Dec. 8, 1936. J. L. DAVIDSON 2,063,152

HEATING SYSTEM

Filed Feb. 2, 1931 2 Sheets-Sheet 1

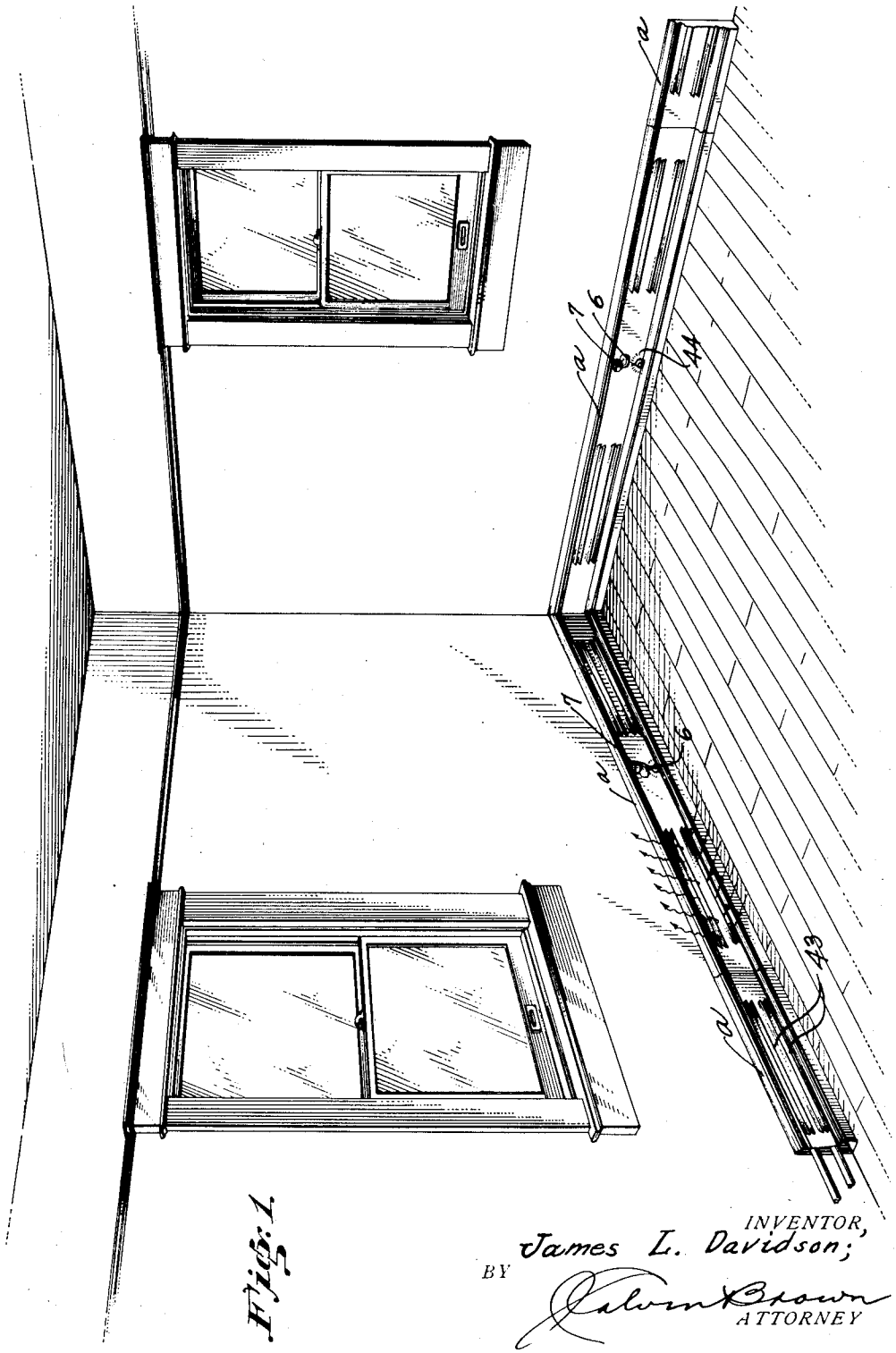


Fig. 1.

