

Dec. 31, 1929.

L. C. GNAGI

1,741,930

RADIATOR

Filed April 8, 1927

2 Sheets-Sheet 1

*Fig. 1.*

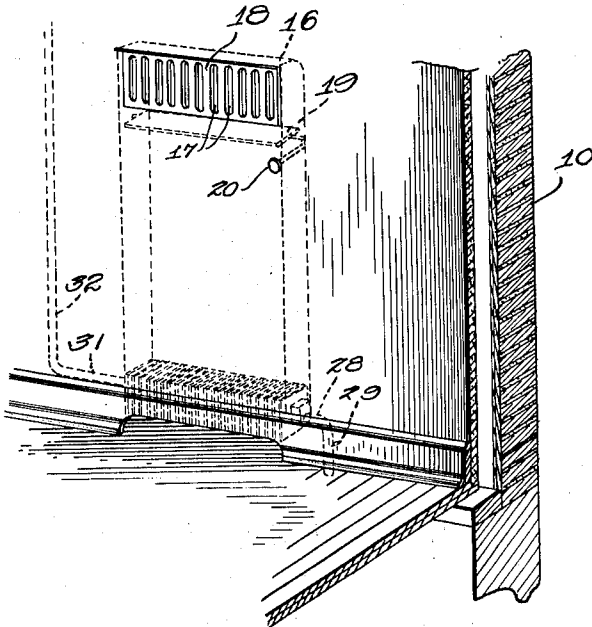


*Fig. 2.*

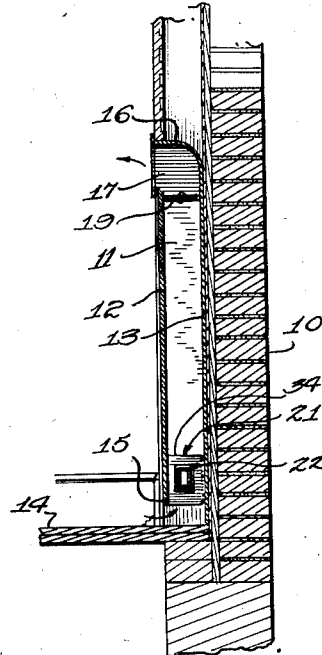


*Fig. 4.*

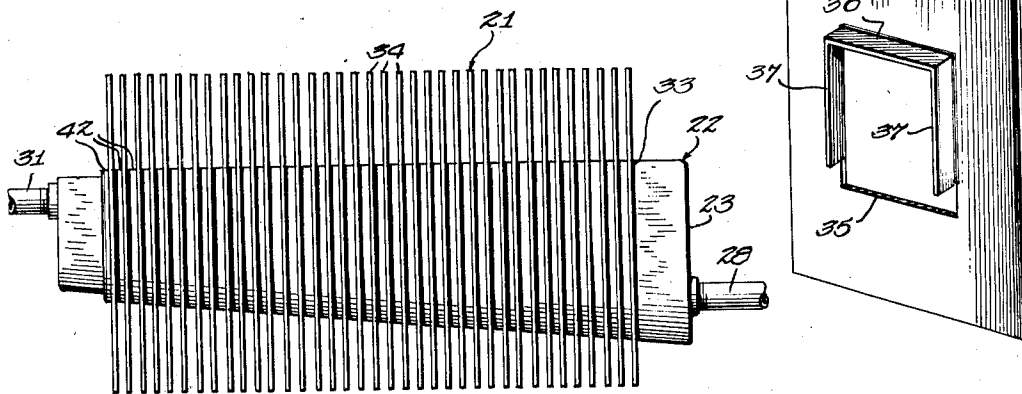


*Fig. 3.*

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Dec. 31, 1929.

