

April 12, 1932.

A. B. MODINE

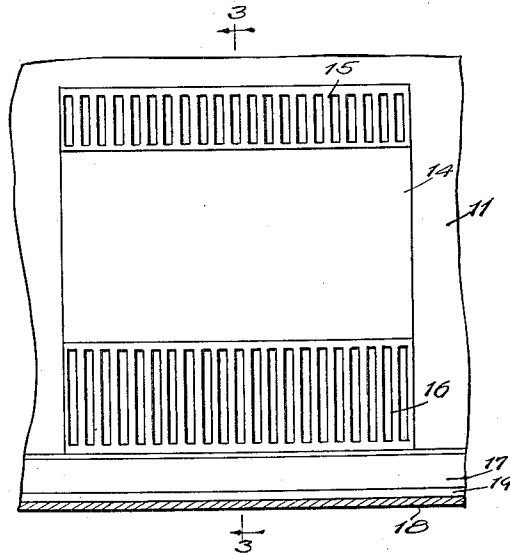
1,853,314

HEATING APPARATUS

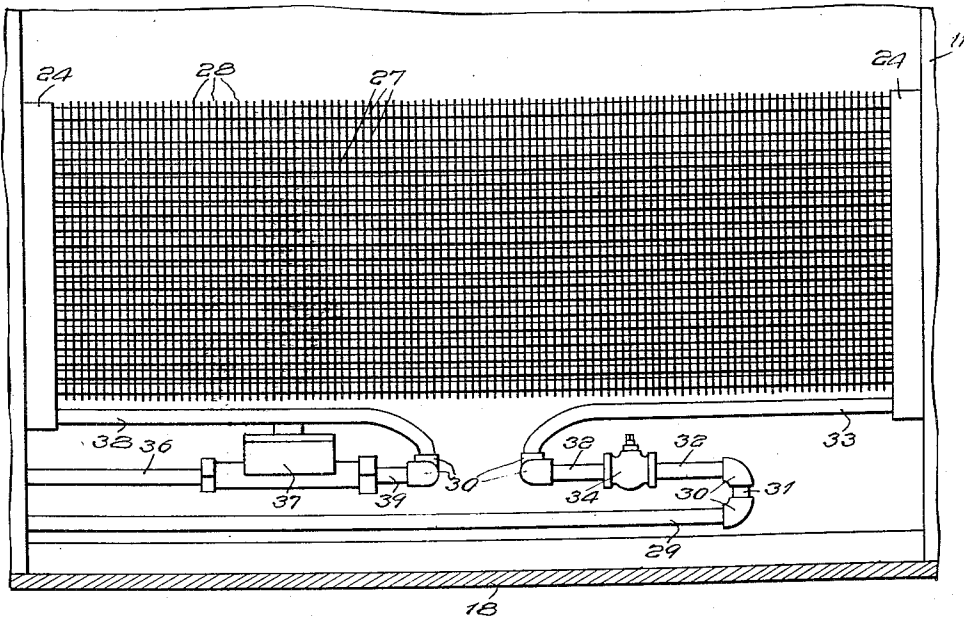
Filed June 17, 1929

2 Sheets-Sheet 1

*Fig. 1.*



*Fig. 2.*



Witness:

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April 12, 1932.

