March 4, 1924. 1,485,667

J. R. H. COLDWELL

ELECTRIC HEATER

Filed Jan. 8, 1923

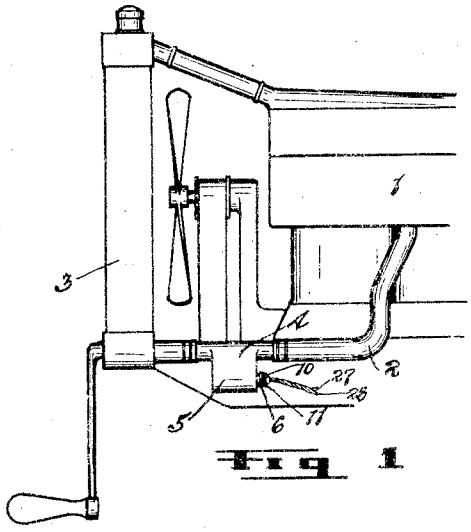


Fig 1

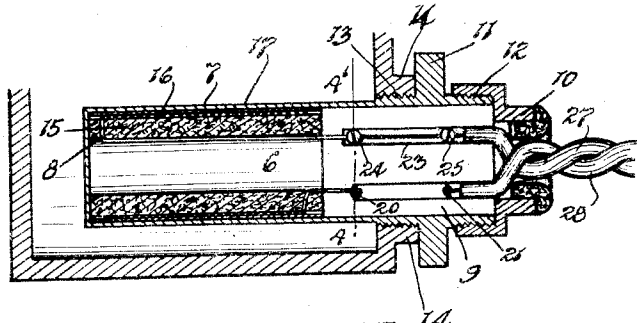


Fig 2

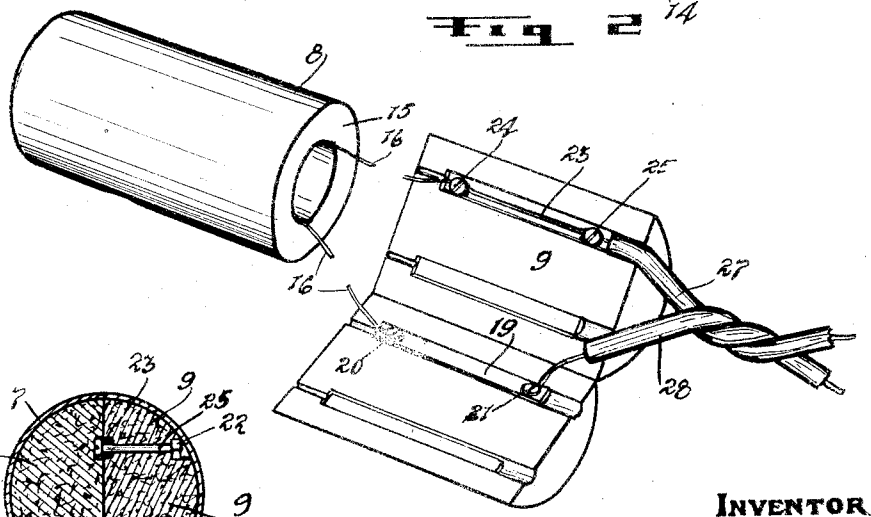


Fig 3

Fig 4

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UNITED STATES PATENT OFFICE.

JOHN ROBSON HARDING COLDWELL, OF WINNIPEG, MANITOBA, CANADA.

ELECTRIC HEATER.

Application filed January 8, 1923. Serial No. 611,456.

To all whom it may concern:

Be it known that I, JOHN ROBSON HARDING COLDWELL, of the city of Winnipeg, in the Province of Manitoba, Canada, have invented certain new and useful Improvements in Electric Heaters, of which the following is the specification.

The invention relates to improvements in electric heaters and particularly electric water heaters and an object of the invention is to provide an electrical heating attachment which can be readily installed and which is arranged such that the electrical element can be easily and quickly removed for inspection or other such purposes and without disturbing the water system.

A further and more specific object of the invention is to provide a container for the element having one end permanently closed and the other end provided with a removable cap and with the container fitted at the cap end with an integrally formed hexagonal or such like flange and provided adjoining the flange with screw threads for the cap and attaching purposes.