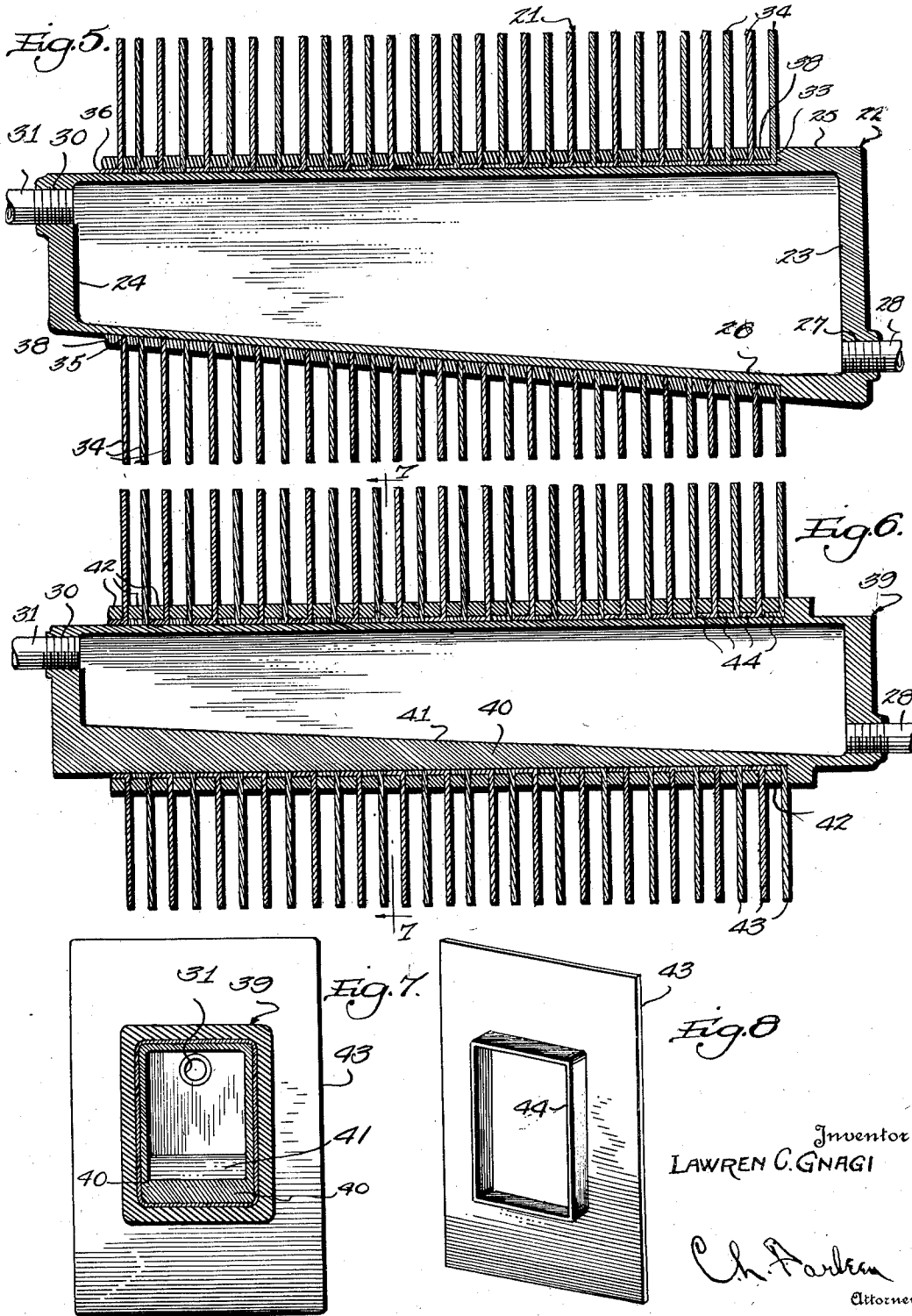
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2 Sheets-Sheet 2



## UNITED STATES PATENT OFFICE

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## RADIATOR

Application filed April 8, 1927. Serial No. 182,133.

This invention relates to radiators, and more particularly to a radiator of the steam or hot water type for heating homes and other buildings adapted to be employed in connection with heating cabinets and heating flues built into the walls of buildings.

Owing to the unsightliness and lack of efficiency of the usual cast iron steam and hot water radiators, there have been developed in recent years a number of heating devices adapted to be used in connection with ornamental cabinets, or to be placed in vertical flues built into the walls of buildings. The heating units employed usually comprise an elongated cast or similar body, and the heating medium such as steam or water flows into one end of the body and out of the opposite end thereof, radiating fins being carried by the body and adapted to radiate heat therefrom to the column of air passing through the fins. It has been found to be extremely difficult to provide relatively simple and inexpensive means for attaching the fins to the body of the heating device so as to derive therefrom the greatest number of heat units to be radiated into the surrounding air. The fins usually are substantially loosely attached to the body, and the poor contact between these elements thus provided effectually reduces the efficiency of the heating units.

