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IMMERSION HEATER

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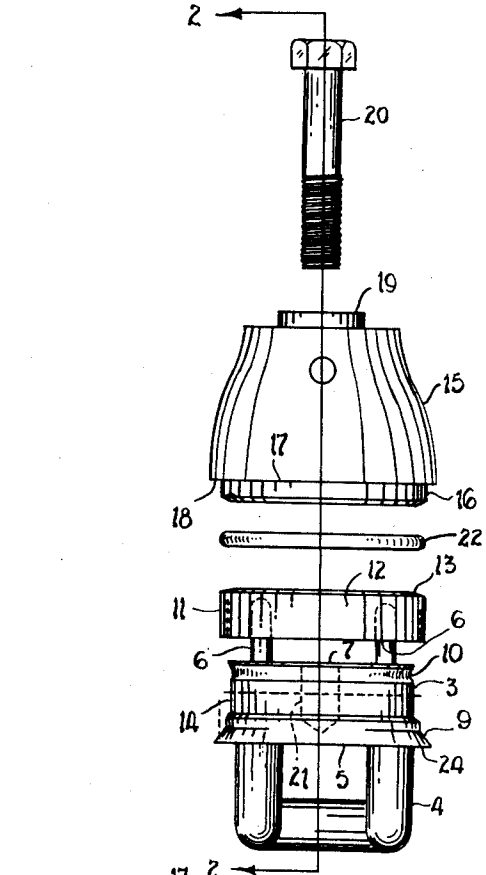



Fig 1

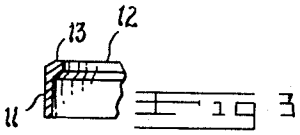



Fig 3

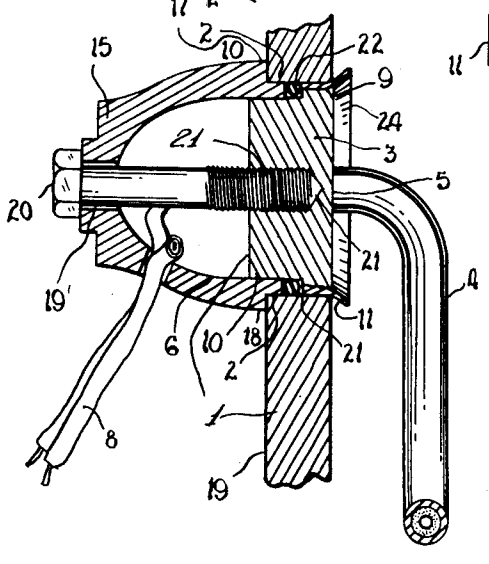



Fig 2

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# IMMERSION HEATER

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4 Claims. (Cl. 219—38)

My invention relates to new and useful improvements in immersion heaters, particularly immersion heaters adapted to be inserted into the cylinder block of an internal combustion engine, the principal object and essence of my invention being to provide a device of the character herewithin described which enables the heater to be clamped securely within the aperture within the cylinder block by means of a circumferentially extending anvil which expands a malleable sealing ring.

Another object of my invention is to provide a device of the character herewithin described which is easily insertable within the cylinder block and includes means to prevent the device from becoming displaced from the cylinder block due to vibration or pressure.

Yet another object of my invention is to provide a device of the character herewithin described which is extremely simple to install, 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 elevation of my device shown in an exploded view.

Figure 2 is a vertical section of my device taken along the lines 2—2 of Figure 1, but shown installed within a supporting surface.

Figure 3 is an enlarged fragmentary section of the malleable sealing ring.

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

So-called block heaters for internal combustion engines are normally inserted through the frost plug apertures normally provided in the cylinder block of an engine. The greatest difficulty in fitting such block heaters is the method of attachment of the heater to the cylinder block in order to form an efficient seal and also to prevent displacement of the heater once it is fitted. Many attempts have been made to provide attachment means normally taking the form of bolts with hooked ends, which engage the inner surface of the supporting surface, but these usually have the disadvantage that the clamping pressure is applied at two points only around the circumference of the aperture. This leads to sealing difficulties, particularly when the engine upon which the device is used is fitted with a pressure coolant system.

Attempts have been made to utilize a conventional expanding O ring and, although these normally produce an efficient seal, nevertheless the device is then held in position purely by the expanding O ring, and if this ring deteriorates, vibration and pressure can cause the entire heater to be displaced from the aperture with a subsequent loss of coolant.

The device hereinafter to be described overcomes these



difficulties inasmuch as an expanding O ring is utilized for sealing purposes, but it will be noted that the actual method of retention of the device within the aperture is by means of an expanded malleable ring which efficiently prevents displacement as well as adding to the seal.

Proceeding, therefore, to describe my invention in detail, it will be seen upon reference to the accompanying drawings that I have illustrated part of the wall 1 of a cylinder block having an aperture 2 formed therethrough, which normally is closed by the conventional frost plug (not illustrated).

