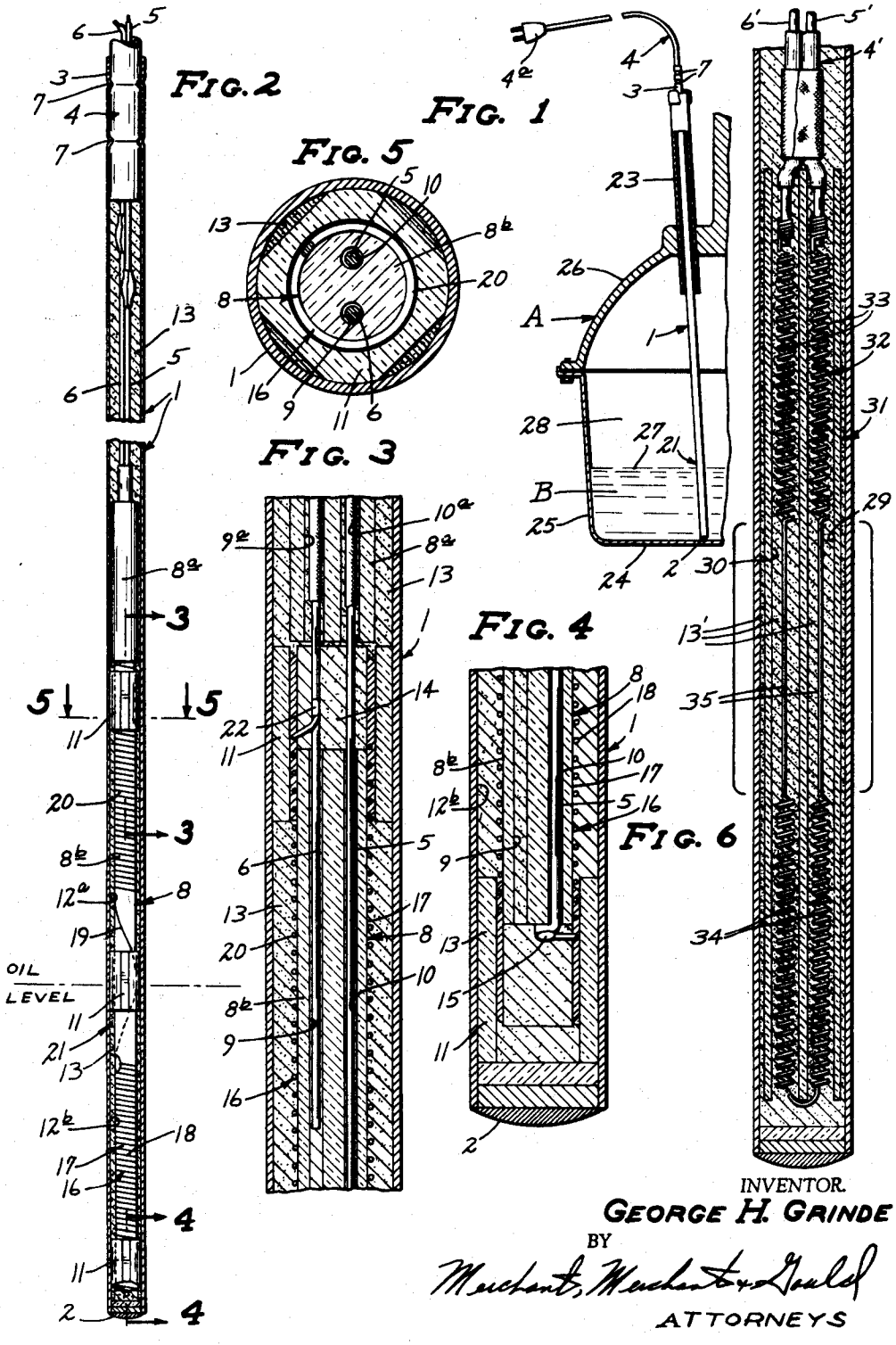
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DIP STICK HEATER

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DIP STICK HEATER

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My invention relates to dip stick heaters for internal combustion engines of the type wherein the crankcase serves as an oil reservoir and, in a sense, is in the nature of an improvement upon my patent No. 2,508,512, "Immersion-Type Heater."

