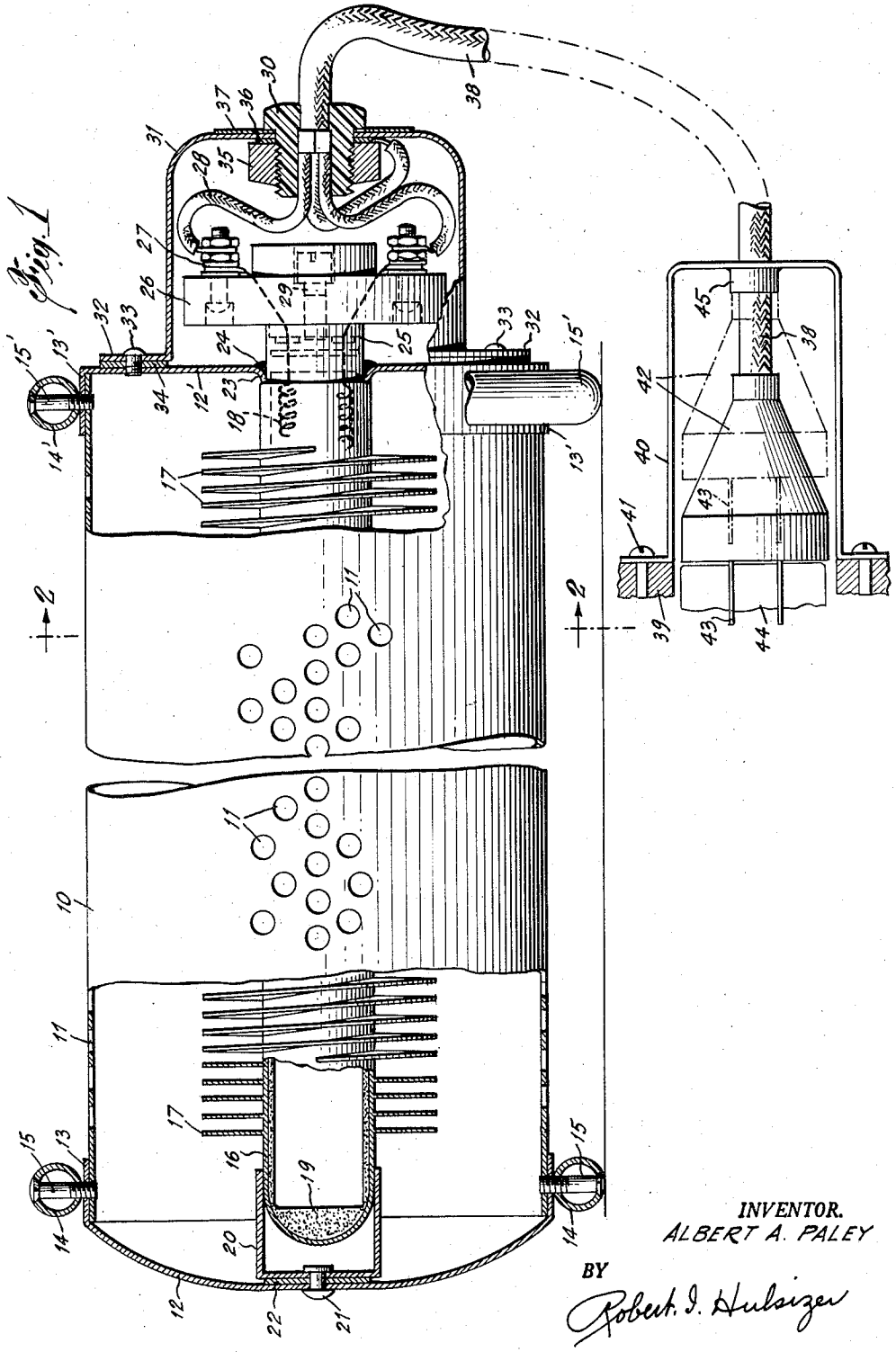
July 15, 1958 A. A. PALEY 2,843,715

AUTOMOBILE HEATING DEVICE

Filed Nov. 16, 1953 2 Sheets-Sheet 1

Fig. 1



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Fig. 1

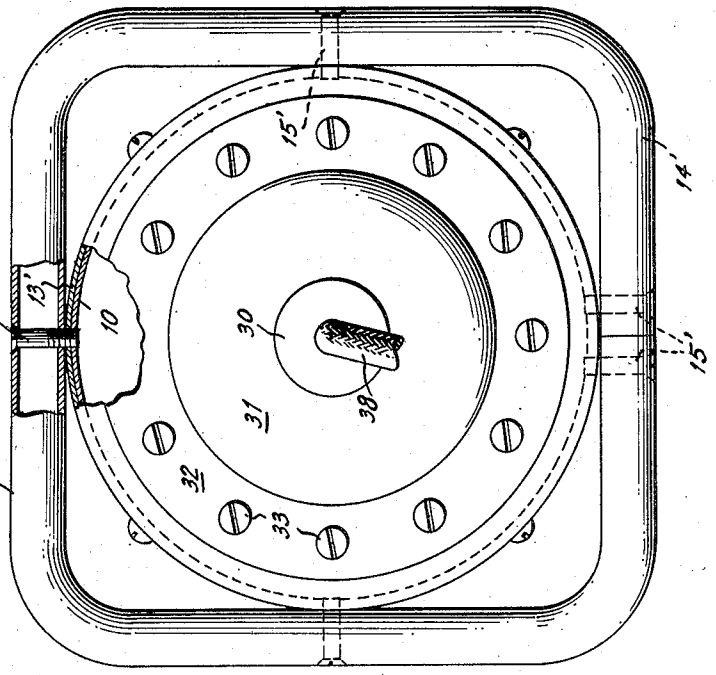
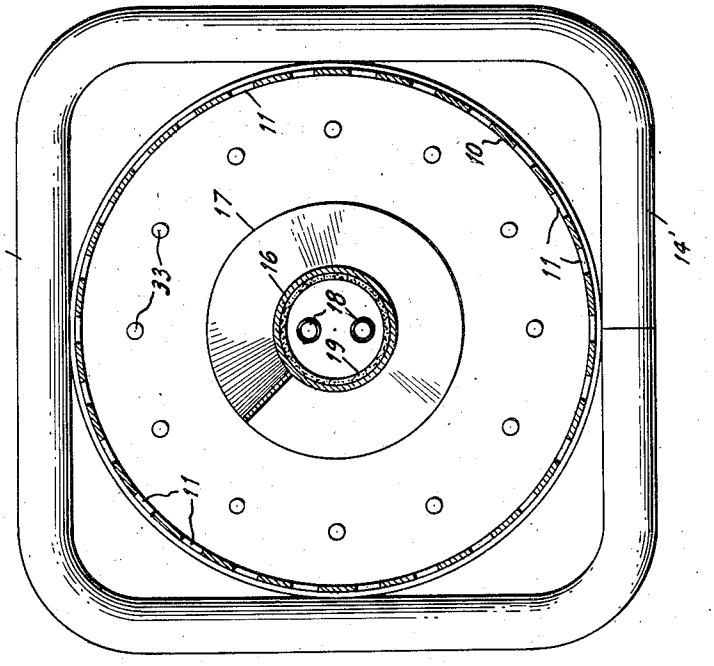


Fig. 2



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AUTOMOBILE HEATING DEVICE

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5 Claims. (Cl. 219—34)

This invention relates to new and useful improvements in convection air heaters and has especial reference to a heater peculiarly adapted to be used for heating automobiles in modern drive-in theatres.

The main object of the invention is to provide a simple, compact, efficient, waterproof and completely insulated device which can hang on the usual post in such theatres with the loudspeakers now provided and be instantly disposed in the car, plugged in and keep the car warm by convected air circulated throughout the car therefrom.