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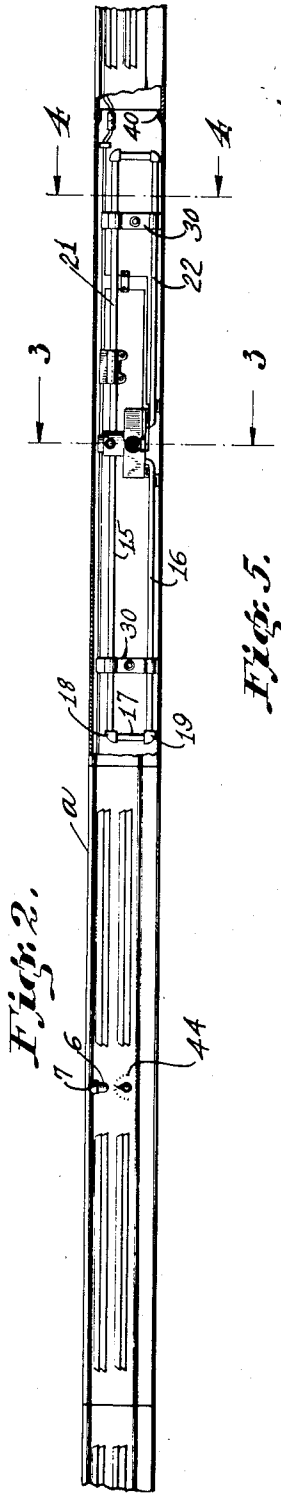


Fig. 2.

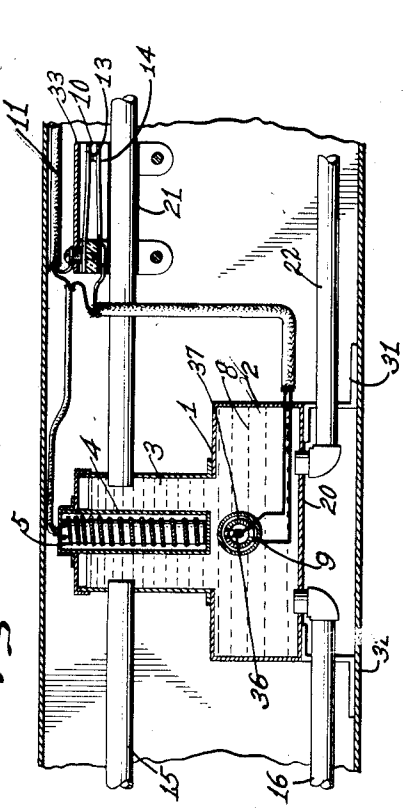


Fig. 5.

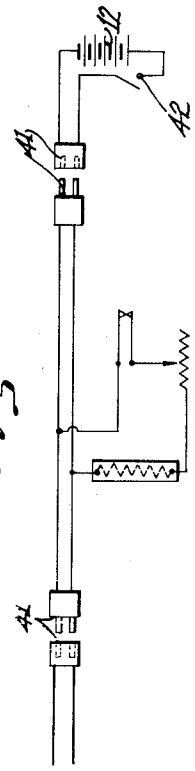


Fig. 6.

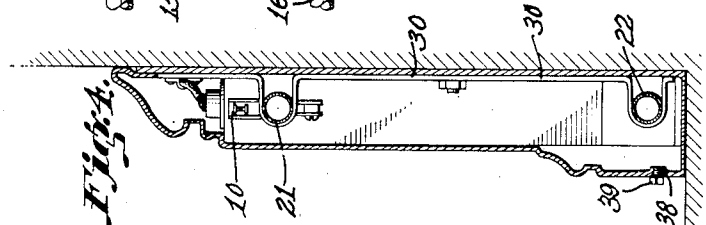


Fig. 4.

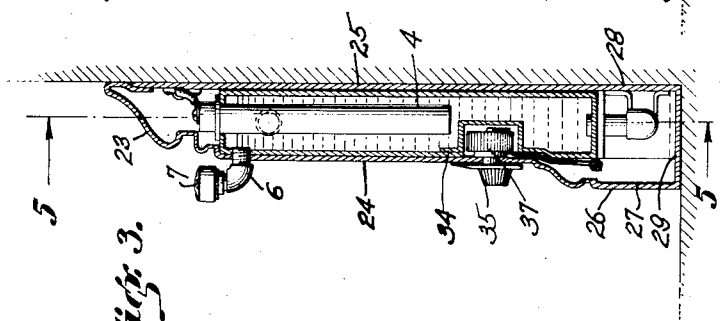


Fig. 3.

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UNITED STATES PATENT OFFICE

2,063,152

HEATING SYSTEM

James L. Davidson, Los Angeles, Calif.

Application February 2, 1931, Serial No. 512,937

7 Claims. (Cl. 219—38)

This invention relates to heating systems.