In dip stick heaters of the type above described, it has been customary to utilize a continuous heating element which runs from the bottom of the dip stick throughout the submerged portion thereof and to a point materially above the oil level in the crankcase. The total heating element draws approximately 100 watts and will run up to a temperature of 1100° in air at room temperature, but at a materially reduced temperature when submerged in liquid, such as oil, due to the rapid heat conductivity of the liquid. Consequently the red hot portion of the heating element above the oil level, acting particularly upon the more volatile hydrocarbon products present in the oil due to dilution and piston blowout, sets up a continuous oxidization. This oxidization not only is undesirable in that it gives rise to obnoxious odors, but also in that it directly impairs the efficiency of the stick due to accumulation of carbon-like deposits thereon. Furthermore, with the passage of time, these accumulated deposits directly impair one's ability to insert the heater into the oil stick aperture and to remove same therefrom.

A primary object of my invention is the provision of a novel dip stick heater which overcomes all of the objectionable features of the present day dip stick heaters, above pointed out. To this end I provide a dip stick heater which splits the heating element into two axially spaced sections, one of which is completely submerged in the oil and well below the oil level, and the other of which is spaced well above the oil level where it heats crankcase air and parts of the engine in contact therewith. With this arrangement, the dip stick is relatively cool in that area immediately adjacent the oil level and this largely or wholly eliminates the problem of formation of carbon or carbon-like deposits thereon.

A further object of my invention is the provision of a dip stick heater of the type immediately above described which may be produced relatively inexpensively, which is rugged and durable in construction, and which is highly efficient in operation.

The above and still further objects of my invention will become apparent from the following detailed specification, appended claim and attached drawings.

Referring to the drawings wherein like characters indicate like parts throughout the several views:

FIG. 1 is a fragmentary view in vertical section of the crankcase of a conventional internal combustion engine showing my dip stick heater in use therein;

FIG. 2 is a view in vertical axial section of the dip stick heater of FIG. 1;

FIG. 3 is an enlarged fragmentary view taken on the line 3—3 of FIG. 2;

FIG. 4 is an enlarged fragmentary detail view as seen from the line 4—4 of FIG. 2;

FIG. 5 is a view in transverse section as seen from the line 5—5 of FIG. 2, on an enlarged scale; and

FIG. 6 is a fragmentary view in axial section of a dip stick heater, illustrating a modified form of my invention.

Referring with greater particularity to the drawings, and initially to the structure of FIGS. 1 to 5, inclusive, the numeral 1 indicates an elongated tubular casing preferably formed from metal and having a closed end 2 and an upper end portion 3. The upper end 3 is closed by an insulating conduit means 4 in the nature of a cable having therein a pair of lead wires 5 and 6, the outer end of which is provided with a conventional plug 4a for connection to a source of electrical power. As shown, the cable 4 is held in the end 3 of the casing 1 by crimping, as indicated at 7, adjacent the upper end.

A refractory insulating member 8, shown as comprising upper and lower aligned sections 8a and 8b, extends from a point spaced from but adjacent to the lower end of the casing 1 upwardly a considerable distance. As shown particularly in FIGS. 3, 4 and 5, the insulating means 8 is provided with a pair of spaced longitudinally extended passages 9 and 10. Concentrically spacing the lower section 8b of the insulating member 8 from the side walls of the casing 1 are a plurality of axially spaced tubular insulating sleeves 11 which define therebetween upper and lower axially elongated annular chambers 12a and 12b.

From the upper end of the casing 1 the leads 5, 6 of the cable 4 extend axially downwardly to a point of engagement with the upper insulating section 8a, at which point, the lead 5 enters and extends through the passage 10a thereof and the lead 6 enters and extends through the passage 9a. The leads 5, 6 are maintained in spaced relation to the walls of the casing 1 by means of powdered insulating material such as aluminum oxide, indicated at 13. As shown particularly in FIG. 3, the lead 5 passes through a relieved area 14 and into the aligned passage 10 of the lower insulating member 8b. As shown particularly in FIG. 4, the lead 5 passes completely through the passage 10 and thereafter is attached, as indicated at 15, to the lower end of a suitable resistance wire such as Nichrome 16. The Nichrome wire 16, in turn, is coiled about the exterior surface 17 of the insulating element 8b to form a lower heating element section 18. Referring now particularly to FIG. 2 it will be noted that the lower heating element 18 is enclosed within the lower chamber 12a. After forming the upper convolution of the lower heating element 18 the Nichrome wire 16 extends upwardly in a single convolution, as indicated at 19, into the upper chamber 12a. At this point a heating element 20, in all respects identical to the lower heating element 18, is formed within said upper chamber 12a and in axially spaced relationship to the lower heating element 18. The area or space between the lower and upper heating elements 18, 20 is identified by the numeral 21.

