Sept. 16, 1952 A. L. FREEMAN 2,611,066

ELECTRIC HEAD BOLT HEATER FOR INTERNAL-COMBUSTION ENGINES

Filed Jan. 12, 1951

Fig. 1.

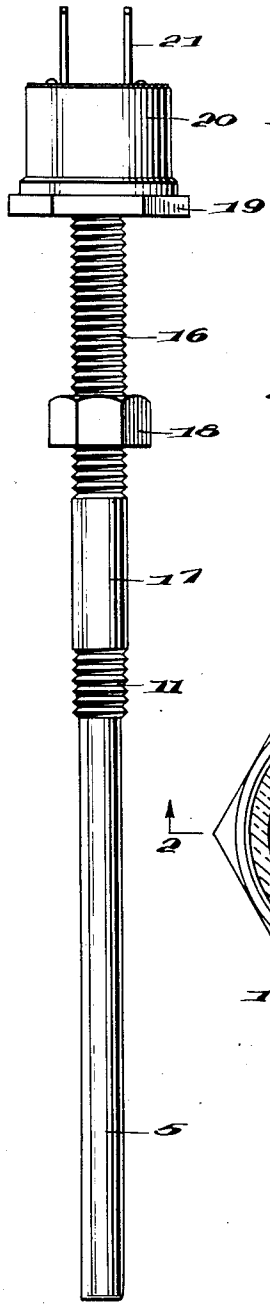


Fig. 3.

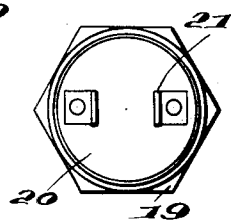


Fig. 4.

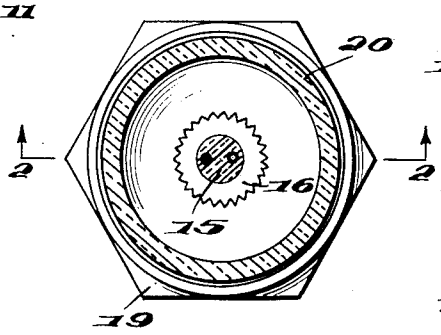
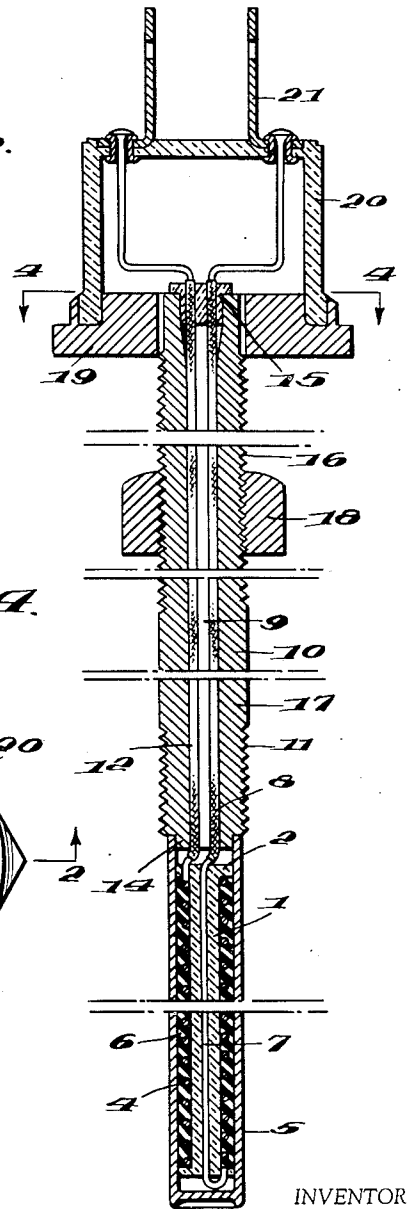


Fig. 2.



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Patented Sept. 16, 1952

2,611,066

UNITED STATES PATENT OFFICE

2,611,066

ELECTRIC HEAD BOLT HEATER FOR INTERNAL-COMBUSTION ENGINES

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Application January 12, 1951, Serial No. 205,662

4 Claims. (Cl. 219—19)

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The invention relates to an electric head bolt heater for internal combustion engines, and more especially to an improvement on the device shown in my Patent No. 2,487,326 of November 8, 1949.

The primary object of the invention is to provide an improved construction of a head bolt heater which is more convenient to use than the one described in such patent.

Another object of the invention is to provide a heater which is sturdier and more durable.

Still a further object of the invention is to provide a heater in which the connector for the normal current source is built with the heater itself so that dangling wires and exposed connections are eliminated.

Still another object of the invention is to provide a head bolt heater with a nut fixed thereon whereby it can be easily threaded and tightened in place.

An additional object of the invention is to provide a simple and compact structure for achieving these results.

Further objects and advantages of the invention will appear more fully from the following description, especially when taken in conjunction with the accompanying drawings which form a part thereof.

In the drawings:

Fig. 1 shows in side elevation a head bolt heater embodying my invention;

Fig. 2 is a longitudinal section therethrough;

Fig. 3 is a top plan view thereof; and

Fig. 4 is a cross-section on the line 4—4 of Fig. 2.