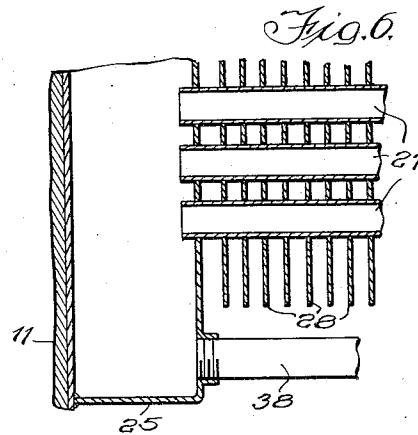
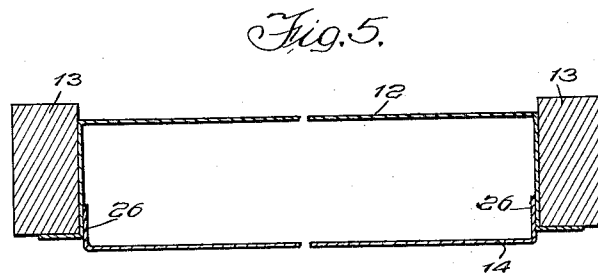
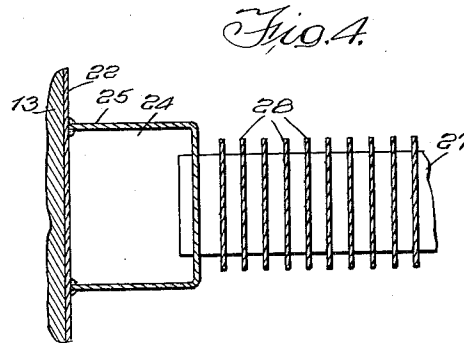
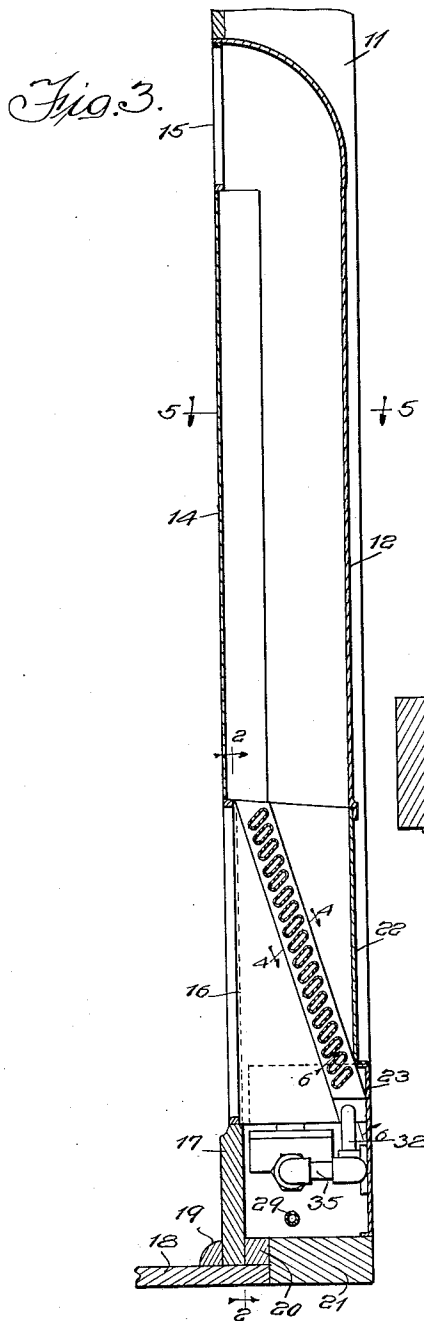
A. B. MODINE

1,853,314

HEATING APPARATUS

Filed June 17, 1929

2 Sheets-Sheet 2



Witness:

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## UNITED STATES PATENT OFFICE

ARTHUR B. MODINE, OF RACINE, WISCONSIN, ASSIGNOR TO MODINE MANUFACTURING COMPANY, OF RACINE, WISCONSIN, A CORPORATION OF WISCONSIN

## HEATING APPARATUS

Application filed June 17, 1929. Serial No. 371,360.

An object of the invention is the provision of a heating device of the kind described which is alike easily assembled and installed in either the wall of old or new buildings.

Still another object of the invention is the provision of heating apparatus of the kind described, which, when in place, adds ornateness to the wall in which the apparatus is installed.

Another object of the invention is the provision of a heating device of the kind described which is self compensating for expansion and contraction due to variations in temperature.

A still further object of the invention is the provision of heat exchange devices of the kind described which are inexpensive to manufacture, easily installed, durable, reliable and highly satisfactory for their intended purposes.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawings wherein like reference characters indicate like or corresponding parts:

Fig. 1 is a front elevational view of the device as it appears when built into the wall of a room, or the like;

Fig. 2 is a section along the line 2—2 of Fig. 1;

Fig. 3 is a transverse section along the line 3—3 of Fig. 1 drawn to a larger scale;

Fig. 4 is a section along the line 4—4 of Fig. 3 drawn to a larger scale;

Fig. 5 is a section along the line 5—5 of Fig. 3; and

Fig. 6 is a section along the line 6—6 of Fig. 3 drawn to a larger scale.

