Sept. 8, 1964 G. W. HEINBUCH 3,148,268

ELECTRIC ENGINE JACKET HEATER

Filed Feb. 27, 1962

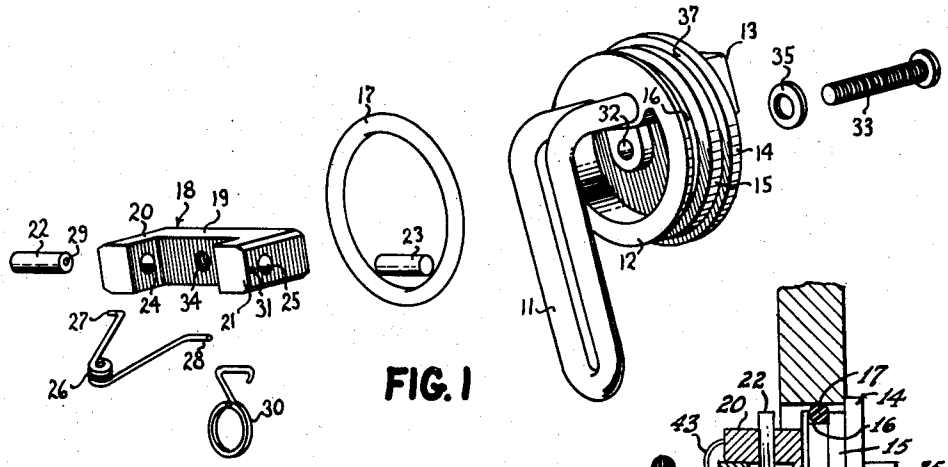


FIG. 1

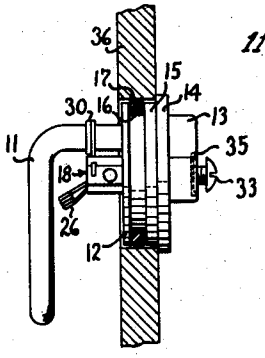


FIG. 2

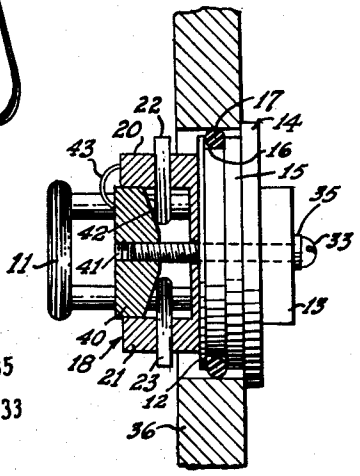


FIG. 5

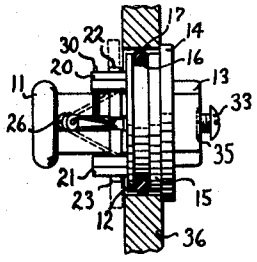


FIG. 3

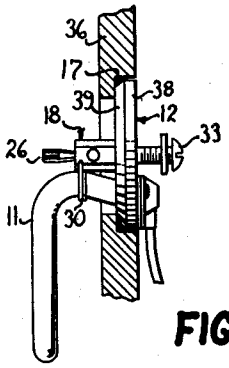


FIG. 4

INVENTOR.
GEORGE W. HEINBUCH

BY Vernon F. Kalb

ATTORNEY

United States Patent Office 3,148,268 Patented Sept. 8, 1964

3,148,268

ELECTRIC ENGINE JACKET HEATER

George W. Heinbuch, Toronto, Ontario, Canada, assignor to Canadian General Electric Company, Limited, Toronto, Ontario, Canada, a corporation of Canada

Filed Feb. 27, 1962, Ser. No. 175,996
4 Claims. (Cl. 219—205)

This invention relates to electric immersion heaters and particularly to heaters provided with means whereby the heater may be inserted through an aperture in a wall of a container with which it is to be associated and thereafter secured to the wall to close the aperture. The invention is particularly useful in connection with heaters for water cooled internal combustion engines and therefore will be described in detail therewith.

In the construction of internal combustion engines adapted to be water cooled, it is common practice to cast the cylinder block and its water jacket in one piece and to provide in the walls of the water jacket suitable apertures to permit the removal of the sand at the termination of the casting operation. When the engines are finally assembled these openings are then closed with suitable dished plates or plugs.

Heretofore, advantage has been taken of the presence of these apertures in the water jacket by removing one of these plates and mounting an electric heating device in the opening with its heating element extending within the water jacket and with its terminals accessible at the outside whereby an electric energy supply may be connected to the heater for the purpose of maintaining or raising the engine temperature during idle periods in cold weather.

The object of the invention is to provide an improved design of such heaters which is sturdy and compact and which may be easily applied and replaced.

