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HEAT EXCHANGE DEVICE

Filed May 15, 1929

Fig. 1.

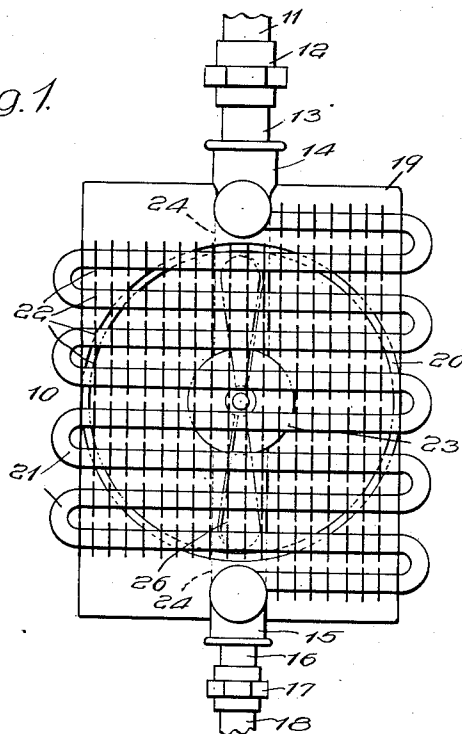
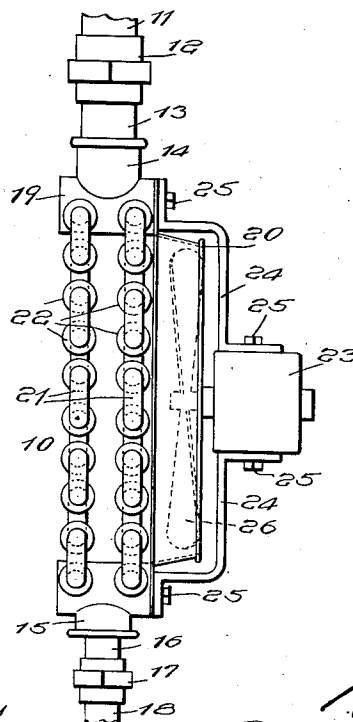


Fig. 2.



Witness:

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HEAT EXCHANGE DEVICE

Application filed May 15, 1929. Serial No. 363,217.

My invention relates to heat exchange devices and its object is broadly to provide improved heating apparatus which is convenient and efficient in operation.

A particular object of the invention is to provide improved construction for that class of heating devices which comprises radiator units adapted to be suspended from steam or hot water pipes by means through which the heating fluid is supplied to the radiator units.

Another object is the provision of improved heat exchange apparatus which is self adjusting to compensate for the contraction and expansion due to changes in temperature.

A further object of my invention is the production of a device of the character described that is simple, convenient, durable, and satisfactory for use wherever found applicable.

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.

Referring now to the drawings forming part of this specification:

Figs. 1 and 2 are, respectively, front and side elevational views of the device.

Referring now more particularly to the drawings, the device includes a radiator unit generally designated by the numeral 10. The device is suspended from an inlet pipe 11 with which the radiator unit is connected through a union 12 and a nipple 13. The nipple 13 discharges directly into an upper T-shaped header 14.

A lower T-shaped header 15 is connected with a discharge pipe 18 through a nipple 16 and a union 17. The headers 14 and 15 are connected by a plate 19, the headers and plate together forming a supporting frame for the radiator unit 10. The radiator unit 10 is shown as comprising two coils of tubing 21 connecting the upper header 14 with the lower header 15 and a plurality of fins 22.

Only one coil of tubing 21 or any number more than one may be used in each radiator unit as desired. The horizontal sections of the adjacent tubings 21 are shown in alignment. Such sections may be arranged in staggered relation, if desired, and the horizontal distance between adjacent tubings 21 may be varied to suit conditions. Each coil of tubing 21 is turned to form a plurality of parallel horizontal sections positioned in a vertical plane. This arrangement and construction of the coils of tubing 21 permits the tubing to contract and to expand with changes of temperature without causing any undue strain on the device or any spreading or change in the spaced relationship of the header members 14 and 15 with which the tubing connects. The plate 19 is fastened to the header members 14 and 15 by any desired means, such as bolts, welding or the like.

The plate 19 has an annulus 20 symmetrically positioned therein to accommodate a fan 26. The fan 26 is supported and driven by a motor 23. A pair of vertically extending bars 24 support the motor 23, the bars being fastened to the members 14 and 15 and to the motor by bolts 25.

A plurality of the fins 22 are mounted on each of the horizontal lengths of tubing 21 and are preferably arranged in uniform spaced relation. The fins 22 are shown as circular plates or sheets of metal centrally apertured for mounting upon the tubing 10. The central apertures of the fins 22 are made to form a close fit with the tubing 21 upon which they are mounted.

The parallel horizontal sections of the tubing 21 may be spaced vertically as desired, the fins 22 being preferably of substantially the same diameter as the vertical spacing of such horizontal sections, thereby providing for substantial contact of the fins on one horizontal section with the fins on the adjacent upper and lower horizontal sections. The fins 22 are arranged in vertical alignment whereby they function in substantially the same manner as would fins formed of continuous vertical plates. Since it is impossible to assemble or mount continuous vertical plates on the horizontal sections as fins,

the circular fins 22 are provided in vertical rows to accomplish the same result.