A further object is the construction of a heater which permits a maximum proportion of the air to pass through the heater and be thoroughly heated while at the same time keeping the walls of the enclosing shell relatively cool and safe to touch.

Another object is to lengthen the season during which drivein theatres may be open while keeping the customers warm and comfortable in their cars without running their engines.

A still further object is to provide means whereby the device cannot readily be removed from the post to which it is attached and whereby any undue pull on the connecting cable will disconnect the heater from the circuit thus avoiding shock or fire.

Further and more specific objects, features and advantages will more clearly appear from a consideration of the detailed specification hereinafter set forth, especially when taken in connection with the accompanying drawings which illustrate a present preferred form which the invention may assume and which form part of the specification.

Briefly and in general terms, the invention concerns a cylindrical perforated shell in which is longitudinally disposed a heating coil contained within a metallic tube. The shell has nonplanar end portions so that it cannot be disposed on either ends. The shell is surrounded at spaced points along its length by polygonal shaped supporting frames which insure that the device will remain in a fixed position once at rest and that the bottom of the shell always remains a suitable distance above the floor on which it rests so that air may freely circulate beneath it and up therethrough. The tube is provided with a series of spirally disposed fins on its periphery to radiate and cause a turbulence of the air which passes up between them and is thrown off a straight line passage whereby more efficient heating of the air results. The parts carrying current are thoroughly insulated both electrically and from water. The cable connecting the device to the power circuit is led to a bracket associated with a socket on a post in the theatre and the plug on the cable is connected thereto. The bracket supports the cable and plug and any undue tension on the cable will pull the plug out of the socket without causing the cable and the plug from becoming free of the bracket, thus preventing shock and fire.

The present preferred form which the invention may assume is illustrated in the drawings, in which,

Fig. 1 is a side elevation, partly broken away, of the heater;

Fig. 2 is a cross section of the device, taken on the line 2—2 of Fig. 1; and,

Fig. 3 is an end elevation of the device, viewed from the right in Fig. 1.

Referring now merely to the specific form of the device shown in the drawings, it will be seen that it includes a cylindrical shell 10, using the word cylindrical in the broad sense not confined to shells of circular cross section. This shell is perforated as at 11 throughout, and a few of these perforations are illustrated.

At one end the shell 10 is provided with a removable cap 12 of curved configuration with a flange 13 to fit tightly over the end of the shell 10. Surrounding this end of the shell 10 is a supporting frame 14 of polygonal conformation and preferably tubular. This frame is held to the shell by elements such as bolts 15 which engage the shell and pass through both the frame and the flange 13. There preferably are as many bolts as there are points of contact between the frame and the flange. At the other end of the shell is another cap 12' of somewhat similar shape with flange 13', supporting frame 14' and bolts 15'. Cap 12', however, is at its end flat instead of curved.

Disposed preferably centrally and axially within the shell 10 is a metallic tube 16 of any desired metal having preferably integral spirally formed fins 17 on its periphery. Disposed longitudinally within the tube 16 and embedded throughout the length of the tube in suitable insulating and heat resisting material 19 are heating coils or elements 18. The left end, Fig. 1 of the tube 16 is closed and curved and slides within a cup-shaped member 20 of suitable metal held against the end of the cap 12 by means of a rivet *q*1. A washer 22 is disposed between the wall of the cap 12 and the cup 20.

The center of the cap 12' is cut away and the edges are bent inward as at 23 and engage the reduced end 25 of the tube 16 and sealing compound 24 is at their union. A terminal block 26 is connected to the end of the tube 16 in any suitable manner and terminal lugs 27 thereon are connected to the ends of the heating wires 18 and to lead out conductors 28. The block is connected to the tube 16 by means of a cap screw 29. A third conductor is the ground wire and is shown connected to a washer 36 disposed between the jam nut 35 and the adjacent wall of the cover housing 31. The jam nut 35 is screwed on to the stem of an insulating bushing 30 which is headed to lie against a washer 37 flat against the outer face of the housing 31. The housing 31 is flanged at 32 and is held against the end wall of the cap 12' by means of screws 33 with a washer 34 between the flange and said end wall.

