is forced to circulate over highly and uniformly heated radiating elements. The offset relation of the tubes in the manner shown provides an efficient arrangement whereby all portions of the current of air are brought into contact with either the fins or the tubes, and this contact is secured without any substantial retardation of the upward draft.

The construction herein disclosed provides a radiator which is unusually efficient for heating purposes, although its dimensions may readily be such as to enable it to be entirely concealed within a recess in the wall of an ordinary room, such as a recess available beneath a window. The radiator headers are so constructed with respect to the enclosure that they incline downwardly from the front of the enclosure to the rear thereof. By arranging the headers in this manner the fins extend across the entire depth of the cabinet although they need not have a transverse dimension equal to this depth. With this arrangement of the headers, tubes and fins, I am enabled to economize to a great extent in the material utilized in the fins, yet the construction of the radiator when assembled within the cabinet is such as to necessitate the passage of substantially the entire column of air entering the lower grille over the most highly heated portions of the fins, a condition which would not result if the headers and fins were arranged to extend vertically within the cabinet.

By inclining the headers downwardly from the front of the cabinet to the rear thereof and providing the forwardly projecting portion at the lower end of each header, which constitutes an inlet valve casing in the case of the supply header, and a trap valve casing in the case of the return header, I am enabled to confine the over-all depth of the radiator to the space which is available for a concealed radiator in the wall of a room as it is ordinarily constructed. The construction of the supply header whereby the inlet valve port is located at a higher level than the lowermost portion of the lowest tube connecting means avoids the objectionable constructions heretofore used in which water accumulates in the supply header to such an extent as to interfere with the passage of steam into the radiator and also produces an objectionable gurgling noise. The construction of the return header whereby the lower portion of the port opening outwardly from the steam trap is at a lower level than the lowermost portion of the lowest tube connection with the return header insures complete and thorough drainage of condensate from the radiator.

The improved enclosure disclosed herein provides a construction in which, although the radiator may be entirely concealed within the wall of a room, the parts thereof which ordinarily require attention are readily accessible. By removing the hand wheel or other manipulating device from the supply valve spindle, the lower grille may be removed from the front of the cabinet by merely pulling the grille forwardly to disengage the spring clips from their co-operating members on the end walls of the cabinet. When this grille is removed, both the steam supply valve and the trap valve are accessible for such adjustments or replacement of parts as may be re-

quired from time to time when the system is in use. The grille may then be replaced, whereupon the front of the enclosure has the appearance of the other wall portions of the room, except for the presence of the inlet and outlet grilles.

By reason of the shape and arrangement of the combined headers, tubes, fins, valves and pipe connections of the structure as described above, the assembled radiating unit may be easily inserted into its position within the enclosure through the air inlet at the bottom of the front wall of the enclosure when the grille is removed therefrom, and the unit is likewise easily removable from the enclosure through this opening.

The unit may be inserted by passing the upper ends of the fins inwardly through the air inlet as indicated by the dotted line position shown at 77 in Fig. 7, then rotating the lower edge of the unit inwardly at the same time the upper edge is raised within the enclosure and brought to its position adjacent the front wall thereof, whereupon the union joints are made up to locate the unit and position the same upon the gusset supports secured to the walls of the enclosure. If for any reason it becomes necessary to remove the unit from the enclosure, the valve manipulating handle is first removed from the valve spindle whereupon the lower grille may be removed easily and quickly from its position in front of the unit, and the unit may then be removed bodily from the enclosure, after disconnecting the unions between the lower ends of the headers and the riser connections, by withdrawing the lower edge of the unit at the same time the unit is rotated so as to lower the upper edge thereof within the enclosure.

While I have disclosed herein certain embodiments of the various features of my improved radiator, it will be understood that such other modifications thereof may be made as fall within the scope of my invention as set out in the appended claims. It will also be understood that various changes may be made in the construction of the enclosing cabinet. Inasmuch as the radiator need not necessarily be concealed within a recess in the wall of the room, but may be located alongside the wall in any convenient location in the room, such changes may be made in the enclosing cabinet as will adapt it to this use. It will be understood, however, that my improved form of radiating unit is particularly designed to be employed with an enclosing cabinet whether the installation be of the concealed type or whether the radiator be positioned alongside the wall of the room.

