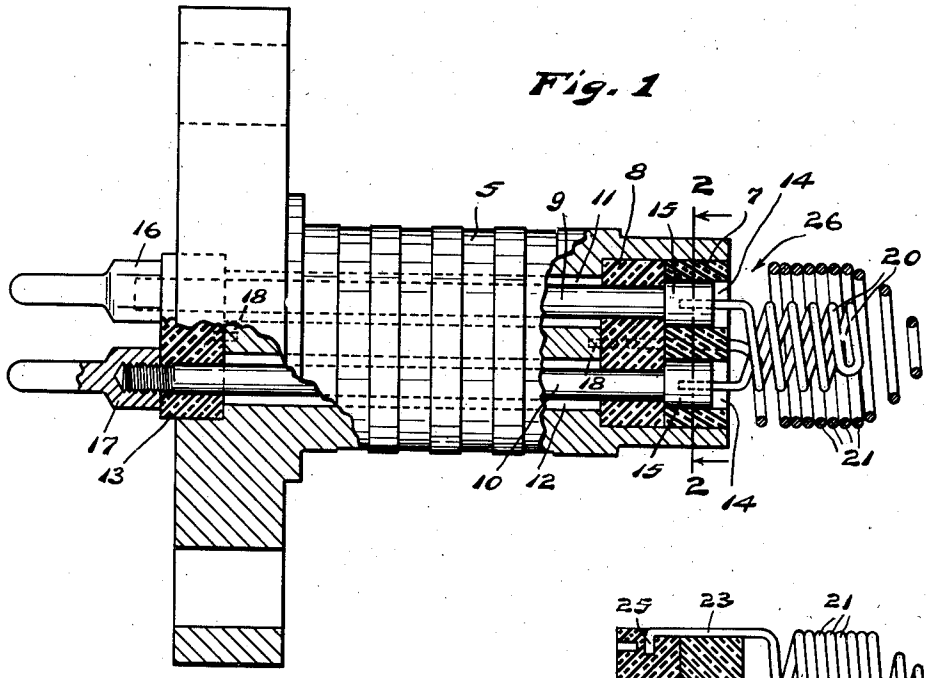
H. W. SUMNER.

IGNITER.

APPLICATION FILED JULY 14, 1919.

1,379,060. Patented May 24, 1921.

Fig. 1



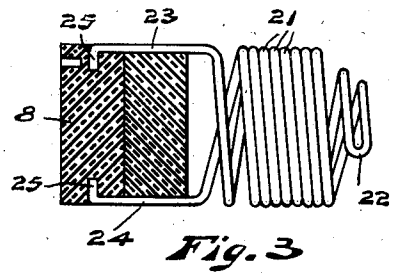


Fig. 3

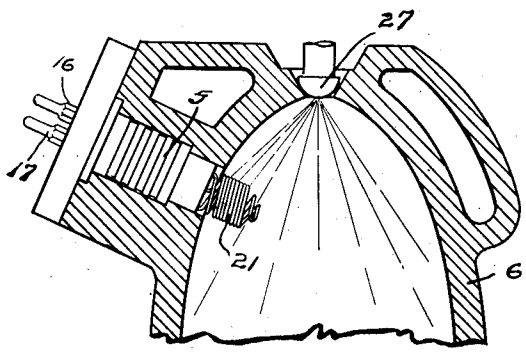


Fig. 4

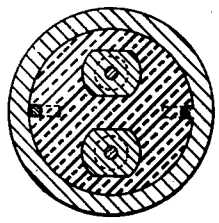


Fig. 2

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HENRY W. SUMNER, OF SEATTLE, WASHINGTON.

IGNITER.

1,379,060. Specification of Letters Patent. Patented May 24, 1921.

Application filed July 14, 1919. Serial No. 310,821.

To all whom it may concern:

Be it known that I, HENRY W. SUMNER, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented a new and useful Improvement in Igniters, of which the following is a specification.

This invention relates to improvements in igniters for internal combustion engines of the type that are adapted to burn relatively heavy fuel oils and the object of this improvement is to provide an electric igniter that will not be cooled below an efficient ignition temperature when a spray of fuel is directed thereonto.

In heavy oil burning engines where igniters of this type are used and where a spray of liquid fuel is delivered directly onto the igniter, the fuel tends to cool the igniter below the temperature that is best suited for efficient ignition thereby causing ignition troubles with a consequent fouling of the engine and loss of power.

I overcome this difficulty by providing an igniter having an igniter coil or element that is protected by a shield or cage which becomes heated by the heat from the coil and which is arranged to intercept a spray of liquid fuel and heat and vaporize such fuel before it comes in contact with the igniter coil. The igniter coil and the protective cage may be of various different forms so long as the cage is constructed and arranged so that it will be heated by the heat from the igniter coil and will intercept and vaporize fuel before such fuel is permitted to come in contact with the igniter coil.

In the accompanying drawings Figure 1 is a view partly in mid section and partly in elevation of an igniter constructed in accordance with this invention; Fig. 2 is a view in cross section of the same substantially on a broken line 2, 2 of Fig. 1; Fig. 3 is a view in elevation of a coil of wire embodied in the invention, the base of insulating material with which the coil is connected being shown in cross section and Fig. 4 is a view in sectional elevation on a reduced scale of a fragment of an engine cylinder showing a relative positioning of this igniter and a fuel spray nozzle by which satisfactory results are obtained.

Like reference numerals designate like parts throughout the several views.