Referring now more particularly to the drawings, the numeral 10 generally designates a heat exchange device installed in a wall 11. The device includes a radiator unit comprising oppositely disposed header tanks 24 connected by horizontally extending tubes 27.

The device includes a plurality of plates forming upper and lower sections of a housing or casing. A bottom plate 23, an intermediate plate 22 and an upper plate 12 are positioned adjacent the back portion of the wall 11 to form the rear wall of the casing.

The plates 12 and 14 form an independent upper section of the housing or casing which cooperates with a lower section of the casing of which the plate 22 forms a part.

The plate 12 has its ends turned inwardly to form side walls of the housing and then again outwardly to form a flange fitting over the outer face of adjacent studding framing timbers 13. The upper end of the plate 12 is curved outwardly for a purpose hereinafter more particularly described.

The front plate 14 together with an upper grille 15 and a lower grille 16 form front closing members in substantial alignment with the wall surface. The grille 16 forms a part of the lower section of the housing and preferably extends down to a base board 17. The base board 17 forms no part of the device and is merely a continuation of the base board which usually forms a part of the wall of a room. A quarter round 19 is positioned at the junction of the base board 17 with the flooring 18. For the particular portion of the wall in which the device is installed, a strip 20 is provided to hold the base board 17 securely in position. A base timber 21 is also provided in the bottom portion of the device to provide a fastening means for the inwardly turned flange on the plate 23.

The housing is assembled by first placing the plate 23 at the bottom of the structure and then fastening the plate 22 thereon, the

plates 22 and 23 for this purpose having corresponding overlapping flanges. The plate 12 is projected outwardly at its lower edge to form a flange overlapping the upper edge of the plate 22. It is obvious that the plate 22 can be placed in position or removed by merely tilting the plate forwardly or rearwardly. Any suitable means may be provided for fastening the plate 14 and the grilles 15 and 16 in position.

The air to be heated enters the device through the lower grille 16 and passes between the tubes 27 and thence upwardly to the top of the housing from which it is deflected by the curved portion of the plate 12.

Heating fluid is supplied to the radiator unit through a feed line comprising a horizontal pipe section 29, a plurality of L's 30 interconnected by nipples 31, 32, and 35 and a curved pipe section 33. The pipe section 33 discharges into one of the header tanks 24 from which the fluid travels through the tubes 27 into the oppositely positioned header tank 24. A curved pipe section 38 corresponding to the curved pipe section 33 provides an outlet for the fluid from the last mentioned header tank 24. From the pipe section 38, the fluid travels through a plurality of L's 30 which are inter-connected by means of nipples 35 and 39 and thence into a trap 37. From the trap 37, the fluid flows through a pipe section 36 to the point of discharge. The arrangement of the feed and discharge pipe sections as shown permits a considerable expansion or contraction due to variations in temperature without placing any unusual strain or stress upon the various parts.

The tanks 24 are constructed by fastening a U-shaped plate 25 to the side wall portions of the plate 22, the connections between the plates being made water-tight by brazing, welding or other suitable means. The upper ends of the tanks 24 terminate adjacent the upper edge of the grille 16 and extend downwardly and rearwardly terminating adjacent the back wall and opposite the lower edge of the grille 16, the radiator unit being of substantially the same depth as the grille. The radiator unit comprising the tanks 24 and the tubes 27 is thereby inclined downwardly and rearwardly making access to the pipe fittings easy upon removal of the grille 16.

The tubes 27 are arranged in parallel relation with the spaces between the individual tubes inclined upwardly and rearwardly so that air in passing through the grille 16 in a generally horizontal direction strikes the tubes and is deflected upwardly and rearwardly with the result that the speed of the air is retarded sufficiently to transfer a considerable portion of the heat to the air. The transfer of heat from the tubes to the passing air currents is accelerated by mounting a

plurality of transversely extending fins 28 on the tubes.

