May 13, 1958 G. H. GRINDE 2,834,864

HEAD BOLT HEATER

Filed Sept. 10, 1956

Fig. 1

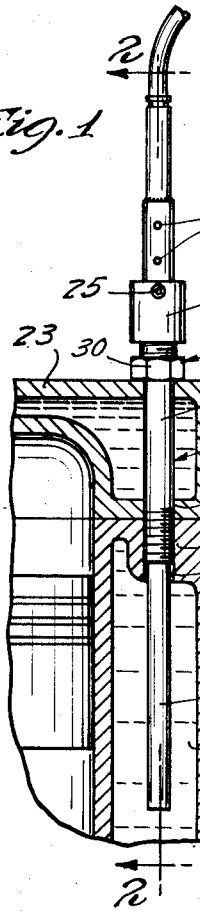


Fig. 2

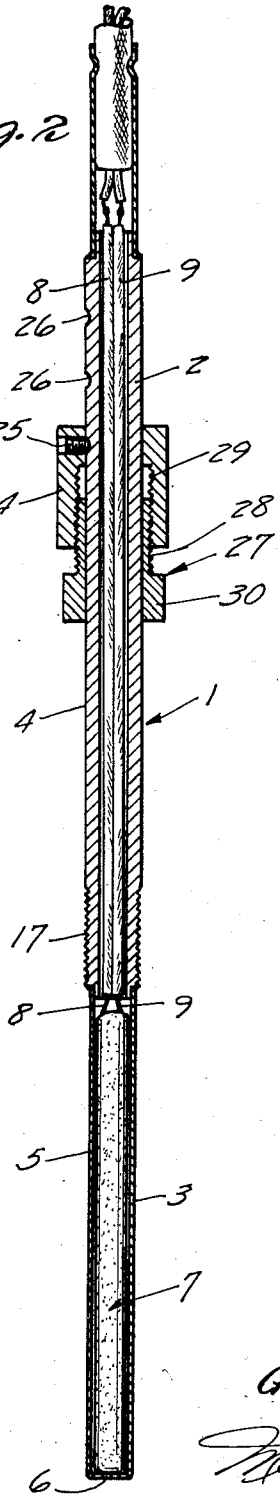
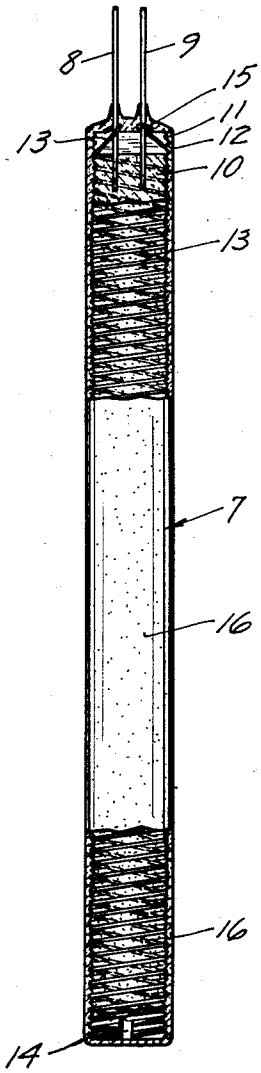


Fig. 3



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HEAD BOLT HEATER

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1 Claim. (Cl. 219—38)

My invention relates to heaters for internal combustion engines and, more particularly, to improvements in electrical head bolt heaters.

Head bolt heaters conventionally include a tubular bolt, adapted to replace the head bolt of a given engine, said tubular bolt having a depending heating element which extends downwardly from the bolt hold into the fluid chamber of the engine's cooling system. The tubular bolt of the heater acts as a conduit for the electrical wires leading to and from the electrical resistance element in the heater. Because of the considerable difference in thickness between the heads of so-called L-head and valve-in-the-head engines, and because of the differences in the thicknesses of similar type engines of different makes, it has heretofore been necessary to manufacture head bolt heaters in varying sizes to fit engines of different types, or, alternatively, to fit engines of like types by different manufacture, in order that the cylinder bolt heater exert the desired amount of clamping pressure upon the head of the motor to effect a seal.

The primary object of my invention is the provision of a cylinder bolt heater which may be used on substantially all makes and types of internal combustion engines, with equal effectiveness.

A still further object of my invention is the provision of a device of the class immediately above described which has a longitudinally adjustable head thereon, which may be locked in desired set positions to compensate for the differences and/or types of internal combustion engines, said head being provided with a screw threaded head-engaging pressure-exerting nut.

