April 27, 1937. G. E. STRAWSER 2,078,548

ELECTRIC HEATING SYSTEM

Filed Feb. 19, 1934

Fig. 1.

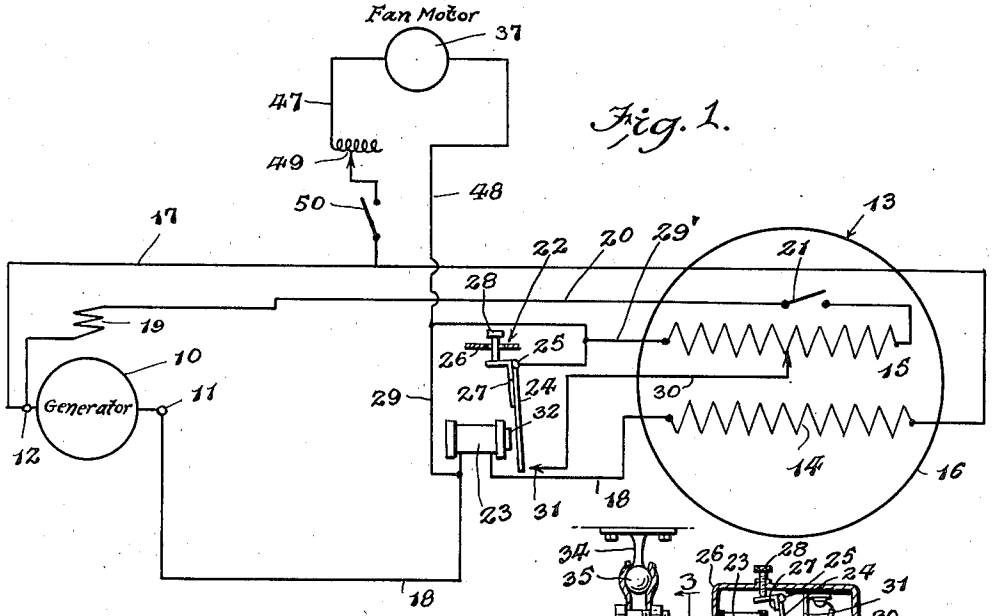


Fig. 2.

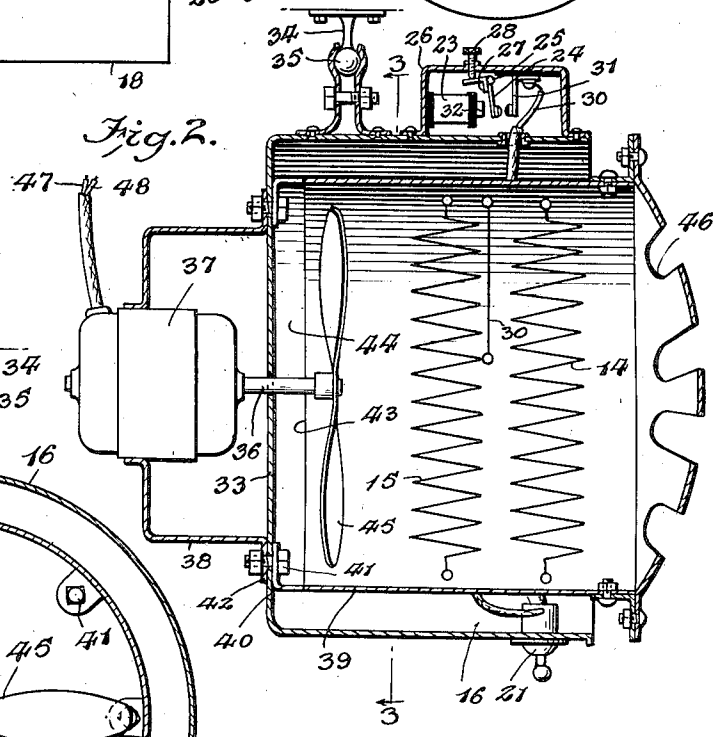
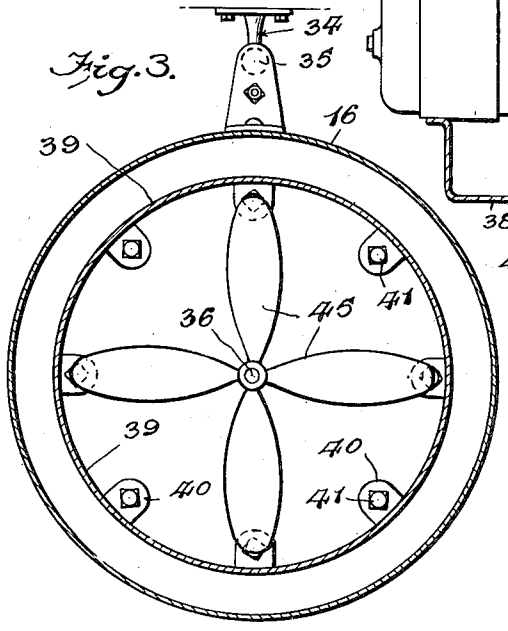


