

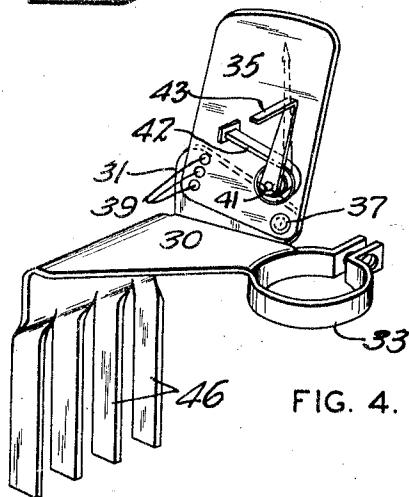
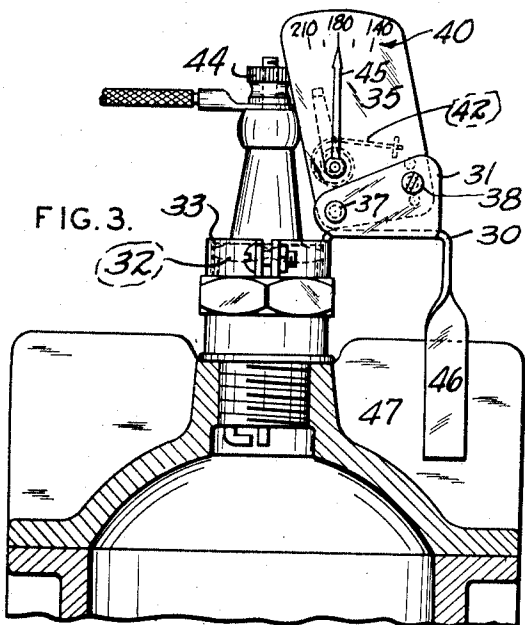
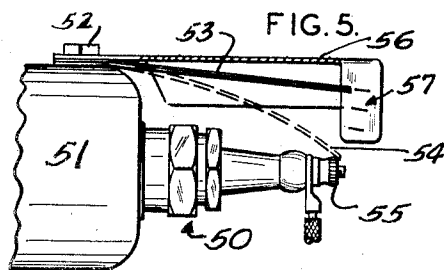
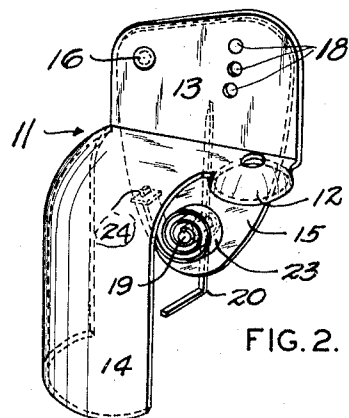
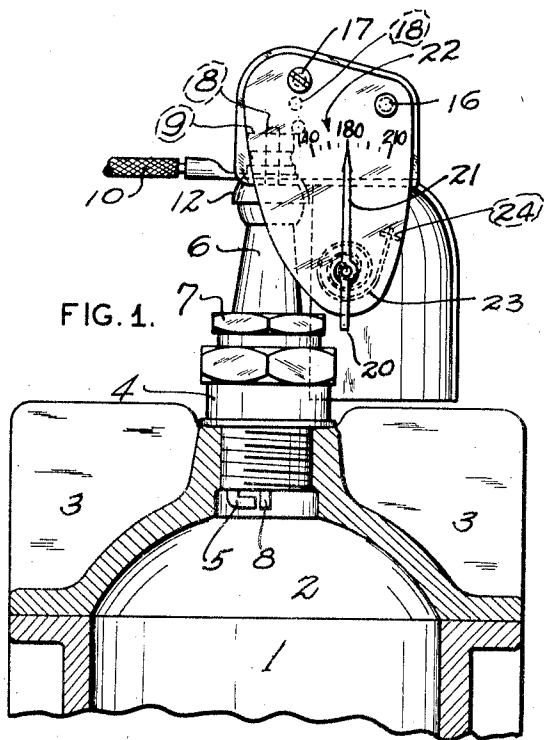
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E. N. CURRAN

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ENGINE SAFETY DEVICE

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INVENTOR.

EDWARD N. CURRAN

By Rodney Redell
ATTORNEY.

UNITED STATES PATENT OFFICE

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ENGINE SAFETY DEVICE

Edward N. Curran, St. Louis, Mo., assignor to
Guy M. Wood, St. Louis, Mo.

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9 Claims. (Cl. 123—146.5)

The invention relates to safety devices for internal combustion engines and more particularly to temperature-controlled devices adapted to short-circuit automatically the ignition system of the engine when the engine becomes overheated to prevent injury thereto.