A further object of the invention is to provide a special construction for attaching the feed wires to the heating coil of the element, the arrangement being such that the connections can be quickly and positively made and after being made will be effectively insulated, and further to embody a fuse to protect the heating element, the fuse being entirely concealed and also effectively insulated.

A further object is to construct the device so that it is universal in its application.

With the above more important objects in view the invention consists essentially in the arrangement and construction of parts hereinafter more particularly described and later pointed out in the appended claims, reference being had to the accompanying drawing in which:

Fig. 1 is a side view of the device introduced in the water circulating system of an internal combustion engine.

Fig. 2 is an enlarged detailed vertical sectional view centrally and longitudinally through the heater.

Fig. 3 is a perspective view of the heater, one end being opened up to expose interior construction.

Fig. 4 is an enlarged detailed cross sectional view at 4—4' Fig. 2.

In the drawing like characters of reference indicate corresponding parts in the several figures.

In the present instance the heater is shown as introduced in the water circulating system of an internal combustion engine 1, the heater being located in the water pipe 2 leading from the bottom of the radiator 3 to the water jacket of the engine.

When installing my heater I provide a tubular casing 4 which communicates with the pipe 2 and is provided with an offset chamber or well 5 centrally and on the underside. In actual practice this casing may have a variety of forms, depending on the type of the water connections.

In the present instance the heater, which is indicated generally by the reference numeral 6, is inserted in the well.

The heater comprises an element container 7, a heating element 8, an insulator 9, and a demountable cap 10. The container 7 is in the form of a tube of predetermined dimension, the tube having its inner end closed and its outer end open and provided adjoining the latter end with an integrally formed hexagonal or such like flange or head 11. The body of the container is also exteriorly screw threaded at the opposite sides of the flange, the threads 12 receiving the cap 10, while those 13 are screw threaded into an interiorly screw threaded receiving boss 14 provided at the end of the well.

The element comprises a hollow tubular porcelain body piece 15 which is somewhat shorter than the container and around this porcelain body a heating nichrome wire 16 is coiled, both ends of the wire coil being brought to the interior of the porcelain body piece and being extended to be attached to parts later described.

The coil is enclosed by applying clay 17 or other similar material on the outside of the porcelain body piece and baking the same.

A split cylindrical porcelain insulator 9 is located at the end of the element, this insulator being of the same diameter as the element and of a length such that when the element and the insulator are inserted in the container they snugly fill the interior of the same.

In the present instance the insulator is split lengthwise into halves and each half is provided with facial channels which, when the

halves are brought together, form a pair of lengthwise extending openings passing through the insulator from end to end.

Within one of these openings I locate a conducting plate, such as a brass plate 19, this plate being held in place by bolts 20 and 21 passing through the porcelain and provided at their outer ends with counter sunk nuts 22. Within the other of the openings I locate a fuse wire 23, the ends of which are also fastened by bolts 24 and 25 passing through the porcelain and having their outer ends fitted with counter sunk nuts 26.

The projected ends of the element or wire coil 16 are connected electrically to the plate 19 and the fuse wire 23 by the bolts 20 and 24 and the feed wires 27 and 28 are connected to the fuse wire and plate 19 by the bolts 21 and 25.

From the above arrangement it will be apparent that it is a very easy matter to make the connections as the insulator 9 can be readily opened and in the manner as shown in Figure 3 to permit of the insertion of the plate and fuse wire and the connecting of the same in circuit with the feed wires and the element.

After the connections have been made the halves of the insulator are brought together and then the element and the insulator are inserted in the container 7. Once in place the cap 10 is applied and tightened up. Obviously, the terminals are effectively insulated and there is positively no possibility of short circuiting.

One can, at any time, remove the element for inspection by simply undoing the cap and in this connection it is to be particularly noted that the container is not molested in any way. The fuse wire avoids any possibility of the element being burnt out when the article is in use.

As the element and the insulator 9 fit snugly within the container the insulator cannot come apart or work loose and in this connection it is to be noted that the halves of the insulator are not fastened one to the other, but are separate so that when the element is removed they can be quickly taken apart for inspection or repair.

The heater can be universally used as it is simply a matter of screwing the same in place by applying a wrench or similar tool on the flange 11.