Fig. 3.



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ELECTRIC HEATING SYSTEM

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1 Claim. (Cl. 219—39)

My invention relates to electric heaters for automobiles and the like, and consists in the constructions, arrangements and combinations herein described and claimed.

It is a principal object of the invention to provide a heater and generator of rugged construction which may be readily installed upon a motor vehicle for converting electrical energy into heat units whereby to heat the interior of a motor vehicle body.

It is a further object of the invention to provide a heater of the character described wherein suitable adjusting means is provided whereby an automatic control of the heat given off by the heater is maintained constant regardless of the speed of the engine driving the generator associated with the heater unit.

A still further object of the invention is the provision of a novel construction of heater embodying a fan for forcing heated air into the body of the motor vehicle.

Additional objects, advantages and features of invention will be apparent from the following description and accompanying drawing, forming part of this application, wherein

Figure 1 is a diagrammatic view of the generator and heater and associated wiring therefor.

Figure 2 is a vertical section through the heater unit.

Figure 3 is a cross section on the line 3—3 of Figure 2.

Referring particularly to Figure 1 of the drawing, I have illustrated a low voltage generator 10 of conventional construction which may be driven in any suitable manner from the internal combustion engine of an automobile. It is contemplated mounting the generator 10 by suitable brackets, in such position that a pulley carried by the shaft of the generator may be driven by the fan belt of the engine. This structure is well understood in the art, and illustration thereof is not thought necessary, since these details form no part of my invention.

The generator 10 comprises two contacts 11 and 12, these contacts being associated with brushes operable in conjunction with the armature, as usual.

The heater unit 13 is preferably mounted beneath the dash board of the motor vehicle, or in some other appropriate location for the most efficient distribution of heated air into the body of the vehicle. The heater includes a main heating coil 14 and a resistance coil 15 suitably mounted in a casing, generally indicated at 16.

A lead line 17 is connected between one end of the heating coil 14 and the terminal 12 of the generator, the other end of the coil being connected to the terminal 11 by a lead line 18. A shunt field winding 19 of the generator is installed between the contact 12 and one end of the resistance coil 15, by a lead 20 in which there is connected a switch 21.

Means for regulating the degree of heating of the coil 14 is provided, as indicated generally by the reference character 22, and comprises a relay 23, in electrical circuit with the heating coil 14 by interposition thereof in the line 18. The regulator 22 includes an armature 24, swingingly mounted as at 25 to the casing 26. An L-shaped spring arm 27 bears upon the armature tending to hold the same in engagement with the contact 31, one leg of the spring arm 27 projecting into the path of an adjusting screw 28, and therefore the relationship between the armature and the relay may be varied by manipulation of the screw 28, as will be understood, and further explained hereinafter. A lead 29 is connected to line 18 and the armature 24, and connected with lead 29 there is a branch line 29' in circuit with the resistance coil 15.

The resistance coil 15 further has a lead 30 connected intermediate its length and terminates in a contact 31 previously referred to, positioned in the path of swinging movement of the armature 24.

The circuit thus far described completes the circuit from the generator 10 to the heater 16 and the operation is substantially as follows:

The generator 10 being driven by an internal combustion motor electrical current will be generated, passing to the heater coil 14 by way of the lead 18 through the heating coil 14 and back to the generator 10 through the lead 17. The shunt winding 19 which is in circuit with the generator is in electrical circuit with the resistance coil 15 through lead 20, as is the armature 24, by reason of the leads 29' and 30, and this circuit may be termed the control circuit since it functions to control the output of the generator 10. With the adjusting screw 28 set for a predetermined degree of heating of the coil 14, the tension of the spring 27 will hold the armature 24 away from the core 32 of the relay 23 until the current produced by the generator has increased sufficiently to overcome the tension of the spring 27, thereby breaking the circuit with the contact 31 and completing the circuit with the core and the armature 24. Thus a greater resistance is inserted in the control circuit causing a less generation of current by the

generator 10, until the generated current falls to such an extent as to weaken the energization of the relay 23 to such a degree that the spring 27 will return the armature 24 to its normal position in engagement with the contact 31, permitting the current to again heat the coil 14.