Previous devices for similar purposes have been cumbersome and have required special engine or ignition system structure and were not arranged for ready application to an engine. The present invention comprises a self-contained unit readily attachable to an engine without machine work on the latter and includes heat responsive means arranged to short-circuit the ignition system of the engine when the engine becomes overheated.

One object of the invention is to provide a self-contained safety device for an internal combustion engine which device may be applied to the engine quickly and easily without the use of special tools. Another object is to provide a safety device which automatically will stop the engine when the engine becomes overheated. Another object is to provide a safety device which may be attached to a spark plug of the engine and which will short-circuit the plug automatically when the engine attains a predetermined temperature. Another object is to facilitate adjustment of the device to adapt it for operation under substantially different atmospheric conditions. Other objects and advantages will be apparent to those skilled in the art from the following description which refers to the drawing wherein:

Figure 1 is a front view of one embodiment of a safety device constructed according to the invention and showing the device attached to an internal combustion engine.

Figure 2 is a rear view of the device.

Figure 3 is a front view of another embodiment of the invention and showing the device attached to an engine.

Figure 4 is a rear view of the device.

Figure 5 shows another embodiment of the invention attached to an engine.

Figure 1 illustrates an ordinary cylinder block 1, a cylinder head 2 having radiating fins 3 and receiving a spark plug which includes a shell 4 threaded into the cylinder head and mounting an electrode 5, an insulator 6 held in shell 4 by nut 7 and carrying an electrode 8 which projects through the top of the insulator and is threaded for a nut 9 by which the cable 10 and the safety device is assembled with the spark plug.

The safety device includes an angular body or bracket 11 with a cup-like portion 12 to be seated

on insulator 6 and with an upstanding leg 13 and a depending skirt 14. A plate 15 is pivoted to leg 13 at 16 and is held in a selected position by a bolt 17 inserted through one of a series of apertures 18 in leg 13.

Journalled in plate 15 is a pivot element 19 carrying an arm 20 having a finger 21 arranged to move over a temperature scale 22 on plate 15. A spiral bimetallic strip 23 forms a thermostat having one end secured to pivot 19 and the other end secured at 24 to plate 15. Body 11, plate 15 and arm 20 are electrically connected with cable 10 and when the adjacent portion of the engine reaches a predetermined temperature, arm 20, moving in a clockwise direction, contacts nut 7 to ground or short-circuit the ignition current and the cylinder becomes inoperative.

Skirt 14 shields the thermostat from air currents tending to move across the top of the engine and to interfere with the heating of the thermostat by the engine, and also serves to conduct heated air upwardly from the cylinder more directly to the thermostat.

By inserting bolt 17 in a different hole 18, plate 15 is shifted on its pivot 16 and the thermostat and arm 20 are moved closer to or farther away from the spark plug to vary the extent of movement of member 18 required to bring the same into contact with nut 7. This arrangement provides for the adjustment of the device for different operating conditions.

If the device is used on a one-cylinder motor, the motor will stop when the plug is short-circuited. If the device is used on a multicylinder motor, then the overheated cylinder will misfire and the operator will be warned that an abnormal condition exists in the engine. If the motor is not stopped by the operator after one plug ceases firing, then if each plug is equipped with a safety device, as the cylinders overheat, the corresponding plugs automatically cease firing and the motor stops.

In the embodiment shown in Figures 3 and 4, the safety device includes a bracket 30 having an upstanding leg 31 and attached to the spark plug nut 32 by a clamp 33. A plate 35 is pivoted to bracket leg 31 at 37 and is adjustably positioned by bolt 38 inserted through a selected one of holes 39 in leg 31. Plate 35 bears a temperature scale 40 and journals a pivot 41 to which is fastened one end of a spiral thermostat 42 having its other end secured to plate 35.

An arm 43 on pivot 41 moves to contact spark plug nut 44 as the motor reaches a predetermined temperature and thereby to short-circuit the

ignition system whereby the cylinder becomes inoperative. A finger 45 on pivot 41 moves over scale 40 to indicate the approximate temperature of the cylinder. Bracket 30 has depending fins 5 arranged to extend between and preferably to contact the cylinder head fins 47 to produce a closer thermal relation between the engine and the safety device.

In the embodiment of the invention shown in Figure 5, the spark plug 50 is shown as mounted on an upright face of the engine 51 and the safety device is also mounted on the motor by one of the cylinder head bolts 52 or a bolt which, if necessary, may be provided especially for this purpose. The safety device thermostat 53 extends outwardly from the engine head and is arranged to deflect, when heated, to assume the dotted line position indicated at 54, in which its outer end will contact the spark plug nut 55 and short-circuit the ignition system direct to the engine.

