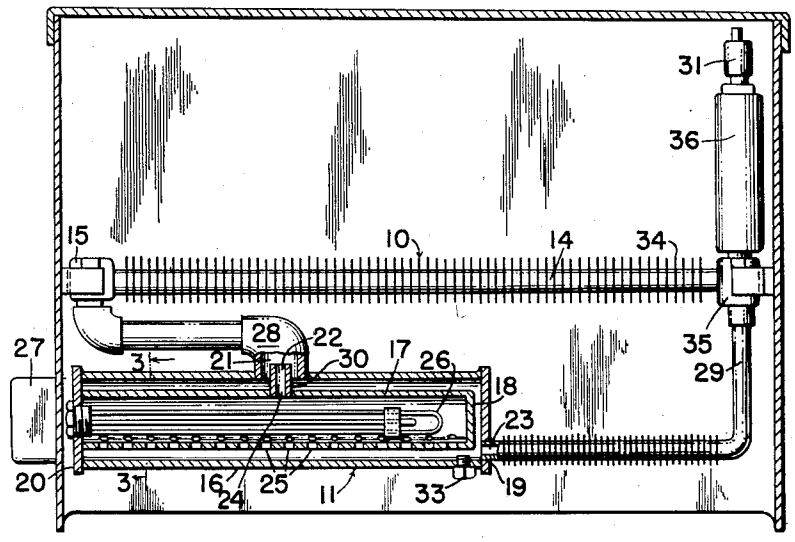
July 1, 1958 C. Z. ALEXANDER 2,841,685

RADIATORS

Original Filed Nov. 15, 1952 2 Sheets-Sheet 1

FIG. 1



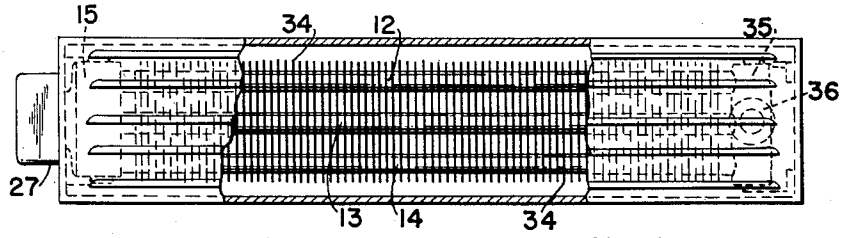


FIG. 2

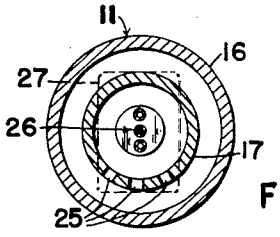


FIG. 3

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July 1, 1958 C. Z. ALEXANDER 2,841,685

RADIATORS

Original Filed Nov. 15, 1952 2 Sheets-Sheet 2

FIG.4

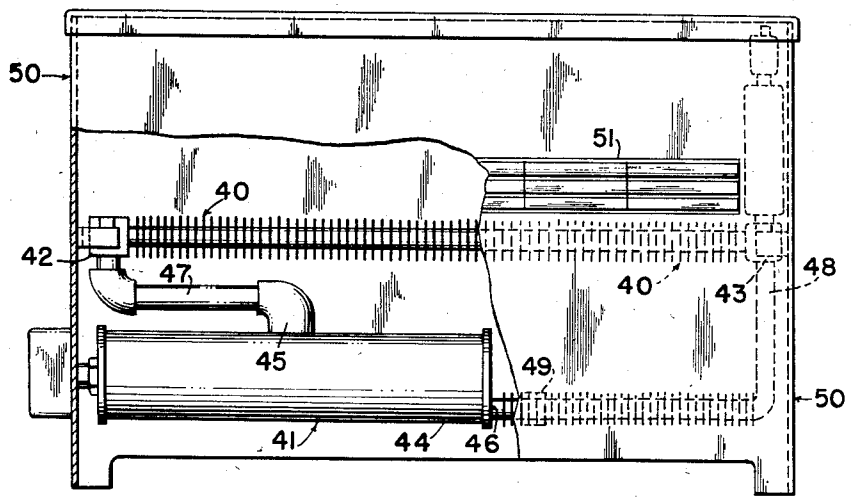


FIG.5

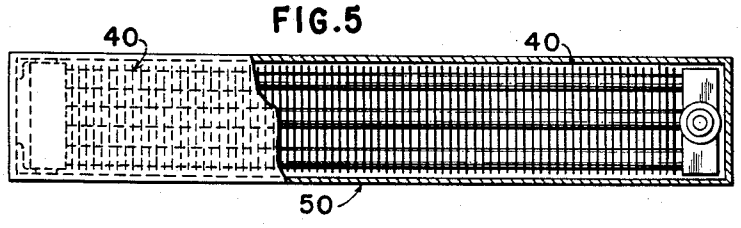
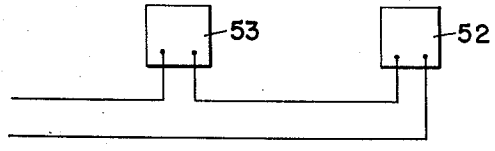


FIG.6



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RADIATORS

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Original application November 15, 1952, Serial No. 320,662, now Patent No. 2,736,790, dated February 28, 1956. Divided and this application February 27, 1956, Serial No. 567,968

3 Claims. (Cl. 219—38)

This invention relates to improvements in radiators for heating purposes.