It will be understood that when the control circuit is in operation a certain amount of heat will be given off by heating of the resistance coil 15, and I therefore preferably arrange the resistance coil 15 and the heating coil 14 in such proximity to the body of the motor vehicle that all heat units developed by the coils will be employed in the heating of the vehicle.

I provide means for forcing the circulation of heated air through the body of the car, this means being in the form of an electrically driven fan, and attention is now invited to Figures 2 and 3, in conjunction with Figure 1 for a general discussion of the heater. The casing 16 is of circular formation having an open front end and a rear wall 33, and at a suitable point on the outer periphery of the casing, a suspension hanger 34 is fastened. The hanger 34 in the present instance is shown as embodying a ball and socket connection 35, permitting tilting of the casing to any angle desired to direct the heated air to various portions of the vehicle body. The casing 16 also enables mounting of the regulator 22, and switch 21, as shown.

The rear wall 33 is centrally apertured and receives a drive shaft 36 of a motor 37, therethrough. The motor 37 is supported by a housing 38 bolted to the rear of the wall 33.

An inner open ended casing 39 is positioned within the casing 16 and is provided with foot members 40 adapted to lie flush with the wall 33, and are suitably apertured to receive bolts 41. In the present instance, I have illustrated the bolts 41 as passing through the foot members 40 and a flange 42 of the casing 39, thereby securing the casing and housing to the casing 16. It will be noted that the inner edge 43 of the casing 39 stops short of the wall 33 and that the diameter of the casing 39 is considerably less than the casing 16. By such an arrangement, a circulation of air is permitted between the casings 16 and 39, the air being allowed to enter the casing 39 by virtue of the space 44 formed between the wall 33 and the end of the casing 39. It will be obvious that the outer casing 16 will be maintained cool by such circulation of air, thereby avoiding the possibility of passengers becoming burned by coming in contact therewith, as well as supplying air to the heater coil.

The resistance coil 15 is secured within the casing 39 intermediate the length thereof, and slightly in advance thereof, the heating coil 14 is mounted, all of which is clearly shown in Fig. 2.

A propeller 45 is secured to the shaft 36 and is positioned to the rear of the resistance coil 15, and revoluble within the casing 39.

The front end of the casing 39 has secured thereto a foraminate guard plate 46, preventing accidental engagement with the coils 14—15, yet permitting ready passage of heated air.

The motor 37 is driven by the generator 10, the leads 47—48 from the motor being connected respectively to the leads 17 and 29 of the heater circuit. If desired, an adjustable resistance 49 and switch 50 may be installed in one of the leads, as shown. Thus, the circuit may be regulated to suit the demands of any low voltage motor; and the motor may be stopped by opening of the switch 50.

It will be noted that the greater the heating of the coil 14, due to increased output of the generator, the greater the speed of the fan. Therefore the speed of the fan is commensurate with heat of the heating coil 14.

In order to shut off the heater it is merely necessary to open the switch 21, breaking the circuit through the shunt winding 19, which will prevent the generator from functioning, and also functions to stop the fan motor 37.

While I have shown and described a preferred embodiment of the invention I do not confine myself to the exact details of construction set forth and reserve as my own, all such modifications as fairly fall within the scope of the appended claim.

I claim:

An electric air heater comprising a main casing having an open front end and a rear wall, a fan motor casing secured to the rear wall and projecting rearwardly therefrom, a motor supported by the motor casing, the shaft thereof extending through an aperture in the rear wall of the main casing, a secondary casing mounted concentrically within the main casing and spaced a substantial distance therefrom defining an air passageway and extending forwardly beyond the main casing and terminating in an annular outwardly directed flange, the secondary casing stopping short of the rear wall of the main casing and having leg members for mounting on said wall to hold the same in spaced relation therewith, heating means mounted within the secondary casing, a propeller fixed to the motor shaft and positioned rearwardly of the heating means, and a guard plate secured to the annular flange of the secondary casing.

GREELEY E. STRAWSER.