June 11, 1957 L. W. ROMINE 2,795,771

COMBINED SIGNAL AND CONNECTOR BOLT

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FIG. 1

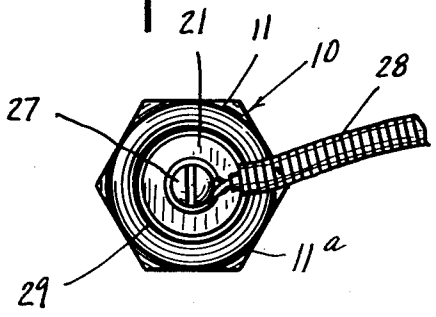
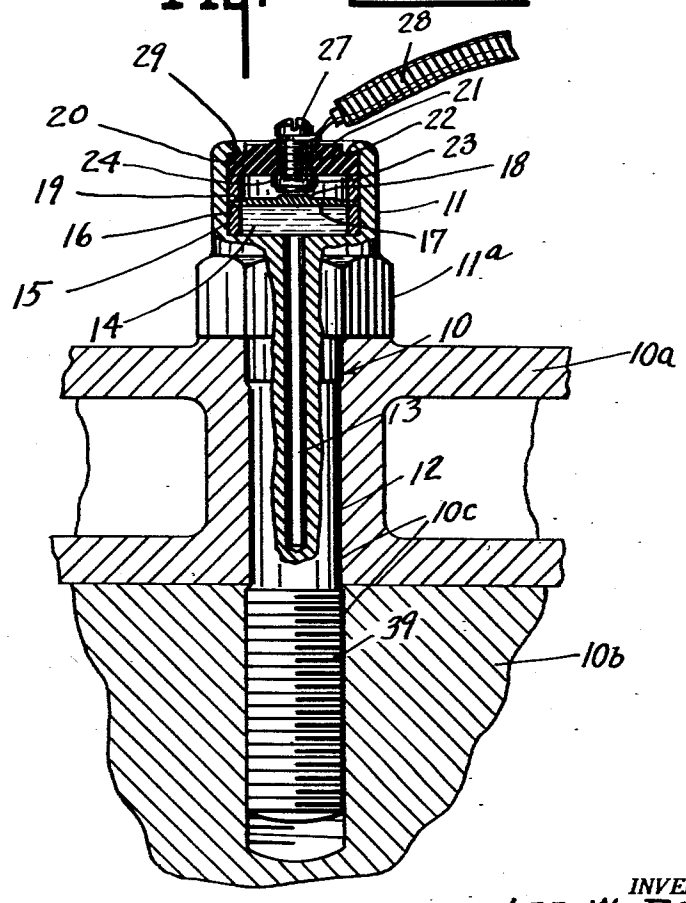


FIG. 2



INVENTOR.
LEE W. ROMINE.

BY
Lockwood, Galt, Woodard & Smith.
ATTORNEYS.

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COMBINED SIGNAL AND CONNECTOR BOLT

Lee W. Romine, Indianapolis, Ind.

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2 Claims. (Cl. 340—57)

This invention relates to a signal bolt, and more particularly to one that is a combined connector and warning medium.

It is the primary object of this invention to provide a device which will serve not only as an ordinary bolt in connecting an internal combustion engine cylinder head and block, but will serve also as a warning medium that the engine is overheating. While every automobile has a temperature indicator, it is nonetheless true that because of the infrequency of its becoming significant or important, the average driver does not observe it when high temperatures are indicated. In short, while it is there in front of him, he does not observe it. Furthermore, such conventional indicators reflect only the temperature of the water and but very indirectly or remotely the heat of the block itself. With the present invention the temperature of the block itself is what actuates the signal.

A further object of the present invention is to provide a combined connector and signal bolt which will cause the driver to be audibly warned when the engine block has reached a predetermined temperature. As is well known, the blocks in use in internal combustion engines today are so well constructed that the temperatures therein have to exceed approximately 800 degrees Fahrenheit before damage is likely to result. The hottest parts of an engine are adjacent the valve ports and this is the area that must be kept at a temperature low enough that no damaging cracks are formed. With the present invention, the driver is audibly warned prior to the temperature reaching the critical point.

It is a still further object of the present invention to provide a bolt of the character described which will have a minimum number of parts, will be relatively inexpensive in cost, and of the greatest simplicity. Heretofore there have been many and varied warning devices, but most of them have been cumbersome, complicated and expensive. On the other hand, the present invention may be formed out of the conventional bolts in use to connect the cylinder head to the cylinder block in an internal combustion engine.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 is a top plan view of the bolt alone.

Fig. 2 is a side elevational view thereof with parts of the bolt, cylinder head and block shown in section.