The immersion heater consists of a cylindrical body portion 3 carrying a conventional immersion heater element 4 which extends from the side 5 thereof. This immersion heater extends through the body portion and is connected to terminals 6 extending upon the opposite side 7 of the body portion, said terminals being connected to electrical conduits 8 in the usual manner.

The body portion 3 is provided with a flared or flanged annular ring 9 formed around the body portion adjacent the side 5 thereof and it should be noted that the diameter of this portion 9 is substantially equal to the diameter of the aperture 2 so that it can be passed therethrough in fitting. An annular groove 10 is formed around the body portion adjacent the side 7 thereof, the purpose of which will hereinafter become apparent.

A hollow ring 11 manufactured of a malleable material, freely surrounds the body portion 3 and the outer diameter of this ring is substantially equal to the diameter of the flanged portion 9 of the body portion so that it will seat as illustrated in phantom in Figure 1. The side 12 of the ring 11 remote from the flanged portion 9 extends inwardly to form lip 13 and the internal diameter of this lip is equal to the main portion 14 of the body portion 3.

A hollow domed cover portion 15 is provided and it will be noted that this cover portion is stepped as at 16 adjacent the inner end 17 thereof. This stepped portion is adapted to be inserted within the aperture 2 so that the shoulder 18 abuts against the outer surface 19 of the wall or supporting surface 1, as clearly shown in Figure 2.

The cover portion 15 is apertured centrally as at 19' and a threaded bolt 20 passes therethrough and is adapted to engage within an aperture 21 formed within the body portion 3. It will be noted that this aperture 21 is centrally located, but only extends part way through the body portion 3.

In operation, the aperture 2 is cleaned out to present a machine surface whereupon the sealing ring 11 is entered upon the body portion 3, as shown in phantom in Figure 1. A conventional O ring 22 is located within an annular groove 10 formed adjacent the side 7 of the body portion, whereupon this portion of the device is inserted through the aperture 2 with the elements 4 extending within the cylinder block.

The cover portion 15 is now positioned so that the shoulder 18 abuts against the surface 19 and the bolt 20 is passed through the cover portion and screw threadably engaged within the aperture 21 in the body portion. Upon tightening the bolt 20, the body portion is drawn towards the cover portion 15, but due to the increased diameter of the flange 9 on the body portion, this acts as an anvil and flares the rim 24 of the sealing ring 11 to a diameter greater than the diameter of the aperture 2. At the same time, the O ring is pushed forwardly out of its groove 10 and is squeezed against the lip 13 of the sealing ring and the forward end of the shoulder 16 of the cover, thus causing the O ring to expand diametrically and act as an additional seal.

From the foregoing, it will be appreciated that full sealing qualities are provided and that the mechanical

flaring of the portion 24 acts as an efficient lock for the device within the aperture so that it cannot be displaced by vibration or pressure.

Since various modifications can be made in my invention as hereinabove described, and many apparently widely different embodiments of same made within the spirit and scope of the claims without departing from such spirit and scope, it is intended that all matter contained in the accompanying specification shall be interpreted as illustrative only and not in a limiting sense.

What I claim as my invention is:

1. A coolant heater adapted to be inserted into a circular aperture in a supporting surface, comprising in combination a cylindrical body portion, an immersion element carried by said body portion and extending upon one side thereof, said body portion adapted to pass through said aperture, a cover portion detachably secured to the other side of said body portion, means cooperating between said cover portion and said body portion adapted to clamp said body portion sealably into said aperture, and a resilient O ring also surrounding said body portion adapted to be clamped between said cover portion and said body portion.

2. A coolant heater adapted to be inserted into a circular aperture in a supporting surface, comprising in combination a cylindrical body portion, an immersion element carried by said body portion and extending upon one side thereof, said body portion adapted to pass through said aperture, a cover portion detachably secured to the other side of said body portion, means cooperating between said cover portion and said body portion adapted to clamp said body portion sealably into said aperture, an annular groove around said body portion adjacent said last-mentioned side, a flared anvil ring formed around said body portion adjacent said first-mentioned side, a malleable sealing ring freely surrounding said body portion and engageable by said anvil ring, and a resilient O ring also surrounding said body portion.



3. A coolant heater adapted to be inserted into a circular aperture in a supporting surface, comprising in combination a cylindrical body portion, an immersion element carried by said body portion and extending upon one side thereof, said body portion adapted to pass through said aperture, a cover portion detachably secured to the other side of said body portion, means cooperating between said cover portion and said body portion adapted to clamp said body portion sealably into said aperture, said cover portion being hollow and provided with a stepped shoulder upon one side thereof, said stepped shoulder adapted to enter said aperture and abut against the face of said supporting surface, said cover portion being centrally apertured, said body portion also being centrally apertured, said body portion also being centrally apertured on said second-mentioned side, said last-mentioned aperture extending part way through said body portion and being screw threaded, and bolt means passing through said apertured cover portion and engaging said apertured body portion adapted to draw said body portion towards said cover portion when in situ, thereby clamping said body portion sealably into said aperture.

4. The device according to claim 3 which includes a resilient O ring also surrounding said body portion adapted to be clamped between said cover portion and said body portion.

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