It is obvious that rotation of the fan 26 will drive air through the radiator unit 10 and that the air is heated in passing through the cells formed by the horizontal sections of the tubing 21 and the vertically arranged rows of fins 22. The radiator unit 10 is adapted to be turned to direct the heated air in any desired direction in the room. The device is adapted to be turned relative to the inlet pipe 11 and the outlet pipe 18 by reason of the threaded connections of the pipes with the unions 12 and 17 respectively.

Thus it will be seen that I have provided a heating device which is of simple construction and is adapted to be suspended from a steam or hot water main; is self-compensating to provide for contraction and expansion due to changes in temperature and which may be rotated to direct heated air coming therefrom to any desired portion of the room in which the device is mounted.

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 apparatus of the kind described, a supporting frame including oppositely positioned header tanks and a radiator unit connecting the tanks, said radiator unit comprising a plurality of adjacent substantially straight sections of tubing arranged in parallel relation connected to form a continuous conduit and means for advancing air through said unit, said means being connected with a support by said header tanks.

2. In apparatus of the kind described, a supporting frame including oppositely positioned elements providing supports and header tanks, a radiator unit connecting the tanks, said radiator unit comprising a plurality of adjacent substantially straight sections of tubing connected to form a continuous conduit, a frame extending between said header tanks, and means for advancing air through said radiator, said means being supported by said frame.

3. In apparatus of the kind described, a supporting frame including oppositely positioned elements providing supports and header tanks, and a radiator unit connecting the tanks, said radiator unit comprising a plurality of conduits, each of said conduits taking the form of a plurality of connected sections of tubing arranged to form a continuous conduit, means for advancing air through said radiator unit, and an arm which extends from one of said tanks providing

means for supporting said air advancing means.

4. In apparatus of the kind described, a supporting frame including oppositely positioned header tanks, and a radiator unit connecting the tanks, said radiator unit comprising a plurality of conduits separately connecting said tanks, each of said conduits taking the form of a plurality of connected sections of tubing arranged in parallel relation, a member forming an annulus located at one side of said conduits, and an arm extending from one of said tanks providing means for supporting the means for advancing air through said conduits, said annulus being located between said arm and radiator unit.

5. In apparatus of the kind described, a supporting frame including upper and lower tanks, a radiator unit comprising a plurality of conduits separately connecting the header tanks, each of said conduits taking the form of a plurality of connected horizontal sections arranged in spaced relation in a vertical plane and connected at their ends with adjacent upper and lower sections to form a continuous conduit, an element having an opening, said element being arranged at one side of said radiator unit, air advancing means, an element of said air advancing means being located in said opening and having a motor arranged at one side of said element, and means for supporting said air advancing means, said supporting means having its opposite ends respectively connected with one of said tanks and said motor.

6. In apparatus of the kind described, a supporting frame including oppositely positioned header tanks, and a radiator unit connecting the tanks, said radiator unit comprising a plurality of adjacent substantially straight sections of tubing arranged in parallel relation connected to form a continuous conduit, and a fan operable to drive a column of air through the radiator unit, a member providing an annulus secured to said tanks, a motor for driving said fan, the annulus being arranged between the motor and radiator unit, and a support for said motor extending inwardly relatively to said tanks.

7. In apparatus of the kind described, a supporting frame including upper and lower header tanks, tubular means for suspending the frame from a fluid supply pipe and for connecting the pipe with the upper header tank, a radiator unit comprising tubing connecting the header tanks, said tubing taking the form of a plurality of horizontal sections arranged in spaced relation and connected at their ends with adjacent upper and lower sections to form a continuous conduit, an outlet pipe for the lower header tank in vertical alignment with the supply pipe, and means operable to permit the frame and radiator unit to be rotated about the axis of said pipes.

8. In apparatus of the kind described, a supporting frame including upper and lower header tanks, tubular means for suspending the frame from a fluid supply pipe and for
5 connecting the pipe with the upper header tank, a radiator unit comprising tubing connecting the header tanks, said tubing taking the form of a plurality of horizontal sections arranged in spaced relation and connected at
10 their ends with adjacent upper and lower sections to form a continuous conduit, a fan supported by said tanks and being operable to drive a column of air through the radiator unit, an outlet pipe for the lower header tank
15 and means operable to permit the frame and radiator unit to be rotated about the axis of said tubular means.

9. In apparatus of the kind described, a supporting frame including upper and lower
20 header tanks, tubular means for suspending the frame from a fluid supply pipe and for connecting the pipe with the upper header tank, a radiator unit comprising tubing connecting the header tanks, said tubing taking
25 the form of a plurality of horizontal sections arranged in spaced relation and connected at their ends with adjacent upper and lower sections to form a continuous conduit, a plurality of plates forming fins mounted on
30 each of said sections, a fan operable to drive a column of air through the radiator unit, an outlet pipe for the lower header tank in vertical alignment with the supply pipe and means operable to permit the frame and radi-
35 ator unit to be rotated about the axis of said pipe.

10. In apparatus of the kind described, a supporting frame including header tanks, a radiator unit comprising tubing connecting
40 the header tanks, said tubing taking the form of a plurality of sections arranged in spaced relation and connected at their ends with adjacent sections to form a continuous conduit, air advancing means associated with
45 said tanks and tubing to thereby provide a heat exchange unit composed of said sections and air advancing means, said tanks providing means for connecting said apparatus to a support, and said support providing means
50 through which fluid is supplied to said radiator unit.

In testimony whereof, I have hereunto signed my name.

ARTHUR B. MODINE.

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