If desired, the device may include a bracket 56 providing a measure of protection for the thermostat and carrying a scale 57 over which the outer end of the thermostat moves as it is affected by the engine temperature.

Obviously, the thermostat could be mounted on the spark plug and deflect, when heated, to contact the motor cylinder or head.

A safety device constructed according to this invention may be used for controlling the operation of either air-cooled or water-cooled engines, but it has been found that the device is particularly useful on air-cooled engines.

The safety device is constructed as a self-contained unit and is readily attachable to an internal combustion engine without the use of special tools or other equipment. The forms shown in Figures 1 to 4 are mounted upon the spark plug and even the cylinder bolts are not removed and applied. The device responds quickly to temperature variations in the motor and there is no time lag after the motor becomes overheated and before the engine is stopped by the device.

While I have described selected embodiments of the invention, it should be understood that other arrangements may be used without deviating from the scope of the invention as defined in the appended claims.

What is claimed is:

1. In combination with an internal combustion engine having a body member and an ignition system including a spark plug member, and a device for preventing overheating of the engine comprising a strip of thermostatic metal mounted on one of said members and extending adjacent to but normally spaced from the other said members and arranged, when heated to a predetermined temperature, to move towards and contact the other of said members to short-circuit the ignition system and terminate the operation of the engine.

2. A self-contained safety device readily attachable to an internal combustion engine and adapted to short-circuit the ignition system of the engine, said device comprising heat responsive means and a member to mount said means on a spark plug of the engine, said heat responsive means being arranged so that when the engine reaches a predetermined temperature said means short-circuits the ignition system through the spark plug on which the device is mounted.

3. A self-contained safety device readily attachable to an internal combustion engine for

automatically stopping the engine when the engine becomes overheated, said device comprising heat responsive means arranged to short-circuit the ignition system of the engine when the engine attains a predetermined temperature, a mounting for carrying said means and electrically connecting the same to one terminal of a spark plug of the engine, and said means being arranged to contact the other terminal of the plug, when the engine attains a predetermined temperature, to short-circuit the engine ignition system through the plug.

4. In a safety device for an internal combustion engine, a bracket constructed and arranged for ready mounting on the engine, a heat responsive means carried by said bracket and arranged to short-circuit the ignition system of the engine when the engine attains a predetermined temperature, and a member having a scale indicating various temperatures, said heat responsive means being arranged to indicate on said scale the temperature of the engine.

5. In combination with an internal combustion engine having an ignition system including a spark plug, a self-contained safety device readily attachable to the engine and comprising heat responsive means arranged to short-circuit the ignition system of the engine when the engine attains a predetermined temperature, said heat responsive means including a strip of thermostatic metal, said strip being attached at one end to the engine and the free end of said strip being arranged to move towards a spark plug to short-circuit the ignition system through the plug when the engine becomes overheated and the temperature of said thermostatic strip rises to a predetermined degree.

6. A self-contained safety device readily attachable to the spark plug of an internal combustion engine and adapted to cause the plug to misfire automatically when the engine becomes overheated, said device comprising a body, means to mount said body on the plug, heat responsive means supported by said body, a scale on said body, a member pivotally supported by said body and moved by said heat responsive means, said member including a pointer arranged to indicate on said scale the temperature of the engine, said member being connected electrically with the terminal of the plug to which said body is connected and being arranged to contact the other terminal of the plug to short-circuit the plug when the engine attains a predetermined temperature.

7. A self-contained safety device readily attachable to an internal combustion engine and adapted to stop the engine automatically when the engine becomes overheated, said device comprising a body, means to attach said body to the positive terminal of a spark plug of the engine, heat responsive means supported by said body, a member pivotally carried by said body and movable by said heat responsive means, said member being connected electrically with the positive terminal of the plug and being arranged to engage the grounded portion of the plug to short-circuit the plug when the engine attains a predetermined temperature.

8. In an internal combustion engine, a safety device for causing said engine to misfire when said engine is overheated, said device comprising heat responsive means, a body, means to attach said body to the grounded terminal of a spark plug of said engine, a member pivotally supported by said body and moved by said heat responsive

means, said member being connected electrically to the grounded terminal of the plug and being arranged to contact the positive terminal of the plug when the engine becomes overheated to short-circuit the ignition system of the engine, and heat conducting fins in thermal relation with the engine and heat responsive means so that said heat responsive means responds quickly to temperature changes of the engine.

engine having an ignition system including a spark plug, a self-contained safety device comprising a strip of thermostatic metal attached at one end to a cylinder head bolt of the engine and extending therefrom alongside of said spark plug and arranged, when heated, to move towards and contact said spark plug to short-circuit the ignition system. 5

0 9. In combination with an internal combustion

EDWARD N. CURRAN. 10