In the drawings the bolt is shown generally at **10**, it being either the conventional bolt used to connect a cylinder head **10***a* of an internal combustion engine to the cylinder block **10***b*, or a bolt having a slightly larger than conventional head with a round portion **11** and a hex portion **11***a*.

The head and shank **12** of the bolt are first drilled to form an elongated chamber **13** for a fluid **14**. The fluid may be of any type or character provided it is expansive and has a boiling point that is higher than water.

Once the chamber is drilled, the head is then counterbored to form the recess **15**. Mounted therein in sealing engagement with the inner peripheral wall of the head is the lead seal or washer **16**. Nested within the recess and seated upon the upper face of the washer is the diaphragm **17** which is preferably formed of a metal such as brass. Upon the upper face of the diaphragm is formed a contact **18**.

A second washer or seal **19** is provided, it being seated upon the upper face of the diaphragm adjacent its marginal edge, and being in engagement with the inner peripheral wall of the bolt head. Seated upon the last-mentioned washer is a fibre insulating washer **20** which has a narrow crown **21** projecting upwardly therefrom.

Extending through the opening of the fibre washer is plug **22** having the terminal contact **23** formed on the end thereof. As will be observed from the drawing, the contact **23** is in spaced vertical relation to contact **18**.

The lower end of the plug has its diameter enlarged to form the shoulders **24**, which abut the adjacent face of the fibre washer and make it impossible to move the plug upwardly or outwardly when it is mounted as shown in Fig. 2.

A recess or bore is formed in the upper portion of the plug for threaded reception of the terminal screw head **27**. The insulated wiring **28** is connected to the screw in the conventional way. Once the fibre washer is placed within the recess, it is firmly anchored in place by rolling radially inwardly the upper ends of the head as at **29**.

In operation, the bolt, which has its shank conventionally threaded, as at **39**, is fitted in one of the accommodating threaded apertures **10***c* formed through the cylinder head and block, respectively. No changes whatsoever need be made in these apertures. One of the conventional bolts or cap screws is merely removed and the invention threaded home in its place. Preferably a bolt near the center of the engine where the greatest heat is generated, will be the one removed to make room for the invention.

The bolt comprising the invention (in combination with the cylinder head and block) will have been adjusted or calibrated at the factory so that the fluid will expand at a predetermined heat, such as 250 degrees to 300 degrees Fahrenheit, to force the diaphragm contact into engagement with the plug contact. At such a time the electric circuit will be closed. The wiring leads to the automobile Klaxon or horn which is sounded thereby, advising the driver that the heat of his engine block has reached a point that forebodes damage. The horn can be shut off merely by turning off the ignition switch. Since the electric circuit which actuates the horn may be of any conventional form well within the skill of the ordinary mechanic, it is not believed necessary to illustrate or describe it in detail.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention and the scope of the claims are also desired to be protected.

The invention claimed is:

1. In a motor vehicle including audible warning means, a cylinder head and block having aligned threaded apertures normally occupied by cap screws, the combination with one of said apertures of a combined connector and signal bolt threaded in said aperture in place of said cap screw, said bolt comprising a threaded shank having a longitudinal bore formed therein and sized to fit in said apertures, a head on said shank having a recess formed therein and in communication with said bore, heat re-

sponsive expandable fluid in said bore and recess, a pair of vertically spaced annular seals in sealing engagement with the peripheral wall defining said recess, a yieldable diaphragm disposed between said seals and in abutment therewith, said diaphragm bridging said recess transversely of the axis thereof and having a contact point formed on its upper face, the lower face of said diaphragm being exposed to said fluid, and an electrical conductor connected to said audible warning means and including a contact point within said recess in normal axially spaced relation to said first mentioned contact point, said diaphragm being flexed by the expansion of said fluid upon a predetermined temperature being reached to bring said respective contact points into engagement whereby said audible warning means is actuated.

2. A combined signal and connector bolt to be inserted in standard threaded openings in a cylinder head and block to connect the latter together, comprising a cylindrical shank provided with screw threads near one end to engage with the threads of the block, an enlarged integral head at the opposite end of said shank to clampingly engage with the head when the shank is screwed into said block, said head counterbored at its outer end providing an open ended recess defined by a peripheral wall, said shank having a bored axial chamber communicating at one end with said recess and terminating inwardly from the threaded end of said shank, said recess and chamber having heat responsive expandible fluid therein, a yieldable diaphragm extending across and closing said recess above the liquid level therein, vertically spaced annular seals in said recess and engaging said peripheral wall arranged upon opposite sides of said diaphragm to hold the latter in position, an insulating washer closing said recess and spaced beyond said diaphragm with its outer edges in sealing engagement with said peripheral wall, the outer end of said wall peened over said washer to hold the latter and said seals and said diaphragm in assembled relationship, and a contact member centrally disposed in said washer with its lower end normally spaced from said diaphragm.

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