The invention has for an object the provision of a heating system so arranged as to permit uniform heating of a room. It is well known that the average room when heated either by a radiator, stove, or equivalent means, will be heated in only a portion of the room whereas remaining portions of the room are practically unaffected, or at best the temperature is not as great as that portion where the stove or heater is located. Certain heaters known as the "Radiant" type are supposed to heat a room uniformly but it common knowledge that they do not do so.

An object of the present invention is to provide a system whereby any portion of a room may be heated to any temperature desired, or all portions of a room may be heated to a uniform temperature.

It is apparent that with such a system as contemplated by this invention that less heat will actually be required to heat a room where the heat distribution is uniform than would be required where a single heating unit was utilized for heating all portions of the room. In other words, where a single unit is used, a greater heat must be maintained at one zone of the room. A common fault generally recognized in heating systems is the one just mentioned. A person may be sitting in one portion of a room, say near a heater and be perfectly comfortable whereas a person sitting in another portion of the room may be cold, and the existence of any draught in a room, such as by an open door, a partially open window and the like, creates currents which render the proper heating of a room difficult and non-uniform.

A further object of my invention is to provide a heating system wherein the actual heating units are not visible.

Another object is the provision of a heating system which is easily installed and may be supplied in units for immediate installation.

Another object is the provision of a heating system which may come as a unit structure and which may be installed without the necessity of cutting openings in the floor, wall or like structure of a building.

Another object is the provision of a system in which a heating unit is complete in and of itself, without the necessity of having connections with another master heating system.

Another object is the provision of a heating system which may operate either through hot water, electricity, steam, or the like.

Another object is the provision of a heating system which is inexpensive of manufacture, less expensive to install than existing heating systems, and which does not require a skilled plumber for its installation, which is fool-proof in construction, sightly in appearance, not subject to excessive wear or damage, a system which is easily adaptable to any type of installation whether it be for the home or an office, and which is generally superior to any existing heating systems.

With the above and other objects in view, the invention consists in the novel and useful provision, formation, construction, association and relative arrangement of parts, members and features, all as shown in a certain embodiment in the accompanying drawings, described generally, and more particularly pointed out in the claims.

In the drawings:

Figure 1 is a fragmentary perspective view of an installation embodying the invention,

Figure 2 is an elevation, partly in section, showing details of the system and means comprising the invention,

Figure 3 is a cross sectional view on the line 3—3 of Figure 2,

Figure 4 is a sectional view on the line 4—4 of Figure 2,

Figure 5 is a sectional view on the line 5—5 of Figure 3, and

Figure 6 is a wiring diagram.

Referring to the drawings, for convenience of illustration I have provided what may be termed heating units designated as an entirety by *a*. These so-called heating units are in sectional lengths and adapted to be joined together substantially as shown in Figure 1. As is evident from the drawings, the heating unit forms an integral portion of the base-board of a room. Thus, in one aspect of the invention I may consider the same as a base-board heating system. Now, if a plurality of serially arranged base-board units *a* are provided, it is evident that if the heat emanating from each base-board unit was substantially the same, that a room would be uniformly heated so far as a distribution of the heat adjacent the side walls of the room was concerned and that obviously the space enclosed by the base-board would be taken care of, but in any event, the room would be substantially uniformly heated. Thus, in the simplest form of my invention, I provide a base-board adapted to house or enclose a heating system and which base board may be arranged in units for cooperation either singly or jointly.

As stated in the preamble of this specification, the method of heating is relatively unimportant, but the means whereby the method may be suc-

cessfully carried out is of importance. I mean by this that the base-board is so constructed as to best house a heating system. Quite obviously, all rooms in order to have a finished appearance are provided with base-boards, and it is the purpose of my invention to utilize the base-boards for housing the heating units. Ordinarily, a base-board performs no useful function other than that of ornamentation or finish. It is true that some base-boards act to hide electrical conduits, telephone wires and the like, but the use of such a base-board is not universal due to expense. With my form of heating system and means, it is possible to house wires within the base-board if necessary or desirable.

In large heat distributing systems, such as the well known steam radiator system, it is customary to provide a boiler with pipes leading to the different floors of a building and to the steam radiators. Various systems are utilized, such as the force or gravity types, open systems, closed systems, and the like. For the purpose of illustration, I show a very simple form of heating system wherein I provide a tank 1 having different cross sectional area chamber portions, as shown at 2 and 3. The chamber portion 3 has depending therein a casing 4, within which casing is an electrical heating unit 5. A filler 6 is provided for the tank adjacent the uppermost portion of the chamber 3, as best shown in Figure 3. This filler is provided with a perforated cap 7.

