March 9, 1926. 1,576,254

H. W. SUMNER

CLOSURE FOR ENGINE IGNITERS

Filed Jan. 25, 1922

FIG. 1

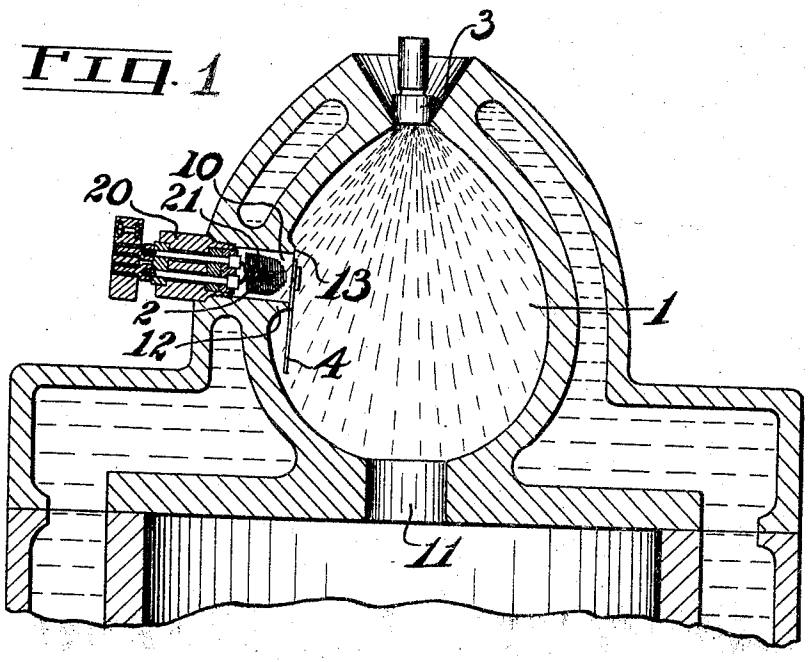


FIG. 2

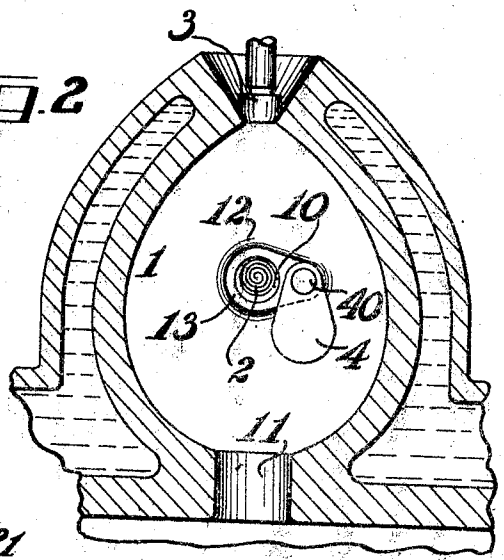
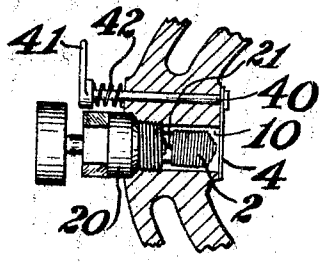


FIG. 3



Inventor

Henry W. Sumner

By W.L. & G.L. Reynolds

Attorneys

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UNITED STATES PATENT OFFICE.

HENRY W. SUMNER, OF SEATTLE, WASHINGTON, ASSIGNOR TO H. W. SUMNER OIL ENGINE COMPANY, OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON.

CLOSURE FOR ENGINE IGNITERS.

Application filed January 25, 1922. Serial No. 531,633.

To all whom it may concern:

Be it known that I, HENRY W. SUMNER, a citizen of the United States of America, and resident of the city of Seattle, in the county of King and State of Washington have invented certain new and useful Improvements in Closures for Engine Igniters, of which the following is a specification.

My invention relates to internal combustion engines and particularly to means for closing off the ignition means from the combustion chamber.

My invention is particularly adapted to oil engines in which the charge is intended to be ignited by a heated ignition element, this element being heated either from an external source or by the heat generated by combustion in the chamber, or by a combination of an externally-heated element at starting and an internally-heated element thereafter.

