J. E. MACOMBER.

ELECTRIC HEATER.

APPLICATION FILED APR. 24, 1909.

931,013.

Patented Aug. 10, 1909.

2 SHEETS—SHEET 1.

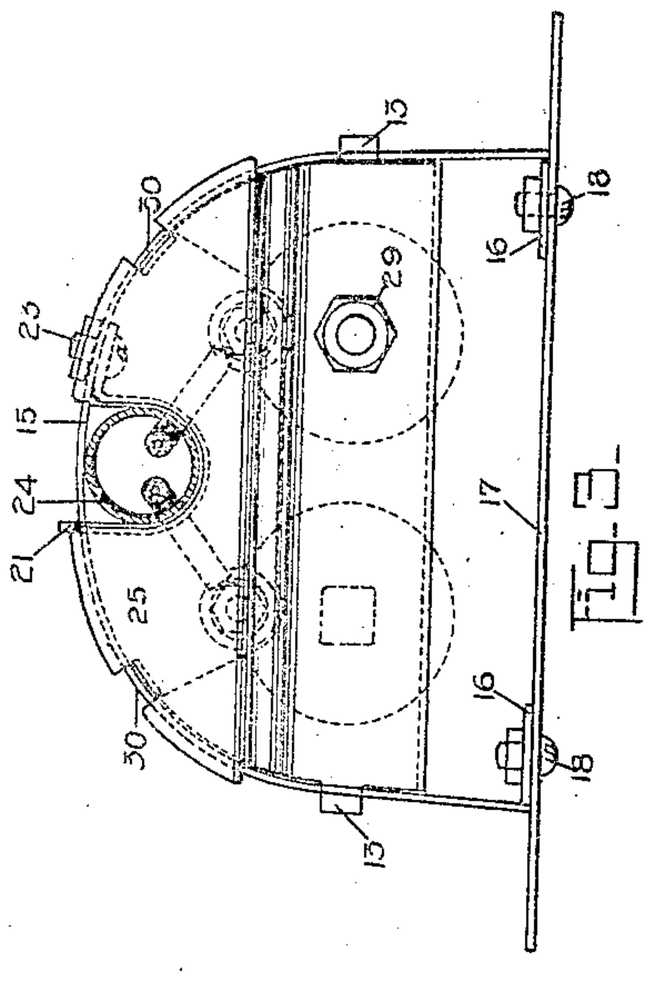

FIG. 3.

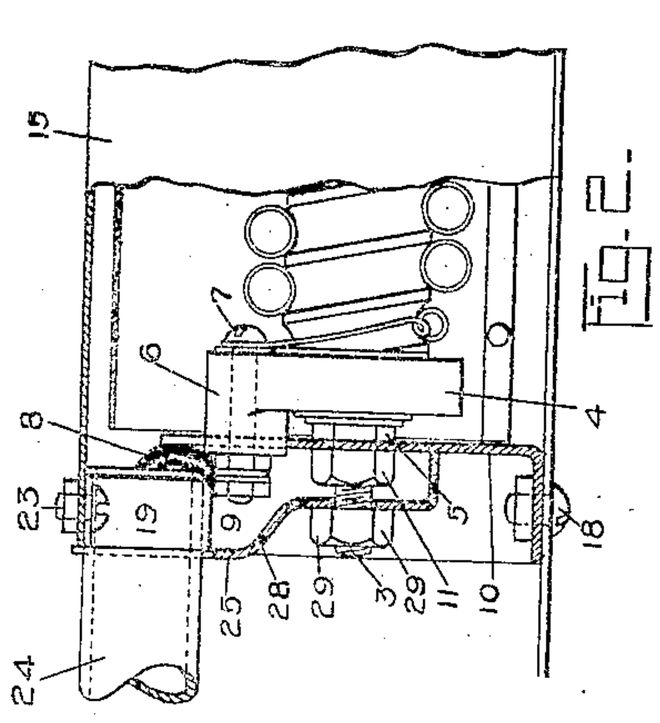

FIG. 2.