Having thus described my invention, what I claim and desire to secure by United States Letters Patent is:

1. A radiator header comprising an upright body portion, tube connecting means on one side thereof, a laterally projecting portion on the lower end of the body portion extending substantially in a plane at right angles to the plane of the tube connecting means and forming a valve chamber in communication with the interior of the body portion and having an opening in the outer wall thereof, a downward extension on said valve chamber having pipe connecting means thereon, and a valve in said chamber insertable and removable through the said opening.

2. A radiator header comprising a tubular body portion, a plurality of tube connecting means on one side thereof, a lateral projection on the lower end of the body portion forming a valve chamber having an opening in the outer wall

thereof and a port communicating with the interior of the body portion at a substantial distance above the lowermost portion of the lowermost tube connecting means, a downward extension on said chamber having pipe connecting means thereon, and a valve insertable and removable through the opening in the outer wall of said chamber for closing said opening and controlling said port.

3. A radiator header comprising a tubular body portion, tube connecting means on one side thereof, a lateral portion integral with and projecting from the lower end of the body portion substantially at right angles to said tube connecting means and forming a valve chamber with a port communicating with the interior of the body portion and an opening in the outer wall thereof, means on said laterally projecting portion for connecting the header to a source of heat supply, and a valve insertable and removable through the opening in the outer wall of said chamber for closing said opening and controlling said port.

4. A radiator header comprising a tubular body portion, tube connecting means on one side thereof, a laterally projecting portion on the lower end of the body portion forming a valve chamber having an opening in the outer wall thereof, a web extending across said chamber and having a port therethrough below the tube connecting means, means on said laterally projecting portion for connecting the header to the return of a heating system, and a valve insertable and removable through the opening in the outer wall of said chamber for closing said opening and controlling said port.

5. A radiator header comprising a tubular body portion having tube connecting means on one side thereof, a valve casing integral with and projecting laterally from one end of the body portion substantially at right angles to said tube connecting means and having an opening in its outer wall, a partition across said casing and having a port therethrough below said tube connecting means, means on said casing for connecting the header to a return pipe, and a trap valve insertable and removable through said opening for closing the same and controlling said port.

6. A radiator header comprising a tubular body portion having tube connecting means on one side thereof, a valve casing integral with and projecting laterally from one end of the body portion substantially at right angles to said tube connecting means and in communication with the interior of the body portion, said casing having an opening in its outer wall and a port in its inner wall, pipe connecting means on said casing, and a valve insertable and removable through said opening for closing the same and controlling said port.

7. A radiator header comprising a tubular body portion having tube connecting means on one side thereof, a valve casing projecting laterally from one end of the body portion and in communication with the interior thereof and having an opening in its outer wall, pipe connecting means projecting from said casing and having a port opening therein from said casing, and a valve insertable and removable through said opening for closing the same and controlling said port.

8. A radiator comprising a pair of headers, a plurality of vertically spaced tubes interconnecting the headers, and a plurality of fins arranged in spaced relation on the tubes, each of said headers comprising an upright, tubular body portion having a laterally projecting portion on the bot-

tom thereof forming a valve chamber in communication with the interior of the body portion and having an opening in the outer wall thereof, pipe connecting means on said laterally projecting portion, and a valve insertable and removable through the opening in the wall of said chamber for closing said opening and controlling the passageway between said body portion and said pipe connecting means.

9. A radiator comprising a pair of headers, a plurality of tubes interconnecting the same and a plurality of fins arranged in spaced relation on said tubes, each of said headers comprising an upright tubular body portion having a laterally projecting portion on the lower end thereof forming a valve chamber in communication with the interior of the body portion and having an opening in the outer wall thereof, pipe connecting means on said laterally projecting portion, an inlet valve insertable and removable through the opening in the wall of one of said headers for closing said opening and controlling the passage of steam into the body portion of the header, and a steam trap insertable and removable through the opening in the wall of the other of said headers for closing said opening and controlling the outlet of the radiator.

10. A radiator comprising a pair of headers each including a tubular body portion inclined downwardly from front to rear, a forwardly extending valve chamber on the lower end of the body portion in communication with the interior thereof and having an opening in its front wall, pipe connecting means on said chamber, a plurality of spaced tubes interconnecting the body portions of the headers, a plurality of spaced fins on said tubes, a valve insertable and removable through the opening in the front wall of one of said chambers for closing said opening and controlling the steam supply to the radiator, and a steam trap insertable and removable through the opening in the front wall of the other chamber for controlling the outlet of the radiator.

