March 18, 1930. J. F. SKOLD 1,750,907

ELECTRICALLY HEATED RADIATOR

Filed Jan. 16, 1929

Fig. 1.

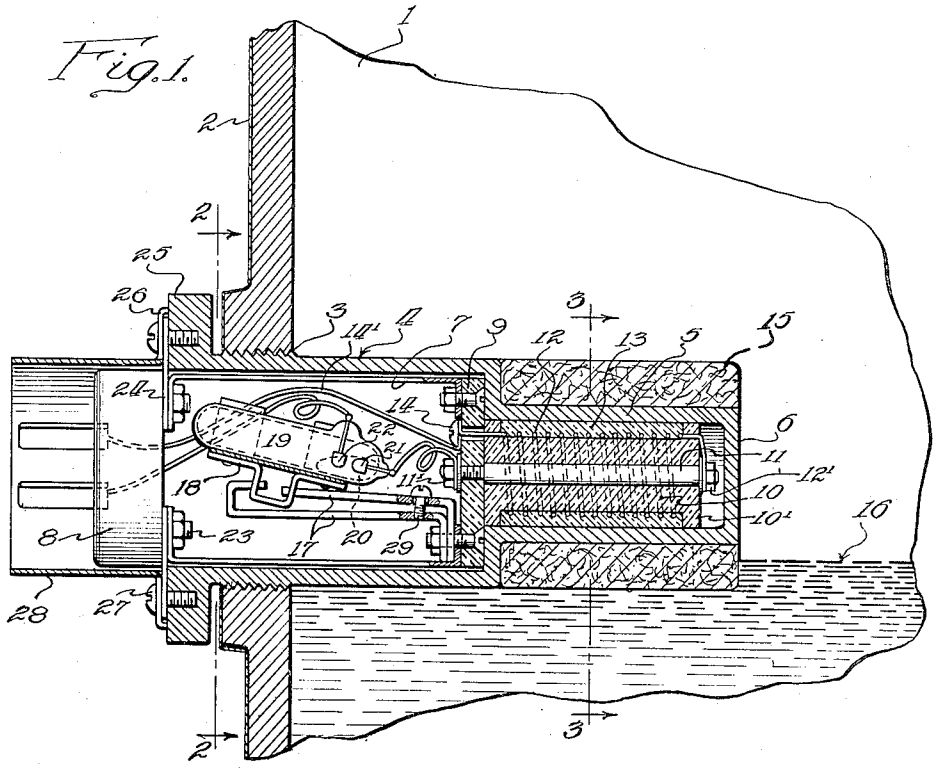


Fig. 2.

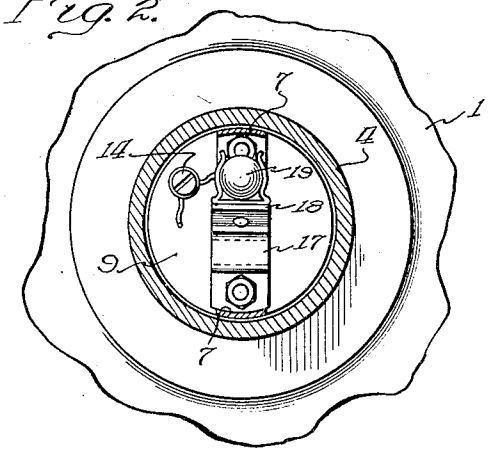
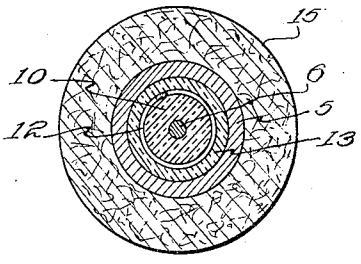


Fig. 3.



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UNITED STATES PATENT OFFICE

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ELECTRICALLY-HEATED RADIATOR

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This invention relates to an electric vapor radiator and particularly to an attachable heating unit for standard radiators.

The main objects of this invention are to provide an improved and simplified heating unit for radiators of standard design that may be successfully operated under vacuum conditions; to provide an improved construction in a device of the class described for facilitating convenient removal and replacement of the heating element without breaking the vacuum in the radiator; to provide an improved heating unit of compact construction being substantially concealable in a radiator to avoid unsightliness of external mechanism; and to provide an improved arrangement of a heating element and a thermostatic switch which will permit both the switch and the heating element to be assembled in, and removed from a radiator simultaneously as a unit.

In the accompanying drawings, I have illustrated a specific embodiment of my invention in which:

Figure 1 is a fragmentary section of a radiator showing a longitudinal section of my improved heating unit.

Fig. 2 is a transverse section taken on the line 2—2 of Fig. 1.

Fig. 3 is a transverse section taken on the line 3—3 of Fig. 1.

In general my invention comprises a tubular housing or receptacle provided with threads for mounting it in an aperture in a radiator and having an inner end section of reduced diameter provided with a wick for absorbing liquid and retaining the same in close proximity to the surface of the inner extremity of the receptacle. A heat unit comprising a frame having a contact plug at its outer end, a heat element at its inner extremity and a thermostatic switch intermediate its ends is removably mounted in the housing. The heat element is covered with suitable insulating material and closely fits within the inner section of the housing.