It is an important object of the present invention to provide novel means of a relatively simple and inexpensive nature for attaching the fins to the body of the heating unit in such a manner as to greatly increase the radiation of heat.

A further object is to provide a novel form of radiating fin and means for attaching a plurality of the fins to the body of a heating unit in such a manner that there is close mechanical contact between the fins and the body whereby greatly increased radiation is obtained.

A further object is to provide a novel form of heating body adapted for use in connection with the fins previously referred to, the body being of such construction as to facilitate the passage of the steam or hot water therethrough, and to facilitate the draining

of water of condensation from the body when steam is employed as the heating medium.

A further object is to provide a device of the above mentioned character wherein the radiating fins are adapted to be readily and easily assembled upon the body.

A further object is to provide a device of the above mentioned character which is particularly adapted for use in connection with ornamental heating cabinets and built-in wall flues.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the drawings I have shown several embodiments of the invention. In this showing—

Figure 1 is a perspective view illustrating the invention as applied to a built-in wall flue,

Figure 2 is a vertical sectional view taken transversely through the flue and adjacent wall,

Figure 3 is a side elevation of the heating unit,

Figure 4 is a perspective view of one of the radiating fins,

Figure 5 is a vertical longitudinal sectional view of the heating unit,

Figure 6 is a similar view of a modified form of heating unit,

Figure 7 is a transverse section on line 7—7 of Figure 6, and,

Figure 8 is a detail perspective view of a modified form of radiating fin.

Referring to the drawings, the numeral 10 designates a portion of a wall of a building into which is built a heating flue 11. The flue includes inner and outer walls 12 and 13 respectively, the former being spaced from the floor 14, as indicated at 15. The outer wall 13 is curved inwardly at its upper end as at 16 to provide a discharge opening 17 which is preferably covered with an ornamental grille or the like 18. A damper 19 of any desired type is mounted in the upper portion of the flue and is adapted to be controlled by a suitable handle 20.

The device of the present invention comprises a heating unit designated as a whole by

the numeral 21. This unit comprises a preferably cast body 22 closed at its ends as indicated at 23 and 24 respectively in Figure 5 of the drawings. The wall 23 is arranged at the inlet end of the body and the wall 24 at the outlet end, as will become apparent. The side walls of the body are parallel, as shown in Figure 2, while the upper wall 25 is preferably horizontally arranged. The lower wall 26 of the body is preferably inclined downwardly toward the inlet end of the device, as clearly shown in Figure 5. The lower portion of the wall 23 is provided with an internally threaded opening 27 to receive the inner threaded end of an inlet pipe 28 which forms part of a riser 29. It will be obvious that the device is adapted to be used either in connection with steam or hot water as the heating medium, but in practice, it is preferred to use steam, the latter being supplied to the riser 29 from a boiler of the usual type. The upper part of the wall 24 also is provided with an internally threaded opening 30 to receive the end of an outlet pipe 31, this pipe being turned upwardly as at 32 to carry steam to the heating unit or units arranged on the upper floors of the building.

The body 22 is provided with a shoulder 33, as shown in Figure 5. The body is adapted to be surrounded by a plurality of fins 34, one of which is shown in detail in Figure 4 of the drawings. These fins are preferably formed of sheet metal and each is provided with a central opening 35. The width of this opening is equal to the width of the body 22, while the height of the opening corresponds with the height of the body adjacent the shoulder 33, whereby it is apparent that either of the fins is adapted to surround the body at any point between the shoulder 33 and the outlet end of the body. Each fin 34 is provided with an upper flange 36 and side flanges 37, these flanges being stamped from the body of the metal, as will be apparent. The height of the flanges 37 is equal to the height of the body 22 adjacent the outlet end of the device, so that regardless of the position of the fin on the body, the flanges 37 will not project therebelow. It will be apparent that when the fins are placed in position, the flanges thereof will fit snugly against the body, and clamping members 38 are adapted to surround the flanges and the body to maintain each of the fins in position. As clearly shown in Figure 5 the members 38 are graduated in height according to the position they are intended to occupy upon the body but all are of equal width to engage the side flanges 37.

In Figure 6 of the drawings I have shown a somewhat modified form of heating unit body indicated as a whole by the numeral 39. The body 39 is substantially the same in structure as that previously described except that the lower face of the bottom 40 thereof is horizontal and parallel with the top wall.

