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ELECTRIC ENGINE COOLING JACKET HEATER

Filed May 29, 1963

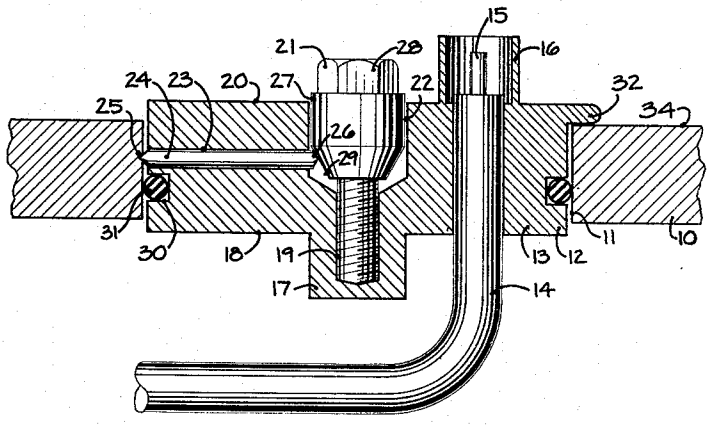


Fig. 1

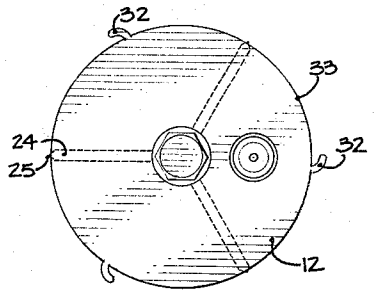


Fig. 2

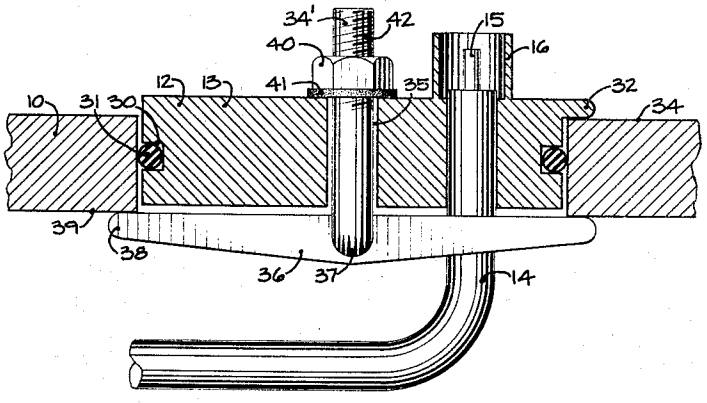


Fig. 3

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ELECTRIC ENGINE COOLING JACKET HEATER

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My invention relates to new and useful improvements to block heaters, particularly block heaters for automobile engines including frost plugs in the engine block through which block heaters are normally attached.

The frost plug aperture in conventional engine blocks although useful for the insertion and retention of block heaters, nevertheless presents many difficulties in the attachment of the block heater to the block.

It is desirable that an efficient seal is provided in order to prevent leakage of the coolant. It is also desirable to have a block heater which is readily attachable to the block through the frost plug aperture. And it is also desirable to have a method of attachment which provides positive location for the depth penetration of the block heater with relation to the thickness of the engine block wall.

The present invention includes these desirable features and at the same time is relatively economical to manufacture.

The principal object and essence of my invention is therefore to provide a block heater of the character herewithin described which is readily attachable to any engine block through the frost plug aperture and which not only provides an efficient coolant seal but also a positive mechanical lock to hold the device in position against vibration and pressure.

Another object of my invention is to provide a device of the character herewithin described in which the depth of penetration of the heater body within the engine block wall is controllable within limits.

A yet further object of my invention is to provide a device of the character herewithin described which can be inserted and locked into position merely by tightening one bolt.

Still another object of my invention is to provide a device of the character herewithin described which is simple in construction, economical in manufacture, and otherwise well suited to the purpose for which it is designed.

With the foregoing objects in view, and such other objects and advantages as will become apparent to those skilled in the art to which this invention relates as this specification proceeds, my invention consists essentially in the arrangement and construction of parts all as hereinafter more particularly described, reference being had to the accompanying drawings in which:

FIGURE 1 is a side sectional elevation of my invention.

FIGURE 2 is a plan view of FIGURE 1 reduced in scale and with the engine block portion not illustrated.

FIGURE 3 is a side sectional elevation illustrating an alternative embodiment of my invention.

In the drawings like characters of reference indicate corresponding parts in the different figures.

Proceeding therefore to describe my invention in detail reference character **10** indicates the wall of a conventional engine block having a cylindrical aperture **11** formed therein normally carrying the conventional frost plug, which of course is removed for the insertion of the block heater collectively designated **12**.

The block heater includes a cylindrical body **13** having a conventional heater element **14** extending therethrough and being soldered or brazed in position in conventional manner.

The element **14** is provided with terminals **15** upon the outer side thereof and a shield cup **16** surrounds the terminals for protection purposes and it should be understood that these terminals are connectable to any source of electrical energy in the conventional manner in order to provide power to the heater element **14** which, of course, is within the engine block.