In the form shown, the radiator 1, of standard design and preferably comprising cast iron, is provided on its external surfaces with a varnish-like coating 2 for sealing the pores in the metal and rendering it impervious to air. One of the threaded apertures of the radiator, not shown in the drawing, is plugged and the other aperture 3 is provided with an inwardly extending housing or receptacle 4 comprising an inner end portion 5 of reduced diameter. The housing 4 is preferably cylindrical in shape and is closed at its inner extremity 6. The outer periphery of the housing 4 is threaded or secured in any other air-tight manner in the aperture 3 of the radiator.

A frame 7 which is provided at its outer end with a contact plug 8 and at its inner extremity with a disk 9 preferably comprising lava is positioned within the larger portion of the housing. The disk 9 supports a heating element comprising a core 10 preferably consisting of lava having enlarged extremities 10^1. The outer extremity 10^1 is secured to the disc 9 by a bolt 11 and a nut 11^1.

A resistance wire 12 is wound on the core 10 and one end thereof is clamped to the bolt 11 by a nut 12^1. The resistance wire 12 extends through an aperture in the disc 9 and is secured to the disc by a screw 14 which in turn is electrically connected to a terminal of the plug 8 by a conductor 14^1. The portion of the core between the enlarged ends 10^1 is built up to the diameter of the end portions by electro-insulating cement 13 which covers the resistance wire 12 and holds the same in place. The heating element is slightly smaller in diameter than the inner diameter of the section 5 of the housing and extends therein to.

A cylindrical wick 15 is mounted on the inner end portion 5 of the housing and is partly submerged in a liquid 16 which has a boiling point lower than that of water though, if desired, water may be employed. The wick 15 absorbs the liquid and retains it in close proximity to the entire surface of the inner section 5 of the housing which is heated by the resistance wire 12.

A thermostatic switch comprising a bi-metallic bracket 17, a tube holder 18 and a tube 19 is mounted between the disc 9 and the contact plug 8. The tube carrier 18 is provided with slots in which end portions of the mem-

bers comprising the bracket are loosely engaged. A globule of mercury 20 is confined in the tube 19 and is adapted to close a circuit between the terminals 21 and 22 which extend into the tube, when the latter is in the position shown in Fig. 1. One terminal of the switch is electrically connected with a terminal of the contact plug 8 and the other terminal of the switch is electrically connected with the resistance wire 12 by the bolt 11 and a conductor secured to the bolt by the nut 11^1.

When a predetermined temperature is attained, the tube is rocked in an anti-clockwise direction by the members of the bracket 17 and the globule of mercury is moved by gravity out of engagement with the contacts 21 and 22. In this manner the opening and closing of the circuit through the heat element is automatically controlled.

The plug 8 is rigidly attached to the frame 7 by bolts 23 on which brackets 24 are also mounted. These brackets 24 extend outwardly adjacent a peripheral flange 25 and the outer extremity of the housing. A tubular guard 28 comprising a flange 26 is positioned over the contact plug and is secured to the flange 25 by screws 27 which also extend through apertures in the brackets 24, thereby simultaneously attaching the tubular guard 28 and the frame 7 to the flange 25 of the housing.

When it is necessary to repair the heat element or any portion of the heat unit, the same may be removed bodily from the housing 4 by unscrewing the screws 27. The entire heat unit, including the thermostatic switch and the heat element, may be removed simultaneously without breaking the seal between the atmosphere and the interior of the radiator. Adjustment of the thermostatic switch for operation at desired temperatures is effected by screw 29.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. In an electric radiator, a housing having a closed extremity mounted in an aperture thereof, a removable unit in said housing comprising a frame, a heating element on one extremity of said frame, an enclosure positioned over said heating element and mounted on said frame, and a thermostatic switch mounted in said frame, said switch, heating element and enclosure being removable as a unit from said housing without admitting air to said radiator.

2. In an electric radiator, a tubular housing extending into the interior thereof, comprising an end portion of reducing diameter, a wick on said end portion for absorbing liquid and retaining the same in close proximity to the outer surface of said housing, and a heating unit insertable in said housing comprising a heating element and a thermostatic switch adapted to be assembled in and removed from said housing without admitting air into said radiator.

3. In an electric radiator of the class described, a receptacle extending thereinto having an open outer extremity and a closed inner extremity and having a threaded air-tight connection with said radiator for maintaining a vacuum therein, a heating unit extending into said receptacle comprising a frame and a heating element on one end thereof, a thermostatic switch within said frame electrically connected with said heating element, a contact plug on the frame electrically connected with said heating element, and an electro-insulating coating on said heating element fitting closely within the inner end portion of said receptacle for transmitting heat thereto, and a wick on the outer surface of the inner end of said receptacle for bringing a limited quantity of liquid into close proximity therewith, said heating unit being removable without admitting air to the interior of said radiator.

4. In an electric radiator, a tubular housing extending into the interior thereof, a wick on the inner end portion of said housing for absorbing liquid and retaining the same in close proximity to the outer surface of said housing, and a heating unit insertable in said housing comprising a frame and a heating element adapted to be inserted in and removed from said housing without admitting air into said radiator.

Signed at Chicago this 8th day of January 1929.

JOHN F. SKOLD.