The inner face 41 of the bottom wall is inclined toward the inlet end of the body, as in the case of the form of the device previously described. It will be apparent that in the modified form of the device the outer faces of the opposite walls of the body are parallel throughout their length thus obviating the necessity for using clamping members of varying sizes. It will be apparent therefore that clamping members 42 may be employed all of which are identical in shape and size. This construction permits the use of radiating fins 43 having a continuous flange 44 surrounding the central opening therein, the flange 44 snugly contacting with the body throughout its length. Thus it will be apparent that each of the clamping members 42 surrounds one of the flanges 44 and does not contact with the body of the device.

The operation of the device is as follows:

The fins 34 are successively placed in position on the body 22, and any of the fins may be employed since the length of the flanges 37 is such that they will not project beneath the body regardless of the position in which they are placed thereon. The first fin placed in position will contact with the shoulder 33, after which the proper clamping member 38 is arranged over the flanges 36 and 37. The internal size of the clamping member is preferably such that it must be driven into position with the top and sides contacting with the flanges 36 and 37, and the bottom contacting with the lower face of the body. The width of the clamping member is preferably such that its free edge is flush with the edges of the flanges 36 and 37 and constitute therewith a shoulder against which the next fin is adapted to bear. The operation of placing the fins and clamping members in position is continued until substantially the entire length of the body is surrounded with the radiating fins. The device is adapted to be used in connection with a heating cabinet of the standard type, or may be employed in connection with the built-in wall flue, as illustrated. The horizontal width of the fins is preferably such as to substantially fill the flue in which they are arranged, and accordingly it will be apparent that all the air passing upwardly through the flue must flow between the flanges to absorb heat therefrom. The opening shown in the base board in Figure 1 of the drawings permits the cooler air to flow into the bottom of the flue, after which the air is heated, and flows upwardly through the flue, the heated air being discharged through the grille 18. The heating action readily may be regulated by the damper 19, as will be apparent. The structure of the fins and the use of the clamping members are such that close mechanical contact is maintained between the body and the face whereby the latter absorb a large proportion of the heat units from the body

to radiate them to the air passing upwardly through the flue. It will be obvious that when a built-in flue is employed, it may be placed in any desired position in a room without arranging it adjacent or beneath a window as is the usual practice with ordinary sectional radiators, in order to secure the best results. The steam or other medium flows into the body through the pipe 28 and leaves the body through the pipe 31, as previously stated. When steam is employed as the heating medium it will be apparent that the radiation of heat units from the system causes a considerable proportion of the steam to condense within the body, and the inclined bottom wall 26 causes the water of condensation to flow downwardly toward the inlet pipe to be returned to the boiler. This structure obviously prevents the accumulation of water of condensation within the body, attention being invited to the fact that the pipe 28 is arranged at the lowermost point of the body to drain all of the water therefrom.

The operation of the modified form of the device shown in Figures 6 to 8 inclusive is substantially the same as in the form previously described. In this form of the device, all of the clamping elements 42 are identical in shape and size since the opposite faces of the body are parallel to each other. Thus fins 43 may be employed having the continuous flanges 42 which entirely surround and contact with the body thus providing efficient heat transfer between the body and the fins. The inclined upper face 41 of the bottom wall 40 facilitates the drainage of water of condensation in the manner previously described.

It is to be understood that the forms of the invention herewith shown and described are to be taken as preferred examples of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. A radiator comprising an elongated hollow longitudinally tapered body through which a fluid heating medium is adapted to flow, and a plurality of heating fins each provided with a central opening corresponding in shape and size to the cross-sectional shape and size of said body at a point adjacent its larger end, each of said fins being provided with a flange portion projecting laterally therefrom adjacent the opening therein and adapted to engage flat against a portion of said body.

2. A radiator comprising a hollow elongated longitudinally tapered polygonal body through which a fluid heating medium is adapted to pass, and a plurality of heating fins provided with central openings corresponding in shape and size to the cross-sectional shape and size of a portion of said body adjacent its larger end, said fins being adapt-

ed to surround said body in spaced relation and each provided on at least two sides of the opening therein with flange portions adapted to lie flat against portions of two adjacent faces of said body.