This application is a division of my copending application, Serial No. 320,662, filed November 15, 1952, Patent No. 2,736,790, issued February 28, 1956.

It is an object of the instant invention to disclose a heating system in which each radiator is a self-contained unit requiring no central heating plant with interconnections intermediate the plant and the radiators.

A further object is to decrease the cost of installation of heating systems.

Another object is to provide a heating system requiring substantially no maintenance.

An additional object is to disclose a heating system especially suited for temporary use where below freezing temperatures may occur during periods of non-use.

It is also an object of the instant invention to disclose a light weight and highly efficient radiator.

Other objects of the instant invention will become apparent in the course of the following specification.

In the attainment of the aforesaid objectives, the improved radiator is made in two forms. In both forms, the temperature of a known radiating unit is controlled by circulating therethrough fluid the temperature of which is raised by an electric heating unit. In the first form, the fluid is circulated by thermo-siphonic action and in the second form by the natural tendency of a heated fluid to rise. To insure that the circulation of the fluid in the second form will be in one direction only, a check valve is inserted in the system.

The invention will appear more clearly from the following detailed description when taken in conjunction with the accompanying drawings showing by way of example, the preferred forms of the inventive concept.

In the drawings:

Figure 1–3 show the first form of the improved radiator constructed in accordance with the principles of this invention, and in which:

Figure 1 is an elevational view of the improved radiator in part section;

Figure 2 is a plan view in part section of the improved radiator shown in Figure 1, and

Figure 3 is a sectional view along 3—3 of Figure 1.

Figure 4 and 5 show the second form of the improved radiator, and in which:

Figure 4 is an elevational view of the improved radiator in part section; and

Figure 5 is a top view of the radiator shown in Figure 4.

Figure 6 is a wiring diagram showing the connections for the thermostatic control of both the room temperature and the temperature of the fluid in the heating unit.

Referring now in greater detail to the first form of the improved radiator shown in Figures 1–3 where like reference numerals indicate the like parts, reference numeral **10** indicates the radiating unit, and **11** the heating unit.

The radiating unit **10** is of known type in which three

spaced pipes **12**, **13**, and **14** are interconnected at one end by the header **15** and at the opposite end by the header **35**. The radiating surface of the pipes **12—14** is increased in a well known manner by the longitudinally spaced fins **34** transversely disposed across the three pipes. The fins may also be added to the later mentioned pipe line **29**. The radiating unit comes in several widths and a great variety of lengths.

The heating unit **11** is constituted in part of the outer housing **16** and the inner housing **17** both of which may be of circular cross section with the inner housing **17** held concentric within the outer housing **16**. One end of the inner housing **17** is closed by the end member **18** with the corresponding end of the outer housing closed by the end **19**. At the opposite ends, the inner and outer housings are closed by the common end member **20**.

At the top of the outer housing **16** is an outlet port **21** which may be in the center, as illustrated, or otherwise as desired. In the end member **19** of the outer housing **16** is an inlet port **23** adjacent the bottom.

At the top of the inner housing **17** is an outlet port **24** aligned with the previously mentioned outlet port **21** of the outer housing. Through the bottom of the inner housing **17** is a plurality of openings **25** which form passageways between the interiors of the outer housing **16** and the inner housing **17**.

The heating unit **11** is further constituted of the known electric heating element **26** inserted in the inner housing **17** through the end member **20**, as illustrated. The temperature of the element **26** is controlled by a thermostat **27** in a known manner and the terminals of which for connection to the house electrical supply are not shown.

A pipe line **28** interconnects the outlet port **21** of the outer housing **16** with the port of the header **15** of the radiating unit **10**. Another pipe line **29** connects the outlet port of the header **35** of the radiating unit with the inlet port **23** of the outer housing **16**. One end of a percolator tube **30** is inserted in the outlet port **24** of the inner housing **17** with the free end **22** of the tube extended into the pipe line **28** and concentric therewith as illustrated.

A known expansion chamber **36** is interconnected with the header **35**, as further illustrated.