A still further object of my invention is the provision of a device of the class immediately above described in which the device comprises a tubular housing made up of a heater containing reduced lower section and an enlarged upper section the walls of which are of greater thickness than those of said lower section, screw threads on the lower end of said upper section adapted to engage the threads in a head bolt receiving recess in the cylinder block, a tubular head slidably receivable on the upper end portion of said upper housing section, a pressure member in the form of a clamping nut having screw threaded engagement with said head, a plurality of longitudinally spaced recesses in the upper end portion of said upper housing section, and a transverse locking element on said head adapted to be snugly received selectively in one of said recesses to lock said head in a desired set position, the space between said recesses being less than the extent of threaded engagement between said head and said pressure member.

A still further object of my invention is the provision of a device of the class described which is provided with a novel heating element.

A still further object of my invention is the provision of a device of the class described which is inexpensive to produce, which is quick and easy to adjust to fit motors

of different types and/or makes, which is highly efficient in its operation, and is durable.

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 parts are indicated by like characters throughout the several views:

Fig. 1 is a fragmentary sectional view of a conventional internal combustion engine showing my novel device in operative position thereon, said device being shown in side elevation.

Fig. 2 is an enlarged sectional view taken substantially on the line 2—2 of Fig. 1; and

Fig. 3 is an enlarged view in side elevation of my novel heating element, some parts being broken away and some parts shown in section.

Referring with greater particularity to the drawings, the numeral 1 indicates in its entirety a tubular housing comprising an upper section 2 and a lower section 3 of diametrically reduced dimensions. Furthermore, as indicated in Fig. 2, the wall 4 of the tubular upper housing section 2 is thicker than the wall 5 of the lower housing section 3. The bottom of the reduced lower housing section 3 is closed, as indicated by the numeral 6. Contained within the reduced housing section 3 is an elongated electrical heating element, which will hereinafter be explained in detail. Lead wires 8 and 9 to and from the heating element 7 extend upwardly through the open-ended upper housing section 2, to a source of electrical energy, not shown.

The heating coil 7 preferably includes a cylindrical core piece 10, formed from ceramic or other insulating heat withstanding material, the cylindrical outer surface of which is formed with a double thread 11 and 12. As shown in Fig. 3, a resistance wire 13 connected to the lower end of the lead wire 8 is received within either one of the threads 11—12 and is wound spirally about the peripheral surface of the core member 10 for substantially the length thereof at which point it passes through a transverse dimetrical slot 14 and is then wound in a reverse direction in the unoccupied thread where it is joined with the lead wire 9, as indicated by the numeral 15. The entire element 7 is finally covered with a ceramic material 16 to insulate same from the wall 5 of the lower housing section 3.

As shown in Figs. 1 and 2, the lower end portion of the upper housing section 2 is threaded, as indicated by the numeral 17 for cooperative engagement with the threads 18 of a conventional cylinder head bolt receiving aperture 19 in a cylinder block 20 of an internal combustion engine. As shown in Fig. 1, the heating element equipped reduced lower housing section 3 extends downwardly through the opening and into the fluid chamber 21 which forms a part of the cooling system. The upper end of the upper tubular housing section 2 projects upwardly through an opening 22 in cylinder head 23, said opening 22 corresponding approximately in diameter to the opening 19 and vertically alignable therewith.

A longitudinally slidable tubular head 24 is mounted on the upper end portion of the upper housing section 2, above the level of the cylinder head 23. A transversely extended setscrew 25, projects through the wall of the head 24 and is adapted to be selectively received within one of a plurality of longitudinally spaced recesses 26 in the wall 4 of the upper housing section 2, to lock the head 24 in a desired vertically spaced relation to cylinder heads 23 of varying thicknesses. A tubular cylinder head engaging pressure member 27 in the form of a nut has a reduced threaded portion 28 which has cooperative engagement with the threaded inner wall 29 of the head 24. The enlarged cylinder head engaging lower portion

of the pressure member **27** is identified by the numeral **30**. It is important to note that the longitudinal spacing of the recesses **26** is less than the linear extent of threaded engagement between the pressure member **27** and the head **24**. This arrangement assures adequate pressure being exerted upon the cylinder head **23** by the pressure member **27** after the setscrew **25** has been received within the proper selected recess **26** so as to properly position the head **24**.

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

What I claim is:

In a device of the class described, an elongated tubular housing comprising upper and lower sections, said lower section being diametrically reduced with respect to the upper section and having a closed bottom, an electrical heating element in said lower section, electric conduit means for said heating element extending through said

upper section, threads on the lower end of said upper section adapted to engage the threads in a bolt hole of an engine block below the cylinder head, a longitudinally slidable tubular head mounted on said upper section, a set screw extending through the wall of said head having selective reception in one of a plurality of longitudinally spaced recesses in the outer surface of said upper housing section, and a tubular cylinder head engaging pressure member having screw threaded engagement with said tubular head and depending therefrom, said recesses being longitudinally spaced with respect to said housing a distance less than the extent of threaded engagement between said head and said pressure member.

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