In order to regulate the temperature of any fluid 8 such as would be introduced into the tank through the filler 6, I have provided a rheostat 9, and conductors are in series with said rheostat, thermostat 10 and coil 5. A conductor 11 leads to the thermostat and to the heating coil, this said conductor likewise leading to a source of current supply 12, see Figure 6. This thermostat is conventional in form comprising two metal members having different coefficients of expansion and adapted to carry contacts 13 and 14 which, in one instance, are in engagement and in a second instance will separate to break current through the thermostat and, of course, through the rheostat and heating coil.

I provide as the heat radiating element, a closed circuit pipe. For convenience in description, the pipe shown at 15 is termed the outgoing and the pipe at 16 as the return, these two pipes being joined by a short length pipe 17 through the medium of the usual elbows 18 and 19. The pipe 15 communicates with the chamber 3 adjacent the top thereof while the pipe 16 communicates with the chamber 2 through the bottom wall 20 of the tank. In the present instance, I provide a further pair of outgoing and return pipes likewise communicating with the upper and lower chambers of the tank, as shown at 21 and 22. The heating pipes as well as the tank with its heating element and regulating rheostat and thermostat are encased within the base-board. This base-board includes a mold 23 adapted to join spaced front and rear skirting members 24 and 25, respectively, and which skirting members in turn merge into an integrally formed or otherwise constructed base shoe 26, having front and rear portions and a base portion, for convenience designated as 27, 28, and 29, respectively. Hence it may be said that the base is hollow in construction and so arranged as to accommodate the heating means. As shown in the figures, the heating pipes are conveniently secured in position by means of strap hangers designated generally as 30, and the tank is secured to the base 29 of the base shoe through the medium of members 31 and 32.

The thermostat is within a casing 33 which casing is adapted to be clamped about either the pipe 15 or 21, that is to say, the egress or outgoing pipe from the chamber 3. For convenience, I have placed the rheostat within a casing 34 which casing is received within the tank 1, as best shown in Figure 3. This rheostat is regulated in the usual manner by turning a knob 35 which moves a contact arm 36 over the usual resistance coil 37. The front wall 26 of the base shoe is formed with a screw-threaded bore 38 adapted to receive a plug 39. This plug is placed adjacent the bottom of the tank 1. In case any overflow of fluid occurs from the tank 1, such fluid will be received within the confines of the base shoe and by removing the plug 39 most of this fluid should be drained.

Attention is directed to Figure 2, wherein it will be seen that the sections or units *a* are arranged so as to telescope in part. For instance, one end of each unit is reduced as to transverse width and height, as shown at 40 so as to be received within the confines of the end of the next succeeding unit. The electrical conduits may be joined together by connectors, as shown in Figure 6 at 41. If we assume that a room is constructed with units *a* throughout the room so that said units form an enclosure, I may regulate all of said units by a common switch 42. Thus, when the switch 42 is operated, current will flow to all of said units and if the rheostats are then properly adjusted, the amount of current flowing to each heating coil will be the same. It will be noted that I have provided longitudinally extending louvers, of which there may be a plurality for each unit, as shown at 43. These louvers may be arranged in any manner desired, such as upper and lower louvers. In the present instance, the louvers would be above the base shoe and, therefore, above the return pipes 16 and 22.

The operation, uses and advantages of the invention are as follows:

The thermostats can be adjusted to operate when a given heat has been obtained in the outgoing pipes 15 and 21. The tank is first filled to a certain level with the liquid, such as water, through the filler 6. This filler 6 is adjacent the top of the tank and acts as a means for the removal of air in the system so that there is no air trapped. When electrical current is turned on, the degree with which the heating coils will heat the fluid surrounding the same will depend upon a setting of the rheostat. Assuming that water is used and being heated, the hot water will flow through the outgoing pipes 15 and 21 and return to the bottom of the tank through the pipes 15 and 22. This is one form of thermo-syphon and is quite similar to the system used upon early automobiles before force-feed circulation was installed. It is elementary that the increase in volume of a given weight of water heated from 32° F. to 212° F. is about 1/23, or approximately 4.33%. Hence, for every 23 gallons in a system at 32° F., an allowance of 1 gallon must be made for expansion when the water in the system is raised to 212° F. In the present instance, pipes are used and the one inch pipe holds approximately ⅓rd of a pint of water per foot. Hence, expansion is not a serious problem in the present form of heating system. As stated, the rheostat will control the amount of electrical current flowing to the heating coil and after a given heat in the pipes is exceeded, the thermostat will

operate to break the current. It is thus possible to regulate the current flowing to the heating coil by the rheostat so that current may flow at a uniform rate. Graduations 44 on the front skirting member permit the rheostats to all be set to a common resistance. Of course, the system depicted is for direct current. If alternating current was used, a tapped transformer might be provided in place of the rheostat.