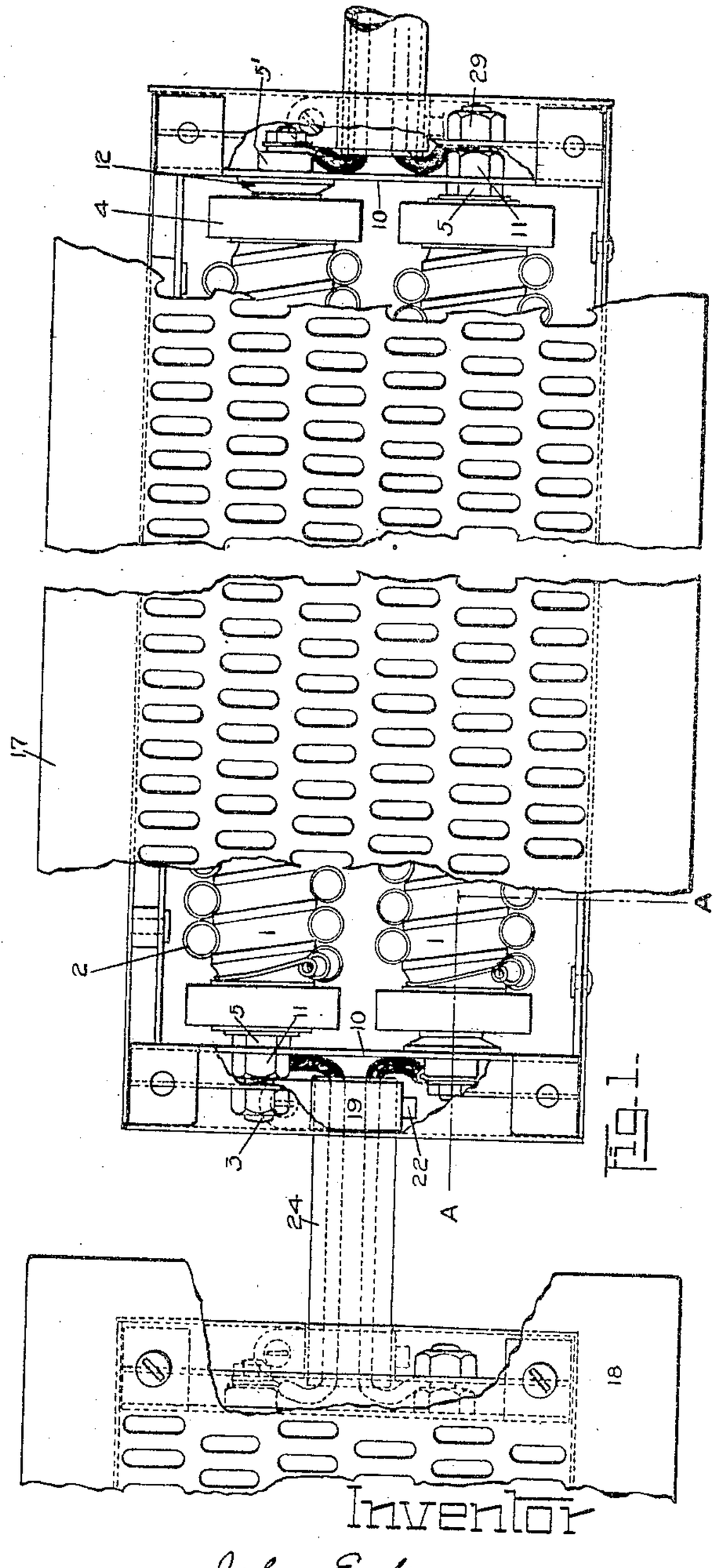

FIG. 1.

Witnesses

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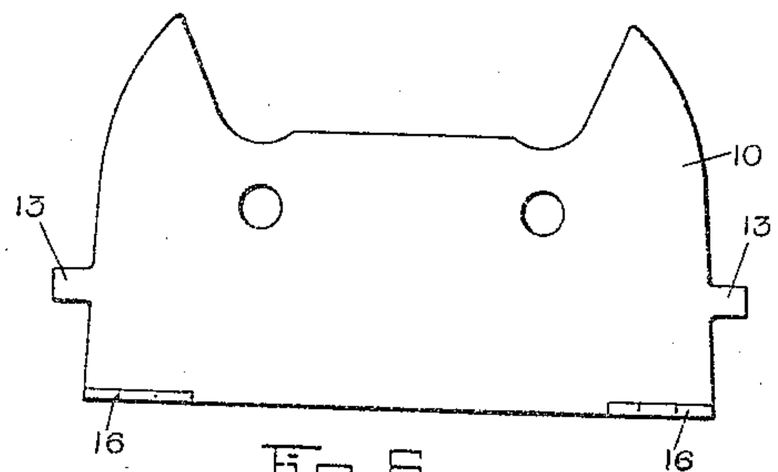

Fig. 6.