Briefly stated, I provide in accordance with one embodiment of my invention a heating device adapted to be inserted through an aperture in a container wall and secured thereto which includes a substantially cylindrical body member having a heating element projecting from one side and terminals from the other side and a clamping means having at least a pair of anchor pins slideably mounted therein and biased so as to slide in opposite directions along the same axis with respect to each other. The clamping means is detachably secured to the body member and sealing means provide a watertight seal between container aperture and heater.

The invention will be more fully understood from the following description of embodiments thereof, taken with the accompanying drawings and the subject matter which I regard as my invention is particularly pointed out and distinctly claimed in the concluding portion of this specification.

In the drawings:

FIG. 1 is an exploded, perspective view of the new heater;

FIG. 2 is an elevation view of the assembled heater;

FIG. 3 is a bottom view of FIG. 2;

FIG. 4 is an elevation view of a modified heater; and

FIG. 5 is a bottom view of another heater modification.

Referring to the FIGS. 1, 2 and 3, **11** represents a heating element of the well-known tubular sheathed wire type supported in a substantially cylindrical body member **12**. The heating element extends through the body member **12** with a hairpin shaped portion at one side and terminates at the other side of the body member in two terminal prongs (not visible) which are protected by a surrounding wall portion **13** which also forms a socket for receiving the plug of an electrical supply cord. The body member **12** comprises a flange portion **14** and a portion **15** of reduced diameter, its outer diameter being

substantially equal to the diameter of the wall aperture in which the heater is to be secured. The portion **15** is equipped with an annular groove **16** provided in its circumferential surface for the reception of a sealing ring **17** which may be of the so-called O-ring type.

A clamping means in the form of a substantially U-shaped yoke member **18** having a central portion **19** and two leg portions **20** and **21** includes a pair of anchor pins **22** and **23** slideably mounted in aligned apertures **24** and **25** provided in the leg portions **20** and **21**. The anchor pins **22** and **23** are slideable along their longitudinal axis and biased by a spring **26** so as to move outwardly and away from each other whereby the spring with leg portions **27** and **28** projects into bores **29** centrally positioned on the planar ends of the anchor pins that face each other of the loop portion. A retainer ring **30** encircles the heating element **11** and is secured to one of the legs of yoke member **18**, in this case to leg **21**, by means of a hook portion which extends through an aperture **31**.

The body member **12** is provided with a central aperture **32** through which a threaded bolt **33** may pass. The bolt **33** is adapted to engage with a threaded aperture **34** centrally located in the central portion **19** of the yoke member **18**. A gasket **35** seals aperture **32** and secures bolt **33** in its tightened position against loosening, which may be occasioned, for instance, by vibration.

To assemble the heater, the sealing ring **17** is forced over portion **15** until it rests in groove **16**. Screw **33** is inserted through the aperture **32** and screwed into the threaded aperture **34** until the end of its shank presses against the opposite ends of anchor pins **22** and **23** which have been previously compressed. The pressure exerted by the shank should thereby be sufficient to prevent the anchor pins from being pushed outwardly by spring **26**. The heater is now assembled as shown in FIGS. 2 and 3 and ready to be inserted into an aperture of a wall **36** of a container such as a cylinder block as indicated by broken lines. When installed in the cylinder block, the heating element **11** extends inside the water jacket of the cylinder block and is held in position by the abutment of shoulder **37** against cylinder block wall **36**. In this position, screw **33** is loosened about a half turn which releases the pressure against the anchor pins so that they are moved outwardly by the force of spring **26**. The pins now extend behind the inner wall **36** as indicated by broken lines in FIG. 3 so that if screw **33** is subsequently tightened the clamping means including anchor pins, is moved towards body member **12** until the anchor pins abut the container wall thereby securing the heater within the wall opening. Sealing ring **17** and gasket **35** provide a watertight seal.

In the event the heater should be removed, screw **33** is unscrewed completely whereupon the clamping means **18** drops down but is still secured to the heating element **11** by means of the retainer ring **30** from which it now depends. The heater may now be taken out of the aperture of wall **36** without loss of any parts and subsequently inserted again after it has been assembled in the before-disclosed manner.

In disclosing the heater as illustrated in FIGS. 1, 2 and 3, it has been assumed that the manufacturer of combustion engines has machined the inside surface of the hole in the water jacket wall for the purpose of receiving a dished plate as a cover for the hole. However, it is conceivable that a manufacturer may provide a counterbored hole for the same reason and it is obvious that in such event the new heater has to be modified accordingly. FIG. 4 illustrates such modified heater wherein identical parts have been designated with the same numbers. As is seen, only body member **12** has to be changed so as to fit into the counterbored hole. Body member **12** com-

prises a cylindrical portion 38, the outer diameter of which is substantially equal to the diameter of the counterbored hole, and a tapered portion 39.