As I stated in the preamble to the specification, the invention does not reside in any particular heating system, as I may provide electrical heating coils between the front and rear skirts of the base-board. The position of the louvers allows for a circulation of air about any heating coil or heated pipe substantially in the manner illustrated by the arrows of Figure 1, wherein it will be seen that air is drawn through the bottom louvers and hot air emitted from the top louvers.

From a manufacturing standpoint, the invention lends itself to sheet metal working, in that the base-board may be of sheet metal. It will be seen upon inspection of Figures 3 and 4 that a single sheet of metal has been so rolled and molded as to form the base shoe, front and rear skirting and top mold.

The units of the invention could be made up in several different lengths so that almost any size room could be readily accommodated. No expensive plumbing is necessary, water in the system is conserved, the filter 6 being arranged to allow excess vapor pressure to escape to the atmosphere, and the electrical circuits are comparatively simple and will meet with underwriters' requirements. Furthermore, the cost of a base-board of the character of this invention is reasonably low, considering the character and the work to be performed by the base-board unit. Saving in space is, of course, effected. The ordinary type of radiator which must stand within a room is unsightly and uses space. If the enclosed type of radiator is utilized, then walls of unusual thickness must be built with increased cost of building construction. The present invention does not greatly increase the cost of construction. I do not confine my invention to a base-board having independent or serially associated heating units, as the base-board may enclose small radiator pipes connected with a central boiler and a switch 42 as well as the rheostat may represent means for turning off or on the heat supply. For instance, if a central boiler was utilized with steam pipes or hot water pipes leading to the radiator units within the units *a*, then it is intended that small valves should control the heat to be emitted from such radiator units either individually or all at one time.

It is obvious that various changes and modifications and variations may be made in practicing the invention in departure from the particular showing of the drawings without departing from the true spirit of the invention.

I claim:

1. A heating system and means for producing uniform heat throughout a room including base-board heating units, said units being arranged for interlocking relation, each base-board heating unit being provided with heating means, means for simultaneously producing joint operation of all of said heating means of the base-board units, and further means for each base-board unit for regulating the temperature of said heating units.

2. In a heating system for heating a room, a base-board, pipes confined therein, and means for supplying heat at spaced intervals to said pipes to thereby maintain the pipes at a substantially even temperature, comprising at spaced intervals a container incorporated in said base-board and rearwardly thereof for holding a fluid to be circulated through said pipes, and means in said container for heating the fluid in said container.

3. A heating system for a room, including a plurality of independently heated base-board heating units, each said unit being provided with a heat radiating pipe adapted to receive a fluid, a container rearwardly of said base adapted to hold a fluid in communication with said pipes, and means in said container for heating the fluid in said container; said heat radiating pipe so proportioned as to be substantially maintained at a selected uniform temperature by said fluid.

4. A heating system for a room, including a plurality of independently heated base-board heating units, each said unit being provided with a heat radiating pipe adapted to receive a fluid, a container rearwardly of said base adapted to hold a fluid in communication with said pipes, and regulatable electrical heating means for heating the fluid in said container, said heat radiating pipe so proportioned as to be substantially maintained at a selected uniform temperature by said fluid.

5. In a base-board heater for rooms, a base-board, a tank adapted to hold a fluid confined within said base-board, a continuous pipe confined by said base-board and having a connection with said container at separated zones thereof, and an electrical heating element within said container at a given zone of said container for producing fluid circulation through said pipe when the fluid is heated by said electrical heating unit.

6. In a base-board heater for rooms, a base-board, a tank adapted to hold a fluid confined within said base-board, a continuous pipe confined by said base-board and having a connection with said container at separated zones thereof, an electrical heating element within said container at a given zone of said container for producing fluid circulation through said pipe when the fluid is heated by said electrical heating unit, said electrical heating unit being adapted to be associated with a source of current supply, and means for regulating the flow of current of said electrical heating unit to in turn regulate the heat radiated by said pipe.

7. In a base-board heater for rooms, a base-board, a tank adapted to hold a fluid confined within said base-board, a continuous pipe confined by said base-board and having a connection with said container at separated zones thereof, an electrical heating element within said container at a given zone of said container for producing fluid circulation through said pipe when the fluid is heated by said electrical heating unit, said electrical heating unit being adapted to be associated with a source of current supply, and means for regulating the flow of current of said electrical heating unit to in turn regulate the heat radiated by said pipe, in combination with thermostatic means for automatically discontinuing current supply to said electrical heating unit when a given heat is exceeded in said pipe.

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