11. In a radiator, the combination of an enclosure having an air inlet adjacent the bottom thereof and an air outlet adjacent the top thereof, a header in each end of the enclosure and comprising a tubular body portion inclined downwardly from the front of the enclosure to the rear thereof, a forwardly extending hollow projection on the lower end of the body portion and in communication with the interior thereof, said projection having an opening in its front wall and pipe connecting means thereon, a plurality of spaced tubes interconnecting the tubular body portions, a plurality of spaced fins on said tubes, a valve insertable and removable through the opening in the front wall of one of said headers for closing said opening and controlling the passage of steam into the body portion of said header, and a steam trap insertable and removable through the opening in the front wall of the other header for closing the opening therein and controlling the outlet of the radiator.

12. A radiator comprising a supply header, a return header, a plurality of vertically spaced tubes interconnecting the said headers and inclined downwardly from the supply header to the return header, a plurality of spaced fins on said tubes, a valve casing projecting laterally from the lower end of the supply header and having an inlet port communicating with the supply header above the lowermost portion of the lowermost tube and an opening in its outer wall, a valve removably mounted in said opening for controlling

said inlet port, a valve casing projecting laterally from the lower end of the return header and having an opening in its outer wall and an outlet port in its inner wall below the lowermost of said tubes, and a trap valve removably mounted in the opening in the valve casing of the return header for controlling said outlet port.

13. In a radiator, the combination with an enclosure having air inlet openings adjacent the bottom thereof and air outlet openings adjacent the top thereof, supply and return headers in the enclosure inclined downwardly from the front of the enclosure to the rear thereof, a plurality of spaced tubes interconnecting the said headers and inclined downwardly from the supply header to the return header, a plurality of fins on said tubes, a valve casing projecting forwardly from the lower end of the supply header and having an inlet port in its inner wall and an opening in its outer wall, a valve removably mounted in said opening for controlling said inlet port, a valve casing projecting forwardly from the lower end of the return header and having an opening in its outer wall and an outlet port in its inner wall below the lowermost of said tubes, and a trap valve removably mounted in the opening in the valve casing of the return header for controlling said outlet port.

14. In a radiator, the combination of an enclosure having an air inlet extending transversely across the lower portion of the front wall thereof and an air outlet extending transversely across the upper portion of said front wall, a heat radiating unit mounted within said enclosure inwardly of said air inlet and insertable and removable therethrough, said heat radiating unit including a header in each end of the enclosure, a plurality of spaced tubes connecting the headers, a plurality of spaced fins mounted on said tubes and a union connection on the lower end of each header, means on the walls of said enclosure for engaging with said union connections to position and support said radiating unit within said enclosure, a removable grille for said air inlet, and means for retaining said grille in position.

15. In a radiator structure, an enclosure having oppositely arranged side walls, a rear wall, and a front wall provided with an air inlet extending transversely across the lower portion thereof and an air outlet extending transversely across the upper portion thereof, gusset supports on said end walls and said rear wall inwardly of said air inlet and having openings therethrough to receive supply and return pipes, a heat radiating unit mounted on said gusset supports in communication with said pipes and insertable and removable through said air inlet, a removable grille for said air inlet, and means for retaining said grille in position.

16. In a radiator, the combination of an enclosure having an air inlet extending transversely across the lower portion of the front wall thereof and an air outlet extending transversely across the upper portion of said front wall, a heat radiating unit supported by said enclosure inwardly of said air inlet and insertable and removable therethrough, said heat radiating unit including a tubular header inclined downwardly from the front wall of said enclosure toward the rear wall thereof adjacent each end of the enclosure, a plurality of tubes connecting said headers in horizontally displaced relation with respect to each other and a plurality of elongated fins arranged in spaced relation on said tubes

and inclined downwardly and rearwardly from the front wall of said enclosure to the rear wall thereof, the width of said fins being substantially less than the depth of said enclosure from front to rear, and a deflector plate between each end wall of the enclosure and the radiating unit to direct the air entering said inlet upwardly between said fins.

17. In a radiator structure, an enclosure having oppositely arranged side walls, a rear wall and a front wall provided with an air inlet extending transversely across the lower portion thereof and an air outlet extending transversely across the upper portion thereof, gusset supports on said end walls and said rear wall inwardly of the lower portion of said air inlet, and a heat radiating unit mounted on said gusset supports and insertable into and removable from the enclosure through said air inlet.