Referring to the drawings the numeral 5 designates a substantially cylindrical igniter casing that is adapted to project through the wall of a cylinder 6 and to be rigidly secured to such cylinder in any well known manner. The inner end of the igniter casing 5 is concentrically bored to form a cylindrical recess for two disks 7 and 8 of insulating material which are held in position by two bolts 9 and 10 that extend lengthwise through passageways 11 and 12 in the igniter casing and through an inserted block or disk 13 of insulating material at the outer end of such casing. The disk 7 is provided with recesses 14 for the heads 15 of the bolts 9 and 10 and the disk 8 is perforated to permit the bolts 9 and 10 to pass therethrough the head 15 of the bolts engaging with the side of the disk 8 when nuts 16 and 17 on the outer ends of such bolts are tightened against the block 13.

The passageways 11 and 12 are of larger diameter than the bolts 9 and 10 so that the bolts are electrically insulated, by surrounding clearance space, from the walls of the igniter casing and the disk 8 and block 13 are preferably provided with dowel pins 18 to prevent them from turning sufficiently to permit contact between the bolts 9 and 10 and the walls of the passageways 11 and 12.

The igniter coil or element 20 is formed of high resistance wire doubled and coiled as shown, the two ends of the coil being connected with the respective heads of the bolts 9 and 10 preferably by inserting such two ends into perforations in the heads of the bolts and then flattening the bolt heads slightly to bind the ends of the wires firmly.

The nuts 16 and 17 serve as terminals which may be connected with electric circuit wires so that current may flow through the coil 30.

The igniter coil 20 is surrounded by a protective cage or shield which may be formed of a wire 21 that is doubled as at 22 and coiled in substantially the manner shown, the two end portions 23 and 24 of the wire being arranged to lie within grooves in diametrically opposite sides of the disks 7 and 8 and the tips of the end portions 23 and 24 being bent inwardly as at 25 and projected into suitable holes in the sides of the disk 8.

The wire 21 forming that portion of the cage that surrounds the main body of the igniter coil 20 is preferably bent in substantially the form of a closed coil but in prac-

tice it is found that sufficient space exists between the convolutions of such closed coil to permit the passage of some fuel vapor. The closed portion of the coil forming the igniter cage is spaced from the inner end of the casing 5 as indicated at 26 and the forward end of such coil is substantially open as shown in Fig. 1, the wires forming the last few convolutions being spaced from each other and wound on a smaller diameter so that it gives a tapered appearance to the forward end of the coil.

The form of shield or cage above described is satisfactory and efficient when the igniter is arranged in substantially the relation to a fuel spray nozzle 27, shown in Fig. 4 so that the spray of fuel from the nozzle does not strike the igniter coil 20 direct but strikes upon the closely wound part of the cage surrounding the igniter coil. If the relative positions of the fuel nozzle and the igniter are changed the shield or cage for the igniter coil will obviously be constructed and arranged so as to shield the coil from a direct spray of fuel.

The igniter is quickly and easily assembled by making the ends of the coil 20 fast to the bolts 9 and 10, then inserting the bolts through the disks 7 and 8, then placing the cage or shield 21 over the coil 20, and then slipping the assembled parts into the housing 5, putting the block 13 in place and screwing on the nuts 16 and 17.

In the operation of this igniter when electric current is admitted, the coil 20 will become red hot and will soon heat the surrounding cage so that when a spray of liquid fuel is directed onto the cage it will be vaporized thereby before it comes in contact with the igniter coil 20 and is ignited.

The cage 21 thus serves to shield the igniter coil 20 from the direct spray of fuel thereby preventing the igniter coil from becoming cooled to such an extent that it is incapable of efficient ignition.

After the engine has been started and is running normally it may be found that the heat from the burning fuel will keep the coils 20 and 21 hot enough for ignition purposes and that current to the coil 20 may be shut off.

The cage or shield 21 by warming and vaporizing the fuel before it comes in contact with the coil 20 also conserves such coil, prevents it from deteriorating as fast as it otherwise would and makes it possible to use smaller wire in the construction of the coil, thereby reducing the amount of current required to heat the coil.

The cage or shield 21 will operate in substantially the same manner with any other form of heated igniter element as it will with the coil 20.

It is obvious that changes in the form of construction and arrangement of parts of this device may be resorted to within the scope of the claims.

What I claim is:

1. Ignition devices including an igniter element arranged to be heated and a shield adapted to be heated by said igniter element and arranged to shield said igniter element from direct contact with a spray of fuel, said shield being capable of being penetrated by a portion of the fuel mixture.

2. Ignition devices comprising an electrically heated igniter element and a shield surrounding said igniter element in close proximity thereto, said shield being capable of being penetrated by a fuel mixture.

3. Ignition devices including an electrically heated ignition coil and a shield formed of a coil of wire surrounding said ignition coil.

4. An igniter comprising a body member, an electrically heated ignition coil projecting from said body member, and a shield formed of a closed coil of wire supported from said body member and encircling said ignition coil.

5. An igniter comprising a body member, an igniter coil projecting from the end of said body member, conductor means extending lengthwise through said body member for supplying electric current to said ignition coil, and a shield formed of a coil of wire supported by said body member and encircling said igniter coil in close proximity thereto, said shield coil being substantially open at both ends and having a closely wound portion surrounding said igniter coil.

6. An igniter comprising a cylindrical igniter casing having a concentric cylindrical recess in the inner end thereof and provided with two longitudinally extending passageways, insulation blocks arranged to fit within the recess in the inner end of said igniter casing, bolts extending through said insulation blocks and through the passageways in said igniter casing, said bolts being insulated from said igniter casing and serving as conductors for electric current, an igniter coil having one terminal connected with each of said bolts and a shield formed of a coil of wire that encircles said igniter coil and is supported in insulated relation therefrom, said shield being substantially open at both ends and having a closely wound portion surrounding said igniter coil.

Signed at Seattle, Washington, this 7th day of July, 1919.

HENRY W. SUMNER.