Since this device, in one use thereof, is to be used in connection with drive-in movie theatres, the end of the cable 38 housing the conductors 28 is provided with a plug 42 having projecting prongs 43 adapted to engage with suitable openings in a socket member 44 mounted on a post 39. These posts are usually provided in such locations to hold the radio amplifier for the use of the patrons in each car. On the post 39 and at the position of the socket 44 is a U-shaped bracket with flanged legs 40 held against the face of the post 39 by means of screws 41. The base of the bracket is provided with a sleeve 45 through which the cable 38 extends and in which it may freely slide. The plug 42 is seen as embraced by the legs of the bracket. Any pull on the cable will cause the plug to be pulled out of the socket before the pull is strong enough to break the cable.

In view of the detailed description thus given of the structure of a preferred form of the invention, it is seen

that since the left end is rounded at cap 12 and the right end is also not flat due to the housing 31, it is impossible to dispose this device in any position except that in which the shell is lying flat along the supporting surface. The supporting frames 14 and 14' of non-circular polygonal configuration and disposed transverse to the axis of the shell 10 will always insure that the device will stay in one position and not roll around when disposed on a surface such as the floor of an automobile. These frames always maintain the bottom surface of the shell 10 a suitable distance above the floor so as to permit proper air circulation beneath the shell.

Due to the various gaskets and washer employed and the character of the materials used the device is entirely waterproof with respect to the electrical elements and connections employed. The sliding connection between the tube 16 and the cup 20 enables the tube to expand and contract without undue strain or friction and is conducive of a great temperature drop from the tube 16 to the cup 20. The final temperature drop is created through washer 22 thus keeping cap 12 relatively cool to the touch. Tube 16 which houses the heating elements, has on its outside the fins 17 which are helically wound and preferably integral with the tube and are spaced proportionately to the internal wattage and the diameter of the outside shell 10. By reason of the helix and the fact that the tube 16 will always lie in a horizontal position, air rising through the perforations in the bottom of the shell 10 will pass around the heating tube and through the fins 17, since convected air rises in a vertical direction, will strike the angular pitch of the fins and cause a turbulence of the air. Thus more air is in direct contact with the fins and therefore is heated to a greater extent. This results in the outside of the shell 10 relatively cool and safe to touch.

This heater has been found to be very efficient, since all its heat is given up to its surrounding air in the car. It works independently of its location within a car, is not conducive to create hot spots in the car, but rather will, through its circulating convective principle, heat the air in the car evenly throughout.

The provision of the socket, plug, bracket connection which permits the device to be connected to the circuit in the drive-in theatre, prevents accidental or unauthorized removal of the heater. Thus the bracket acts as a disconnecting switch by a pull on the cable 38 which need not be a straight pull but can also be a sidewise pull thereby disengaging the prongs 43. If further pulling on the cable continues, the cable will of course break, but shock or fire is averted since the plug has already been pulled out of the socket as explained above. Theft is discouraged because the cable would have to be broken.

When a car is driven into the open-air theatre, it pulls up alongside of the usual post which supports the loudspeaker as well as the device of the invention. The heater is then placed at any desired position or location within the car and will lie flat and, as soon as connected in circuit, will immediately begin to pass warmed air up through the car.

While the invention has been described in detail and shown with respect to the present preferred form, it is not to be limited to such details and forms, since many changes and modifications may be made in the invention without departing from the spirit and scope of the invention in its broadest aspects. Hence it is desired to cover any and all forms and modifications of the invention which may come within the language of scope of any one or more of the appended claims.