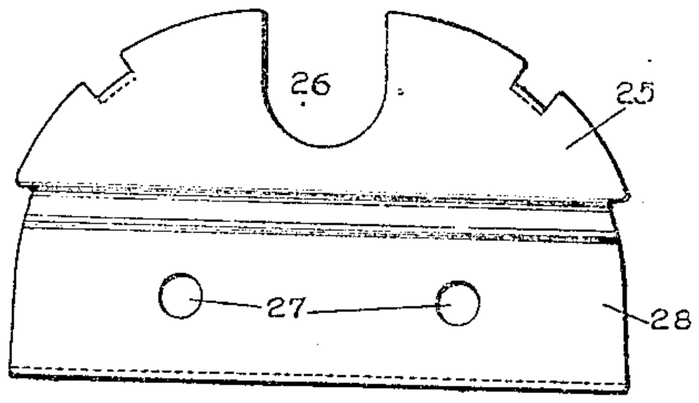

Fig. 7.

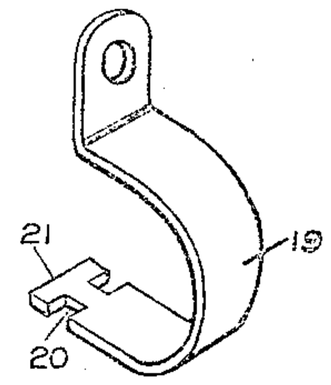

Fig. 5.

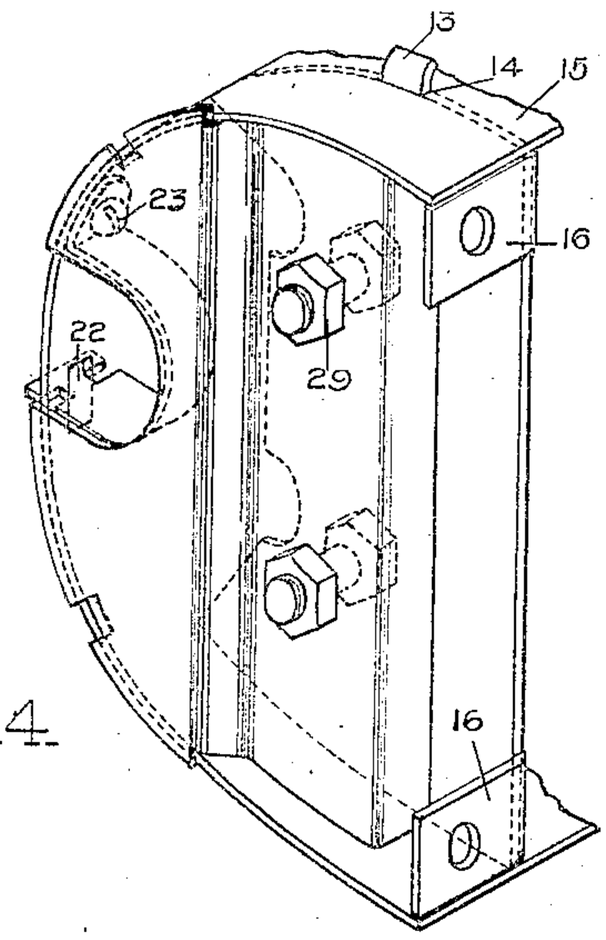

Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN E. MACOMBER, OF ALBANY, NEW YORK, ASSIGNOR TO CONSOLIDATED CAR HEATING COMPANY, OF ALBANY, NEW YORK, A CORPORATION OF WEST VIRGINIA.

ELECTRIC HEATER.

No. 931,013. Specification of Letters Patent. Patented Aug. 10, 1909.