18. In a radiator structure, an enclosure having an air outlet in the upper portion thereof and oppositely arranged side walls, a rear wall, and a front wall provided with an air inlet extending transversely across the lower portion thereof, supporting members on the walls of said enclosure inwardly of the lower portion of said air inlet and having openings therein to receive supply and return pipes, a heat radiating unit mounted on said supporting members in communication with said pipes and insertable and removable through said air inlet, deflector means between said enclosure walls and said unit to direct air from said inlet over said unit, a removable grille for said air inlet, and means for retaining said grille in position.

19. In a radiator structure, an enclosure having oppositely arranged side walls, a rear wall and a front wall provided with an air inlet extending transversely across the lower portion thereof and an air outlet extending transversely across the upper portion thereof, and an upright heat radiating unit mounted in the lower portion of said enclosure and bodily insertable and removable through said air inlet, said unit comprising supply and return headers inclined downwardly from the front of the enclosure to the rear thereof, a plurality of vertically and horizontally spaced tubes interconnecting said headers and inclined downwardly from the supply header to the return header, a plurality of spaced fins on said tubes inclined with respect to the side walls of said enclosure, a valve casing projecting from the lower end of each of said headers, a valve in each of said casings, and means on the said valve casings for connecting said unit to supply and return pipes.

20. In a radiator structure having a pair of substantially upright headers, a plurality of tubes interconnecting said headers, a plurality of fins arranged on said tubes, means for connecting said headers to supply and return piping, and an enclosure with the end walls thereof adjacent to the headers, means for directing a current of air away from the end walls of the enclosure and upwardly between the fins comprising a supporting plate mounted upon said tubes adjacent and parallel to each of the terminal fins and extending between the front and rear walls of the enclosure, a baffle plate secured to said supporting

plate and inclined upwardly from the rear wall of the enclosure to the front wall thereof adjacent the end wall of the enclosure, and a strip of flexible material secured to said baffle plate and projecting outwardly beyond the edges thereof into contact with the front, rear and end walls of the enclosure.

21. A radiator unit comprising a pair of generally upright headers, a plurality of vertically spaced tubes interconnecting said headers and horizontally offset from each other in the same direction, a plurality of spaced fins supported transversely upon said tubes, a supporting plate mounted on said tubes adjacent each of the terminal fins, and a baffle plate secured to said supporting plate and extending outwardly at an angle thereto.

22. A radiator unit comprising a pair of generally upright headers, a plurality of vertically spaced tubes interconnecting said headers and horizontally offset from each other in the same direction, a plurality of spaced fins supported transversely on said tubes, a supporting plate mounted on said tubes adjacent each of the terminal fins, a baffle plate secured to said supporting plate and extending outwardly at an angle thereto, and a strip of flexible material secured to said baffle plate and projecting outwardly beyond its free lateral edge and its opposite end edges.

23. A heat radiating unit comprising a pair of upright headers, a plurality of spaced tubes interconnecting said headers, a plurality of elongated spaced fins arranged on said tubes with the lateral edges thereof inclined to the vertical, and a baffle plate secured lengthwise of said unit along the outer aligned corners of said fins to protect said corners and to direct a current of air upwardly between the fins.

24. A heat radiating unit comprising a pair of upright headers, a plurality of spaced tubes interconnecting said headers, a plurality of elongated spaced fins arranged on said tubes with the lateral edges thereof inclined to the vertical, a supporting plate mounted on said tubes adjacent each of the terminal fins, a baffle plate secured to said supporting plate and extending outwardly at an angle thereto, and a baffle plate secured along the outer aligned corners of said fins between said supporting plates to protect said corners and to direct a current of air upwardly between the fins.

25. A radiator structure comprising an enclosure having oppositely arranged front and rear walls and oppositely arranged side walls, an upright header adjacent each of said side walls, a plurality of tubes interconnecting said headers, a plurality of elongated spaced fins arranged on said tubes and having the lateral edges thereof inclined downwardly and rearwardly between the front and rear walls of said enclosure, a baffle device supported in each end of the enclosure by said tubes and extending across the space between the front, rear and side walls of the enclosure and the adjacent terminal fin, and a baffle plate secured along the aligned corners of the fins between the same and the adjacent enclosure wall to protect the fins and to direct a current of air upwardly between the fins.

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