In operation:

The radiating unit **10**, the pipe lines **28** and **29** and the heating unit **11**, including, of course, the inner and outer housings thereof, are filled with any heat transfer fluid such as water and to which an anti-freeze substance is added, if desired. Obviously, the boiling point of the fluid is predetermined. When the electrical energy is turned on, the heating element **26** in the inner housing **17** will rise in temperature and transfer the heat thereof to the fluid in the inner housing **17**. When the temperature of the fluid in the inner housing has been sufficiently raised it will be forced out of the percolator tube **30** into the pipe line **28**, forcing the fluid in advance thereof through the pipe line to the inlet port of the header **15**, thence through the pipes **12—14** of the radiating unit to the header **35**, thence out of the outlet port thereof through the pipe line **29** to the inlet port **23** of the outer housing **16**, and hence through the openings **25** into the interior of the inner housing **17** to replace the expelled fluid and for repetition of the cycle. Actually the thermosiphonic action of the heater for circulating the fluid is in the manner of a pump but without the necessity for any moving parts.

A removable member **31** in the expansion chamber **36** and a plug **33** in the bottom of the outer housing may be provided for servicing the unit.

Referring now to the second form of the improved

radiator shown in Figures 4 and 5, reference numeral **40** indicates the radiating unit, and **41** the heating unit.

The radiating unit **40** is substantially the same as the previously described radiating unit of the first form and has an inlet port **42** and an outlet port **43**.

The heating unit **41** is also substantially similar to the heating unit of the first form except that only one housing **44** is used. The housing **44** is provided with an outlet port **45** at the top and an inlet port **46** at the bottom. A pipe line **47** connects the outlet port **45** of the housing **44** to the inlet port **42** of the radiating unit. Another pipe line **48** connects the outlet port **43** of the radiating unit **40** to the inlet port **46** of the heating unit **41**. In the pipe line **48** is a check valve **49** so inserted that it opens only in the direction of the heating unit **41**.

In operation, fluid inserted in the system when raised in temperature in the heating unit will rise in the pipe **47** to force the fluid in advance thereof through the radiating unit **40**, thence out of the radiating unit through the pipe **48** and the check valve **49** to return to the heating unit **41** and a repetition of the cycle.

In both forms of the improved radiator, the radiating units are preferably housed in a cabinet **50** with the heating units located below the radiating units as most clearly shown in Figure 4. With the cabinet open at the bottom as illustrated, cool air in the room will enter the bottom of the cabinet to rise through the radiating unit and thence out of the louvers **51** which may extend to the top of the cabinet. With the boiling point of the fluid known, a thermostat **52** (Figure 6) can be set to prevent the temperature of the fluid from rising beyond the boiling point thereof. A second thermostat **53** connected in series with the thermostat **52** may be located in any part of the room for the control of the room temperature. Of course, the improved radiators are portable from room to room but may require a special electric circuit when an existing circuit might become overloaded.

It is obvious that various changes may be made in details within the scope of the appended claims without departing from the spirit of the invention. It is, therefore, to be understood that subject invention is not to be limited to the specific details shown and described.

What is claimed is:

1. A radiator comprising in combination, a radiating unit for a fluid heat transfer medium, a heating unit having an inner housing and containing the fluid disposed therein below and adjacent said radiating unit, and

means for circulating the fluid when raised in temperature within inner housing of said heating unit in one direction through the radiating unit.

2. A radiator comprising, in combination, a radiating unit for a fluid heat transfer medium, said radiating unit having a plurality of parallel pipes and headers interconnecting adjacent ends of said pipes and having an inlet and an outlet, respectively, a heating unit having an outer housing and an inner housing for the fluid disposed therein below and adjacent said radiating unit, said heating unit having an outlet formed in the top thereof and an inlet formed in the bottom thereof, a pipe connecting the outlet of the heating unit with the inlet of the radiating unit, a separate second pipe connecting the outlet of the radiating unit with the inlet of the heating unit, and electrical heating means within said inner housing of said heating unit for raising the temperature of said heat transfer medium.

3. A radiator comprising, in combination, a radiating unit having an outer housing and an inner housing for a fluid heat transfer medium, an electric heating unit for said heat transfer medium disposed therein below and adjacent said radiating unit, said radiating unit having an inlet port and an outlet port formed therein, said heating unit having an outlet port formed in the top thereof and an inlet port formed in the bottom thereof, a pipe line interconnecting the outlet port of said heating unit with the inlet port of said radiating unit, a second pipe interconnecting the outlet port of said radiating unit with the inlet port of said heating unit, a check valve disposed in said second-mentioned pipe and opening only in one direction of flow of the fluid from said radiating unit toward said heating unit, and an electric heating element disposed in within said inner housing of the heating unit for raising the temperature of said heat transfer medium.

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