Application filed April 24, 1909. Serial No. 492,089.

To all whom it may concern:

Be it known that I, JOHN E. MACOMBER, a citizen of the United States, residing at Albany, county of Albany, State of New York, have invented certain new and useful Improvements in Electric Heaters, the following being a full, clear, and exact disclosure of one form of my invention which I at present deem preferable.

My invention relates to electric heaters, and particularly those adapted for use on electric cars and similar vehicles, although they are not confined to such use but may be employed whenever it is desired to produce heat by means of an electric current.

The object of my invention is to provide a more simplified construction which is not only less expensive and less difficult to manufacture, but which also will protect all of the conductors, and especially the leading-in wires so that they cannot come in contact with external parts while at the same time such conductors are made easily accessible so as to be inspected or adjusted if an occasion requires.

For a detailed description of the present form of my invention, reference may be had to the following specification and to the accompanying drawings forming a part thereof, in which—

Figure 1 is a side view in elevation, showing one of my improved heaters, parts thereof being broken away to show the interior of the construction; Fig. 2 is a longitudinal sectional view taken substantially on the line A, A Fig. 1, showing the case of the heater broken away; Fig. 3 is an end view of the heater; Fig. 4 is a perspective view of the end of the heater separated from the main body of the heater itself and showing the manner of attaching the end casing to the longitudinal casing, and also showing the manner of forming the junction boxes; Fig. 5 is a perspective view of a strap for holding the conduit for carrying the electric conductors or connectors, in position in relation to the casing of the heater; Fig. 6 is a plan view of the end plate of the heater casing proper, and Fig. 7 is a plan view of the plate which forms the casing for the junction box.

Referring to the drawings, the numeral 1 indicates the core, usually of porcelain, which supports the helically coiled wire heating conductors 2; the numeral 3 indicates the stems or rods by which the cores 1 are supported. The stems carry insulating end-pieces 4, which are held in position thereon by means of nuts 5, at one end of said rods and heads 5′ located at the other end thereof, suitable washers or other spacers 12 being inserted between the heads 5′ and the adjacent end-pieces 4. The end-pieces 4 have a cylindrical portion 6 located at one side thereof through which the connecting bolts 7 pass. The inner end of these bolts connect with the heating coils 3 and their outer ends connect with the conducting wires 8 and are held in position relative thereto by the nuts 9. The stems 3 pass through the plates 10 which form the ends of the heater casing and are held in position relative thereto so that the cores and heating coils are definitely located within the casing, by means of nuts 11. The plates 10 are provided with laterally extending tongues 13, adapted to pass through slots 14 in the curved back casing 15 of the heater, and these tongues may be bent down at right angles so as to hold the casing in position relative to the end-plates 10. The parts thus described are preferably assembled in the order mentioned. The plates 10 are also provided with perforated ears 16, by which the heater may be attached to and supported upon the perforated supporting plate 17 of the heater proper, as indicated by the numeral 18 in Figs. 1, 2 and 3. The conduits for the connecting wires are then attached to the back casing 15 by means of straps or clamps 19, shown in Fig. 5. These straps are provided at one end with notches 20, forming a T-head 21, which may be inserted in a slot 22, formed in the back casing 15. This slot extends circumferentially of said casing, and when the T-head 21 of the strap is inserted therein, the latter is turned at right angles, thereby locking the end of the strap in position. The opposite end of the strap is secured to the casing by means of a screw or bolt 23. In this manner the conduit 24 is held firmly in position on the end of the heater. The conducting wires 8 having been passed through the conduit 24, their ends are secured to the respective bolts 7. These connecting parts are then covered by a protecting plate 25, shown in Fig. 7, which forms a junction box on the end of the heater. The plate 25 is provided with a recess 26 which engages the conduit 24, and with two holes 27, through which the ends of the stems or

rods 3 are adapted to pass. The plate 25 is also offset, as shown at 28, so as to bring the portion thereof which engages the stems 3 below the level of the end of the casing, so that the nuts 29 may be sunk below the end of the casing when placed upon the ends of the stems 3 to hold said plate 25 in position. The plate 25 is also provided with tongues 30, which are bent inwardly at right angles, therewith to aid in holding the back casing 15 in position.