The steps of assembling, installation or removal of this modified heater are the same as disclosed for the heater illustrated in FIGS. 1, 2 and 3 except that the sealing ring 17 is not included in the assembling operation. This ring, having an outer diameter substantially equal to the diameter of the counterbored hole, is simply placed on the bottom of the counterbored hole before the heater is inserted. Upon the insertion and mounting of the heater, the sealing ring 17 is squeezed between the bottom and side walls of the counterbored hole and the slanting wall of the tapered portion 39 thereby assuming a generally triangular shape in cross section and providing a watertight seal.

It is to be understood that the force for pushing the anchor pins outwardly may be achieved in some other way. For example, instead of employing a spring, a wedge member could be used provided with a threaded hole that cooperates with screw 33 while the former threaded hole 34 in central portion 19 of the yoke member would no longer be threaded but would be the same size as hole 32 in body member 12 so that screw 33 may pass through it. When the screw is then tightened the wedging member would be pulled between the opposing end faces of the anchor pins in a direction transverse to their longitudinal axis and thereby pushing them outwardly after which the clamping means would be moved towards body member 12 until the clamping action is completed. Such an alternative arrangement is illustrated in FIG. 5. The wedge member 40 is threaded at 41 and is arranged to fit within the leg portions 20 and 21 of the yoke member 18 so as to be restrained against rotation while permitting movement along the longitudinal axis of the screw 33. The anchor pins 22 and 23 may preferably be rounded at their inner ends as shown to permit smoother engagement with the inclined surfaces 42 of the wedge member. The wedge member is prevented from falling out of the yoke by means of a simple retaining spring or wire 43 secured to the wedge member and the yoke. At insertion of the assembly into the aperture in the cylinder block wall, the pins 22 and 23 are depressed radially to permit insertion after which the screw 33 is tightened to draw the wedge member 40 toward the body member 12 with the inclined surfaces 42 thereby forcing the pins 22 and 23 radially outward. The screw is tightened until the wedge member 40 bottoms against the yoke 18 at which point further tightening draws the yoke toward the body member 12 thereby bringing the anchor pins 22 and 23 into engagement with the container wall to secure the heater within the wall opening. The unit is disassembled by disengaging the screw 33 to allow the clamping assembly to fall away in the same manner as described in connection with the other embodiments with the clamping assembly remaining secured to the heater by means of the retainer ring 30. It will be obvious to those skilled in the art that various changes and modifications may be made without departing from the invention and it is intended to cover all these changes and modifications in the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An engine jacket heater adapted to be inserted through an aperture in a cylinder block wall and secured thereto, comprising a cylindrical body member, a heating element of the sheathed wire type secured in said body member having an active heating portion projecting from one side of said body member and electrical connection terminals projecting from the other side, a clamping assembly adapted to engage the inner surface of said cylinder block wall to clamp said body member in said aperture with said active heating portion extending into the interior of said cylinder block wall, said clamping assembly including a substantially U-shaped yoke member having a central portion and two leg portions, at least one pair of anchor pins slideably mounted in aligned apertures provided in said leg portions and being arranged to move radially with respect to the longitudinal axis of said cylindrical body member, said pins being adapted to slide along the same axis and longitudinally with respect to said yoke member, means adapted to force said anchor pins to move outwardly with respect to said yoke member upon securing the heater in said aperture, means for detachably securing said clamping assembly to said body member on the side thereof from which said active heating portion projects, whereby said anchor pins may be clamped into engagement with the inner surface of said cylinder block wall to secure said heater in said aperture.

2. Engine jacket heater as defined in claim 1 wherein said anchor pins are forced to move outwardly by a spring member and wherein said means for detachably securing said clamping assembly to said body member is a threaded bolt extending through a central aperture of said body member and engaging a threaded hole located centrally in said central portion of said yoke member.

3. Engine jacket heater as defined in claim 1 wherein said anchor pins are forced to move outwardly by a wedge member engaging them at their opposing end faces and wherein said means for detachably securing said clamping assembly to said body member is a threaded bolt extending through central apertures of said body member and said yoke member and engaging a threaded hole located centrally in said wedge member.

4. Engine jacket heater as defined in claim 1 including a retainer ring having a loop portion encircling said heating element and a hook portion secured to one of the legs of said yoke member.

References Cited in the file of this patent

UNITED STATES PATENTS

223,327	Farrington	Jan. 6, 1880
608,174	Byrnes	Aug. 2, 1898
2,537,183	Bloomer	Jan. 9, 1951
2,905,801	Bleckman	Sept. 22, 1959
2,987,283	Bleckmann	June 6, 1961

FOREIGN PATENTS

512,017	Canada	Apr. 19, 1955