The cylindrical body portion **13** of the heater is provided with a concentrically located shoulder **17** upon the inner side **18** thereof, said shoulder carrying the lower end of a concentrically located screw-threaded aperture **19** which extends to the outer surface **20** of the body portion **13**. This screw threaded aperture receives cap screw **21** and it will be noted that the aperture is bored out as it **22** upon the outer portion of its length. Preferably three drillings **23** extend from the bored out portion **22** radially outwardly through the body portion, said drilling carrying hardened pins **24**, the outer ends **25** of which are point sharpened as clearly shown.

The inner ends are also provided with conical faces **26** engageable by a wedge sleeve **27** formed on or fitted around the cap screw **21** adjacent the head **28** thereof and it will be noted that the lower end **29** of this wedge sleeve is chamfered at an angle substantially equal to the chamfer of the conical ends **26** of the pins **24**.

Below the drillings **23** and towards the inner face **18** of the main body portion **13**, I have formed an annular shoulder **30** adapted to receive a conventional sealing O-ring **31** and this O-ring is a push seal fit into the aperture **11** of the engine block wall **10**.

From the foregoing, it will be appreciated that if the bolt **21** is loosened so that the pins **25** can be retracted inwardly within the drillings **23**, the block heater can be pushed into the frost plug aperture **11** whereupon tightening of the bolt **21** will force the sleeve **27** downwardly into engagement with the inner ends **26** of the pins **24** and that the cooperating tapers of the sleeve and the pins will force the pins outwardly so that the pointed ends **25** engage the wall of the aperture **11** thus locking the heater firmly into position. At the same time, of course, the O-ring **31** seals the block heater against leakage of coolant therepast.

It will be appreciated that it is desirable to locate the penetration of the block heater within the aperture **11** and in his connection I have provided three lugs **32** around the outer periphery **33** of the body portion **13** and these lugs register against the outer surface **34** of the engine block wall **10**. I prefer to make these lugs so that they can, if desired, be bent inwardly or outwardly within limits thus giving a certain degree of adjustment to the depth of penetration of the block heater within the wall **10**.

An alternative embodiment is shown in FIGURE 3 which has some of the reference characters where applicable.

The main body of the block heater is sealed within the aperture **11** within the block **10** by a similar sealing O-ring **31** seated within the annular recess **30** around the periphery of the body portion **13**.

However, in this embodiment, the mechanical locking means consists of a central bolt **34** passing through a centrally located aperture **35** in the body portion, and having a cross bar **36** formed integrally upon the end **37** of the bolt. The ends **38** of the cross bar are adapted to engage the boundary of the frost plug aperture **11** upon the inner face **39** of the wall **10**.

A clamping nut **40** incorporating a seal **41** engages over the screw-threaded outer end **42** of the bolt **34** and seals the aperture **35** against coolant passing therethrough.

In operation, the nut **40** is threaded right back towards the end **42** of the bolt **34** so that the cross bar **36** can be maneuvered to the aperture **11**.

The nut **40** is then tightened thus mechanically clamping the heater into the block without deformation of the ring taking place.

What I claim as my invention is:

1. In association with a cylinder block of an automobile having a frost plug aperture formed therein; a block heater adapted to be inserted within said frost plug aperture, said block heater comprising in combination a cylindrical body portion, an electric heater element extending therethrough and connectable, on one side thereof to a source of electrical energy and extending, within the said cylinder block, upon the other side of said body portion, sealing means coacting between the periphery of said body portion and the bore of said frost plug aperture, and means coacting between said body portion and said bore of said frost plug aperture to mechanically lock said heater in position, said means to lock said body portion to the bore of said frost plug aperture including a central bore in said body portion extending from said one side to adjacent said other side, at least one radially situated drilling extending from the periphery of said body portion to said central bore, a screw-threaded bolt engageable within said central bore, said central bore being correspondingly screw threaded through the portion thereof from the point of intersection of said drilling therewith, to the inner end of said cenral bore adjacent said other side, a pin freely mounted for endwise movement within said drilling, said pin being point sharpened upon the outer end thereof, and cam means coacting between said bolt and the inner end of said pin adapted to urge said pin radially outwardly when said bolt is tightened, whereby said point sharpened end of said pin is projected outwardly beyond the periphery of said body portion.

2. The device according to claim **1** in which said means coacting between said bolt and the inner end of said pin comprises a tapered shoulder formed upon said bolt adjacent the head thereof, a tapered end on the inner end of said pin engageable by said tapered shoulder.

3. The device according to claim **1** which includes means on said body portion engageable with the outer surface of said cylinder block around said frost plug aperture to limit the depth of penetration of said body portion within said frost plug aperture, said means including at least one projecting lug formed integrally with said body portion and projecting radially from said body portion.

4. The device according to claim **2** which includes means on said body portion engageable with the outer surface of said cylinder block around said frost plug aperture to limit the depth of penetration of said body portion within said frost plug aperture, said means including at least one projecting lug formed integrally with said body portion and projecting radially from said body portion.

5. The device according to claim **3** in which said lug is malleable thereby permitting limited manual adjustment of the relationship of said lug with said body portion.

6. The device according to claim **4** in which said lug is malleable thereby permitting limited manual adjustment of the relationship of the said lug with said body portion.

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