While I have shown the heater as utilized in connection with a tubular casing having an offset well, it is pointed out that the casing may vary in form or may be dispensed with entirely and the heater used simply as an immersion heater attached to the body of the container, whatever it may be, which holds the water. As an example, the device could be attached direct to the bottom of a radiator. I have pointed this latter feature out to show that the device is of such a nature that it is universal in its application.

What I claim as my invention is:

1. In an electric heater, a casing for receiving the electrical element, having one end permanently closed and the other end open and provided at the open end with an exterior integrally formed circumscribing hexagonal flange and with exterior screw threads adjoining the base of the flange and at opposite sides thereof, and a closure cap screw threading onto the latter end of the casing, said cap being provided with a centrally located outlet opening.

2. In an electric heater, a casing for receiving the heating element having one end permanently closed and the other end open and provided at the open end with an integrally formed hexagonal circumscribing flange, the flange being set back from the open end of the casing and having the body part thereof screw threaded at the inner and outer sides of the flanges and a closure cap screw threading onto the outer threads, said cap being provided with a centrally located outlet opening.

3. In an electric heater, the combination with a casing having one end permanently closed and the other end open, a removable cap enclosing the open end, and insulated feed wires entering the casing through the cap, of an insulated heating coil and a split insulator inserted within the casing and filling the same and retained therein by the cap and terminals within the insulator for connecting the feed wires to the ends of the coil.

4. In an electric heater, the combination with a casing having one end permanently closed and the other end open, a removable cap enclosing the open end, and insulated feed wires entering the casing through the cap, of an insulated heating coil housed within the closed end of the casing, a two part insulator housed within the open end of the casing, the said coil and insulator filling the casing and being retained therein by the cap, and terminals insulated by and located between the said parts of the insulator, said terminals connecting the feed wires with the ends of the coil.

5. In an electric heater, the combination with a cylindrical casing having one end permanently closed and the other end open, a removable cap closing the latter end of the casing, and feed wires entering the casing through the cap, of a cylindrical suitably insulated electric heating coil inserted within the closed end of the casing and having the ends of the coil extended to project towards the cap end of the casing, a two part cylindrical insulator inserted within the open end of the casing, said insulator and coil filling the casing and being retained therein by the cap, and terminals carried

by the insulator and located between the parts thereof and connecting the feed wires with the projected ends of the coil.

6. In an electric heater, the combination with a cylindrical casing having one end permanently closed and the other end open, a removable cap closing the latter end of the casing and feed wires entering the casing through the cap, of a cylindrical suitably insulated electric heating coil inserted within the closed end of the casing and having the ends of the coil projected towards the open end of the casing, a longitudinally split two-part cylindrical insulator inserted within the open end of the casing and retained therein by the cap, said parts of the insulator being provided with lengthwise extending registering channels forming a pair of lengthwise extending openings within the insulator, and terminals within the openings and carried by the insulator parts said terminals connecting the feed wires with the extending ends of the coil and within the insulator.

7. In an electric heater, the combination with a cylindrical casing having one end permanently closed and the other end open, a removable cap closing the latter end of the casing and feed wires entering the casing through the cap, of a cylindrical suitably insulated electric heating coil inserted within the closed end of the casing and having the ends of the coil projected towards the open end of the casing, a lengthwise split two-part cylindrical insulator inserted within the open end of the casing and retained therein by the cap, said parts of the insulator being provided with lengthwise extending registering channels forming a pair of lengthwise extending openings within the insulator, a pair of spaced terminals located within each opening and carried by the insulator parts, the terminals at one end of the insulator being connected to the ends of the heating coil and the terminals at the other end of the insulator being connected to the feed wires, a conducting plate located within one of the openings and connecting the terminals located therein, and a fuse wire located in the other openings and connecting the terminals located therein.

8. In an electric heater, the combination with a casing, an electrical heating element within the casing, an insulator within the casing, and feed wires communicating through the insulator with the heating element, of a fuse wire introduced in the electrical circuit and contained within the insulator.

9. In an electric heater, a casing, feed wires leading into the casing, an electrical heating element and an insulator placed end to end within the casing and means for effecting an electrical connection within the insulator between the feed wires and the element.

Signed at Winnipeg, this 19th day of July, 1922.

JOHN ROBSON HARDING COLDWELL.

In the presence of:
GERALD S. ROXBURGH,
M. B. KELLEHER.