What I claim as my invention is:

1. In a device of the class described, an elongate heating tube disposed within a cylindrical perforated shell and axially thereof, heating conductors disposed within the tube, a radiating fin structure on the periphery of the tube in the form of a continuous spiral and extending

from one end of the tube to the other, end closure walls on the shell of non-planar shape, supporting elements connected to the shell at spaced points and disposed crosswise thereof, said elements being of polygonal shape to space the bottom of the shell from the floor and to prevent rolling of the device thereon, one end of the tube being fixedly fastened to one of said end walls, and a cup-shaped element fastened to the other end wall and receiving the other end of the tube in a slidable relation to permit contraction and expansion of the tube without strain or breakage thereof.

2. In a device of the class described, an elongate heating tube disposed within a circular cylindrical perforated shell and axially thereof, heating conductors disposed within the tube, end closure walls on the shell of non-planar shape, supporting elements connected to the shell at spaced points and disposed crosswise thereof, said elements being of square shape to space the bottom of the shell an equal distance from the floor in any position of the device with the heating tube horizontal and to prevent rolling, one end of the tube being fixedly fastened to one of said end walls, a cup-shaped element fastened to the other end wall and receiving the other end of the tube in a slidable relation to permit contraction and expansion of the tube without strain or breakage thereof, and a heat insulating washer disposed between the cup-shaped element and the adjacent end of the closure wall.

3. In a device of the class described, an elongate, circular and cylindrical, perforated shell; an elongate heating element and an enclosing tubular form, disposed axially in the shell, the ends of the shell being closed and bulbous to prevent it from being set upright on either end and from being wholly supported in said upright position by a flat, horizontal surface one end of said tubular form being fixedly fastened to an end of the shell and said heating element having terminal portions extending through said fixed end; a cup-shaped support fastened to the other end of the shell and receiving the other end of the tubular form in a slidable relation to permit expansion of the tubular form without strain or breakage thereof; and supporting rails of substantial thickness, extending around and connected to the shell at spaced points and disposed exteriorly and cross-wise thereof, said rails being of substantially square configuration and constituting a plurality of sets of feet located at different sides of the shell, any one of which sets constitutes a stable support for the shell when the latter is disposed horizontally.

4. In a device of the class described, an elongate, tubular, perforated shell; an elongate heating tube disposed within the shell and located axially thereof; heating conductors disposed within the tube; a radiating fin structure on the periphery of the tube, in the form of a continuous spiral and extending from one end of the tube to the other, said fin structure being spaced from the shell, the ends of the shell being closed and bulbous to prevent it from being set upright on either end and from being wholly supported in said upright position by a flat, horizontal surface; and supporting rails of substantial thickness, extending around and connected to the shell at spaced points and disposed exteriorly and crosswise thereof, said rails being of substantially square configuration and being disposed to support the bottom of the shell above the floor and prevent rolling of the device on the floor, said rails constituting a plurality of sets of feet located at different sides of the shell, any one set of which constitutes a stable support for the shell when the latter is disposed horizontally.

5. In a device of the class described, an elongate, circular and cylindrical, perforated shell; and elongate heating element and an enclosing tubular form, disposed axially in the shell, the ends of the shell being closed and bulbous to prevent it from being set upright on either end and from being wholly supported in said upright

position by a flat, horizontal surface, one end of said tubular form being fixedly fastened to an end of the shell and said heating element having terminal portions extending through said fixed end; a cup-shaped support fastened to the other end of the shell and receiving the other end of the tubular form in a slidable relation to permit expansion of the tubular form without strain or breakage thereof; and supporting rails of substantial thickness, extending around and connected to the shell at spaced points and disposed exteriorly and crosswise thereof, said rails being of substantially square configuration and constituting a plurality of sets of feet located at different sides of the shell, any one set of which constitutes a stable support for the shell when the latter is disposed horizontally; and a heat insulation washer disposed between the cup-shaped support and the end of the shell to which said support is fastened.

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