3. A radiator comprising a hollow elongated tapered polygonal body through which a fluid heating medium is adapted to pass, a plurality of heating fins provided with central openings corresponding in shape and size to the cross-sectional shape and size of a portion of said body adjacent its larger end, said fins being adapted to surround said body in spaced relation and each provided on at least two sides of the opening therein with flange portions adapted to lie flat against portions of two adjacent faces of said body, and a plurality of clamping members each adapted to surround said body between an adjacent pair of radiating fins and adapted to clamp the flange portions of one of the fins against said body.

4. A radiator comprising a hollow elongated body of rectangular cross-section through which a fluid heating medium is adapted to flow, two of the sides of said body being parallel substantially throughout their length, the other two sides of said body diverging toward one end thereof, and a plurality of radiating fins each provided with a central opening corresponding in shape and size to the shape and size of said body at a point adjacent its larger end, said fins being adapted to surround said body in spaced relation to each other, each of said fins being provided with a laterally projecting flange at the side of the opening therein corresponding to one of the diverging faces of said body, each fin further being provided with flange portions extending along the sides of the opening therein corresponding to the parallel sides of said body, the flange portions of each of said fins being continuous and each of said last named flange portions being of a length corresponding to the width of the parallel sides of said body adjacent the narrower end thereof, said flange portions being adapted to lie flat against said body.

5. A radiator comprising a hollow elongated body of rectangular cross-section through which a fluid heating medium is adapted to flow, two of the sides of said body being parallel substantially throughout their length, the other two sides of said body diverging toward one end thereof, a plurality of radiating fins each provided with a central opening corresponding in shape and size to the shape and size of said body at a point adjacent its larger end, said fins being adapted to surround said body in spaced relation to each other, each of said fins being provided with a laterally projecting flange at the side of the opening therein corresponding to one of the diverging faces of said body, each fin further being provided with flange portions

extending along the sides of the opening therein corresponding to the parallel sides of said body, the flange portions of each of said fins being continuous and each of said last  
 5 named flange portions being of a length corresponding to the width of the parallel sides of said body adjacent the narrower end thereof, said flange portions being adapted to lie flat against said body, and a clamping member  
 10 adapted to surround said body between each adjacent pair of radiating fins, and adapted to clamp the flange portions of one of said fins snugly against said body.

6. A radiator comprising a hollow elongated substantially horizontally arranged  
 15 body through which a fluid heating medium is adapted to flow and provided with an inlet and an outlet end, the bottom of said body being inclined downwardly toward the inlet  
 20 end thereof, an inlet pipe communicating with the interior of said body at a point adjacent the bottom of the inlet end thereof, an outlet pipe communicating with the interior  
 25 of said body at a point adjacent the top of the outlet end thereof, and a plurality of radiating fins carried by said body, each of said fins being provided with a central opening  
 30 through which said body extends and being provided on a plurality of the sides of said opening with laterally extending flange portions lying flat against the adjacent portions  
 of said body.

7. A radiator comprising a hollow elongated substantially horizontally arranged  
 35 body through which a fluid heating medium is adapted to flow and provided with an inlet and an outlet end, the bottom of said body being inclined downwardly toward the inlet  
 40 end thereof, an inlet pipe communicating with the interior of said body at a point adjacent the bottom of the inlet end thereof, an outlet pipe communicating with the interior  
 45 of said body at a point adjacent the top of the outlet end thereof, a plurality of radiating fins carried by said body, each of said fins being provided with a central opening  
 50 through which said body extends and being provided on a plurality of the sides of said opening with laterally extending flange portions lying flat against the adjacent portions  
 of said body, and a clamping member surrounding said body between each adjacent  
 pair of radiating fins and adapted to clamp the flange portions thereof against said body.

8. A radiator comprising an elongated hollow longitudinally tapered body through  
 55 which a fluid heating medium is adapted to flow, and a plurality of radiating fins each provided with a central opening corresponding  
 60 in shape and size to the cross sectional shape and size of said body at a point adjacent its larger end, said fins being mounted on said body in spaced relation to each other.

9. A radiator comprising a hollow elongated body through which a fluid heating

medium is adapted to pass, a plurality of radiating fins provided with central openings adapted to receive said body, said fins being adapted to surround said body in  
 70 spaced relation and each being provided at the opening therein with a flange portion adapted to lie flat against portions of said body, and a plurality of clamping members each adapted to surround said body between  
 75 each adjacent pair of fins to clamp the flange portion thereof against said body, each of said clamping members corresponding in width to the flange of the corresponding fin.

In testimony whereof I affix my signature.

LAWREN C. GNAGI.

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