The device is assembled by first installing the feed and discharge pipe sections and connecting the radiator unit thereto with the plates 23 and 22 in position. The plate 12 will then be assembled by mounting its lower edge upon the top of the plate 22 and pushing it backwardly into position. The grilles 15 and 16 and the front plate 14 can then be installed. The device is especially adapted for radiator units of considerable length wherein the expansion or contraction due to variations in temperature will be considerable.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understood as limiting myself to the exact form, construction, arrangement, and combination of parts herein shown and described or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. In a device of the kind described, a vertically extending housing having cooperating upper and lower sections, the rear wall of the upper section being turned outwardly to form a cover, the front wall of the lower section comprising a removable inlet grille plate, and a radiator unit positioned in the housing with its upper end adjacent the inlet grille plate and its lower end adjacent the rear wall of the housing.

2. In a device of the kind described, a vertically extending housing having cooperating upper and lower sections, the rear wall of the upper section being turned outwardly to form a cover, an outlet grille on the front wall of the upper section adjacent said cover, the front wall of the lower section comprising an inlet grille plate, and a radiator unit positioned in the housing with its upper end adjacent the inlet grille plate and its lower end adjacent the rear wall of the housing, said housing being built into the wall of a room with the grille plates and the front wall in substantial alignment with the wall surface.

3. In a device of the kind described, a vertically extending housing having cooperating upper and lower sections, the rear wall of the upper section being turned outwardly to form a cover, an outlet grille in the front wall of the upper section adjacent said cover, the front wall of the lower section comprising a removable inlet grille, and a radiator unit positioned in the lower section adjacent the inlet grille, said housing being built into the wall of a room with the grilles and the front wall in substantial alignment with the wall surface and the side walls of the housing fastened to framing members of the wall.

4. In a device of the kind described, the

combination of a radiator including fluid conducting tubes, tanks connected with the opposite ends of said tubes, and a housing for said radiator, said housing providing a wall of said tanks, said housing having an opening in a wall thereof, said radiator being arranged at said opening and being inclined from the upper edge of said opening to the rear wall of said housing adjacent the lower edge of said opening.

5. In a device of the kind described, a vertically extending housing having end walls, the lower portion of the front wall having an air inlet opening, and an inclined radiator unit positioned in the housing adjacent the inlet opening, said radiator unit comprising oppositely positioned header tanks, the end walls of the housing providing a wall of said tanks, a plurality of tubes connecting said tanks, said tanks having their upper ends arranged adjacent the upper portion of the inlet opening and their lower ends arranged adjacent the rear wall of the housing.

6. In a device of the class described, the combination of a vertically extending housing having an opening at the upper and lower portions of said housing, a radiator unit located at the lower opening, fluid inlet and outlet pipes arranged below said radiator unit communicating with said radiator unit, and a grille extending across said lower opening, said grille being removable to permit of access to said pipes and radiator unit.

7. In a device of the class described, the combination of a vertically extending housing having an opening at the upper and lower portions of said housing, a radiator unit located at and extending across the lower opening, fluid inlet and outlet pipes arranged below said radiator unit communicating with said radiator unit, and a grille extending across said lower opening, said grille being removable to permit of access to said pipes and radiator unit.

8. In a device of the class described, the combination of a vertically extending housing having an opening at the upper and lower portions of said housing, a radiator unit located at the lower opening and extending from the rear of said housing adjacent the lower edge to the upper edge of said opening, fluid inlet and outlet pipes arranged below said radiator unit communicating with said radiator unit, and a grille extending across said lower opening, said grille being removable to permit of access to said pipes and radiator unit.

9. A radiator comprised of a member providing a casing having an opening provided in the upper and lower portion thereof and a radiator unit located in the casing adjacent the lower opening, the casing being open at the front, a member providing a closure for said open front, and a removable grille located at the lower opening.

10. A radiator comprised of a member providing a casing having an opening provided in the upper and lower portion thereof and a radiator unit located in the casing adjacent the lower opening, the casing being open at the front and having flanges extending laterally from the side walls of said casing, and a member providing a closure for the open front of said casing.

In witness whereof, I hereunto subscribe my name this 22nd day of May, A. D. 1929.

ARTHUR B. MODINE.

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**CERTIFICATE OF CORRECTION.****Patent No. 1,853,314.****Granted April 12, 1932, to****ARTHUR B. MODINE.**

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, before line 1, insert the following paragraph:-

My invention relates to heat exchange devices and more particularly to radiators which are built into the wall of a room with the front of the device in substantial alignment with the wall surface.

and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of June, A. D. 1932.

(Seal)

**M. J. Moore,**  
**Acting Commissioner of Patents.**