Referring to the drawings, the heating unit as shown comprises a porcelain arbor 1 having a head 2 and a hole therethrough. Wound about the arbor 1 is a coil of nickel chrome wire 4, or similar high resistance wire, which is held to the arbor 1 and insulated from a copper tube casing 5 by cement of the Sauer-Eisen type, denoted by the numeral 6.

Passing through the hole in arbor 1 is a wire 7 which is secured at its lower end by suitable solder to one end of the coil 4. The upper portion of the wire 7 is covered with an asbestos or other insulating material as shown at 8, which passes through a hole 9 in a sleeve or bolt 10, the latter being threaded at 11 for connection to the head of a cylinder block. A similar insulated wire 12 is connected through a hole in the arbor head 2 to the other end of the coil 4.

The bolt 10 has a reduced portion at 14 which tightly fits into the copper casing and is secured thereto by a suitable solder.

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The two wires 8 and 12 pass through the hole 9 and out the upper end thereof, the wires being sealed to the upper end of the bolt by a suitable insulating cement as shown at 15.

The upper end of sleeve 10 is threaded, as shown at 16. Threads 11 and 16 are of opposite pitch, and are spaced apart by an unthreaded sleeve portion 17. A nut 18 is threaded on part 16.

Splined with a press fit on the upper end of threaded portion 16 is a disc 19 having a circular groove in its upper face near its periphery. A cap 20 of insulating material has its lower edge fitting in this groove and adhesively secured therein by a suitable cement. Male electrical terminals 21 are carried by this cap and to them are connected the wires 8 and 12.

When the heating device is to be installed, one of the head bolts of the engine is removed, and the heater is inserted in its place. The heating element proper, that is, coil 4 and the surrounding sleeve 5, being of less diameter than the sleeve 10, passes through the threaded hole in the block, into which threaded section 11 is screwed. The device can be tightened down until the unthreaded portion of the sleeve prevents further turning. Nut 17 can now be tightened down on the cylinder head. Thus the device continues to serve the normal function of the head bolt which it displaces, and at the same time serves to heat the water or other cooling fluid in the engine.

When the device is to be used, a female terminal, for instance on the end of an extension cord, is applied to male terminals 21 to connect the unit to a source of electrical current.

When the heating device is inserted in the cylinder head and the power is turned on, the units will heat the block and the liquids therein to a point to enable easy starting such as is possible in warm weather. Usually about thirty minutes are required to warm up an engine in a temperature 30° below zero. However, the time required depends upon the type of engine and the size of the cylinder block.

The unit is economical, requiring relatively little power consumption. Generally, for a 30 day period the units would require about 18 kilowatt-hours of power. When once heated, the engine will remain in good starting condition throughout the day, provided it is not allowed to stand in cold weather for several hours.

While I have described herein one embodiment of my invention, I wish it to be understood that I do not intend to limit myself thereby except

within the scope of the claims hereto or hereinafter appended.

I claim:

1. A heating device for internal combustion engines adapted to be inserted therein in lieu of a head bolt, comprising a metal sleeve having spaced threaded portions, an electric heating element secured on and extending from one end of the sleeve, a member fixedly secured on the other end of the sleeve, a nut threaded on the threaded portion adjacent such other end, electrical terminals carried by such member, lead-in connections connected to such element extending through the sleeve to such terminals, said terminals, heating element and connections being insulated from the sleeve.

2. A heating device for internal, combustion engines adapted to be inserted therein in lieu of a head bolt, comprising a metal sleeve having spaced threaded portions, an electric heating element secured on and extending from one end of the sleeve, a disc fixedly secured on the other end of the sleeve, a nut threaded on the threaded portion adjacent such other end, a cap of insulating material secured on such disc, male electrical terminals extending from the top wall of the cap, lead-in connections connected to such element extending through the sleeve to such terminals, said terminals, heating element and connections being insulated from the sleeve.

3. A heating device for internal combustion engines adapted to be inserted therein in lieu of a head bolt, comprising a metal sleeve having spaced threaded portions, an electric heating element secured on and extending from one end of the sleeve, a disc fixedly secured on the other end of the sleeve and having a circular groove in its upper face, a nut threaded on the threaded portion adjacent such other end, a cap of insulating material having its edge secured in such groove, male electrical terminals extending from the top wall of the cap, lead-in connections connected to such element extending through the sleeve to such terminals, said terminals, heating element and connections being insulated from the sleeve.

4. A heating device for internal combustion engines adapted to be inserted therein in lieu of a head bolt, comprising a metal sleeve having a threaded portion adapted to engage in a threaded hole in the cylinder block and having an electric heating element secured to the sleeve and extending a substantial distance beyond the inner end of such threaded portion, means associated with the other end of the sleeve adjustable longitudinally thereof and spaced a substantial distance from such threaded portion to engage the cylinder head for clamping it to the block, a member fixedly secured on the sleeve above said last means, electrical terminals carried by such member, and lead-in connections connected to such element extending through the sleeve to such terminals, said terminals, heating element and connections being insulated from the sleeve.

ANDREW L. FREEMAN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,455,246	Furstenau	May 15, 1923
1,702,326	Veronneau	Feb. 19, 1929
2,176,601	Bates	Oct. 17, 1939
2,457,028	Bors	Dec. 21, 1948
2,487,326	Freeman	Nov. 8, 1949
2,551,770	Smith	May 8, 1951

FOREIGN PATENTS

Number	Country	Date
14,562	Great Britain	June 24, 1913