The advantages of my improvements will be apparent to one skilled in the art, without specific enumeration of them.

Having described this form of my invention, what I claim and desire to protect by Letters Patent is:

1. In an electric heater, a casing having transverse end plate and an auxiliary plate superposed thereon and forming a junction box with said end plate and casing.

2. In an electric heater, a longitudinal casing, a transverse end plate, tongue and slot connections between said plate and casing, and an auxiliary plate superposed on said end plate and forming therewith a junction box.

3. In an electric heater, a longitudinal casing, an end plate situated within the same, and an auxiliary plate having a portion resting on the end of said casing and a portion sunk below the same and forming with said end plate a junction box.

4. In an electric heater, a semi-cylindrical longitudinal casing, an end plate situated within the same, and an auxiliary plate having a part of its margin resting on the central portion of the end of said casing, and the remainder thereof sunk below said end and forming with said end plate a junction box.

5. In an electric heater, a semi-cylindrical back plate, a plain front plate, an end plate situated within the end of said back plate, and an auxiliary plate superposed on said end plate and forming a junction box therewith.

6. In an electric heater, a semi-cylindrical back plate, a plain front plate, an end plate situated within the end of said back plate, tongue and slot connections between said end and back plates, and means for rigidly connecting said end and front plates.

7. In an electric heater, a semi-cylindrical back plate, a plain front plate, an end plate situated within the end of said back plate, an auxiliary plate having one end resting on the end of said back plate and its other end resting on said end plate, and means for attaching said front plate to said end plate.

8. In an electric heater, a semi-cylindrical casing, a strap engaging the same interiorly, and a conduit held in position on said plate by said strap.

9. In an electric heater, a bent back plate, a strap engaging the same interiorly, an end plate situated within the end of said back plate, an auxiliary plate having an edge resting on the end of said back plate adjacent said strap and provided with a recess having a shape corresponding to said strap, said auxiliary plate having its opposite edge resting on said end plate.

10. In an electric heater, a longitudinal core, electric heating devices thereon, a stem extending from said core, a bent lougitudinal back plate, an end plate situated within the end of said back plate and engaging said stem, and an auxiliary plate superposed on said end plate and held in position on said stem.

11. In an electric heater, a longitudinal core, electric heating devices carried thereon, a stem extending from said core, a semi-cylindrical back plate, an end plate situated within the end of said back plate and through which said stem passes, a nut on said stem for holding said core in position, an auxiliary plate superposed on said end plate and through which said stem passes, and a second nut on said stem for holding said auxiliary plate in position thereon.

12. In an electric heater, a longitudinal core, electric heating devices carried thereon, a stem extending from said core, a semi-cylindrical back plate, an end plate situated within the end of said back plate and through which said stem passes, a nut on said stem for holding said core in position, an auxiliary plate superposed on said end plate and having one edge resting on the end of said back plate, a conduit passing through said auxiliary plate and attached to said back plate, said auxiliary plate having one edge resting on said end plate and a nut on said stem for holding said auxiliary plate in position.

13. In an electric heater, a casing containing heating coils, a plate external to said casing forming with the end plate of the casing a junction box, an insulated terminal entering said junction box from the casing, and an external conduit for the leading-in wire entering said junction box and secured to the casing independently of said external plate.

14. In an electric heater, a casing containing two heating coils, a junction box at one end of said casing, a conduit entering said junction box but secured to the casing independently of said box and two wires passing through said conduit into the junction box and there connected respectively to the two insulated terminals of the coils.

15. In an electric heater, a casing containing heating coils, an external detachable plate forming with the end plate of the casing a junction box, a conduit entering said box and secured to the casing independently of said external plate, and an insulated coil-

terminal in said box adapted to receive a leading-in wire in said conduit.

16. In an electric heater the combination with a casing, an end plate thereon, an auxiliary end plate forming a junction box, a heater coil in the casing and a supporting rod for the heater extending through both end plates and securing the same.

In witness whereof I have hereunto set my hand, before two subscribing witnesses, this 15th day of April, 1909.

JOHN E. MACOMBER.

Witnesses:
C. C. NUCKOLS,
JAMES F. MCELROY.