As shown in FIG. 3, the lead 6 extends downwardly through the passage 9a of the upper insulating member 8a, through the relieved area 14 and into the passage 9 of the lower insulating member 8b. Within the relieved area 14, however, the extreme upper end of the Nichrome wire 16 is welded or otherwise secured to the lead 6, as indicated at 22. Again the relieved area 14 is finally filled with pulverulent insulating material such as aluminum oxide, the same being true with the passageways 9, 9a, 10 and 10a of the insulating members 8a and 8b and the chambers 12a and 12b, as well as the extreme lower end of the casing 1.

As shown in FIGS. 1 and 2, when my novel dip stick heater, above described, is placed into the oil stick opening 23 of a crankcase-equipped internal combustion engine A, the lower end 2 thereof comes into engagement with the bottom 24 of the oil reservoir forming pan 25 carried by the crankcase 26. It will be noted that the oil level 27 comes midway between the upper and lower heating element sections 18, 20, more specifically within the relatively non-heated space 21. Because of the considerable axial extent of the space 21, it is obvious that the oil level

may vary considerably without affecting the efficient operation of my novel heater.

More specifically to the operation of my novel heater, the lower heating element **18** is totally submerged in the oil B below the level **27**, whereas the upper heating element **20** is totally contained within the air space **28** defined by the pan **25** and crankcase **26**, in upwardly spaced relation to the oil level **27**. Consequently, the area of the casing **1**, adjacent the relatively unheated space **21**, is constantly maintained at a relatively cooler temperature, far below that required to set up the undesirable oxidization above mentioned. Because of the relatively greater conductivity of the oil B, it follows that the upper heating section **20** would rise to considerably greater temperature. Consequently, the air within the space **28** is also heated to a relatively high temperature, thereby imparting desirable heat to surrounding metallic surfaces of the crankcase, pan and other parts of the motor A.

With respect to the slightly modified version of the invention illustrated in FIG. 6, the leads **5'**, **6'** of the cable **4'** are shown as extending into the upper ends of the axially extended passages **29**, **30**, formed in an elongated insulating member **31**. A length of Nichrome resistance wire **32** is shown as being connected at its opposite ends to the leads **5'**, **6**, after forming within each of the passages **29**, **30**, upper and lower heating elements **33** and **34**, respectively, which are spaced from each other but connected to each other by relatively straight low resistance portions **35**. In this manner a relatively unheated area of the casing **1** is created, as indicated by the brackets. Obviously, this area serves the same function as the area or space **21** of the structure of FIGS. 1 to 5, inclusive. Also as in the case of the structure of FIGS. 1 to 5, inclusive, the void areas of FIG. 6 not occupied by the components above described are filled with powdered insulating material such as aluminum oxide **13'**.

My invention has been thoroughly tested and found to be completely satisfactory for the accomplishment of the above objects, and while I have shown a preferred embodiment thereof, I wish it to be understood that same may be capable of modification without departure from the scope and spirit of the appended claim.

What I claim is:

A dip stick heater for the crankcase of an internal combustion engine, said heater comprising:

(*a*) an elongated tubular casing closed at its lower end,

(*b*) an elongated refractory insulating member, generally coaxially disposed within said casing, and

(*c*) coiled electrical heating element means disposed within said casing and carried by said insulating member, said heating element means comprising:

(1) a lower convoluted high resistance heating element section carried by said insulating member and disposed within said casing well below the normal oil level of said crankcase,

(2) an upper convoluted high resistance heating element section carried by said insulating member and disposed within said casing well above the normal oil level of said crankcase, and

(3) a relatively low resistance heating element section connecting said upper and lower convoluted heating element sections and defining an axially elongated relatively cool section immediately adjacent the normal oil level in said crankcase, whereby to substantially eliminate the formation of carbon at the point of juncture within said crank case of the oil and the air layer thereabove.

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