The principal object of my invention is to provide means whereby the ignition element may be closed off from the combustion chamber at will, as in such cases when it is desired to change, inspect, or repair the ignition element, and especially during normal running periods in such engines as are internally self-ignited normally.

A further object is to provide such closure means for cutting off the ignition element which may be operated wholly independently of the ignition element.

A further object of the invention is to provide such closure means which will be self-seating and sealing.

A further object is to provide in the combustion chamber, an aperture or recess for containing the ignition element with a closure therefor which aperture or recess is so positioned relative to the fuel injection nozzle as to receive a portion of the spray therefrom, thereby to insure ignition even though the ignition element does not project into the combustion chamber.

My invention comprises those novel parts and combinations thereof which are shown in the accompanying drawings, described in the specification and particularly defined by the claims terminationg the same,

In the accompanying drawings I have shown my invention in the form of construction which is now preferred by me.

Figure 1 is a section through the head of an internal combustion engine and its combustion chamber, and through the removable ignition element, the closure plate for the aperture containing the ignition element being shown in its open position.

Figure 2 is a similar section taken at right angles to Figure 1.

Figure 3 is a plan section showing a detail of the ignition element, the closure plate being shown in the closed position.

In engines employing heavy oil as fuel, and particularly engines which are employed in marine work, and which must be run for days without stopping, after a preliminary externally-energized ignition the charge is normally ignited by the heat of the combustion chamber, assisted by pressure therein. In such engines, and also in engines which employ an externally-heated ignition element for ordinary use, it is desirable to provide means whereby the ignition elements may be placed out of communication with the combustion chamber, so that it is inoperative, and so that it may be inspected, repaired, or changed, without interfering seriously with the operation of such engines as employ it continuously. In port, or when the engine has not become heated, it is necessary or desirable to use an externally heated ignition element to insure certain firing of the charge. When this is cut out, however, a saving of the expense of the electric current or other energizing medium is effected, the formation of carbon upon or about the ignition element is prevented, and the life of the element itself is prolonged.

In the drawings I have shown the combustion chamber 1 as having an aperture 10 therein which is adapted to receive the preliminary ignition element 2. I have shown also an aperture in the upper part of the chamber 1 which receives the fuel injection nozzle 3 and an aperture 11 communicating with a cylinder of the engine. The aperture 10 is set preferably at such an angle to the spray from the nozzle 3 that a portion thereof will fall within the aperture 10; as otherwise there might be insufficient contact between the fuel and the depressed ignition element 2 to cause proper ignition.

The character of the ignition element 2 forms no part of this invention; any suitable type may be employed. That which I

have shown herein comprises a body 20 which supports an electrically heated element 21 of fairly light wire, this being surrounded by a guard of heavy wire forming a cage 2. This cage 2 quickly becomes heated by radiation from the electric element 21 and is the primary ignition element. The body 20 is adapted to be secured in the aperture 10 and to seal this aperture automatically. After the engine has been started and warmed up, the plate 4 may be closed, and combustion will continue due to the heat retained in the chamber itself, and the engine will continue to run without the use of electric current.

Preferably the aperture 10 inwardly terminates in a boss 12, the inner face 13 of which is finished to provide a valve seating surface, herein shown as a plane smooth seat. A closure or valve plate 4 is secured upon a shaft 40 journaled at one side of the element 2 and extending without the combustion chamber. An operating handle 41 is provided upon the shaft 40 outside of the combustion chamber, and a spring 42 may be interposed between the outer wall of the combustion chamber and the handle 41 to assist in retaining the plate 4 seated.

During the ordinary operation of starting the engine the plate 4 is swung to one side to uncover the inner end of the aperture 10, as is shown in Figures 1 and 2. When the chamber 1 has become sufficiently heated, or when it is desired to remove the ignition element 2 for any reason, the plate 4 may be swung by turning its shaft 40, to seat said plate upon the finished surface 13 and to close the aperture 10. The plate is of resilient material and should be resistant to high temperatures, nichrome steel having been found suitable for the purpose. On account of its resiliency and on account of the fact that the pressure within the combustion chamber 1 of such engines is always above atmospheric, the plate 4 will be pressed to its seat by such pressure. The spring 42 will, of course, assist in this action. The resiliency of the plate, and the spring 42, obviate the necessity for a packing gland about the shaft 40.

While the plate 4 covers the end of the aperture 10, the element 2 may be removed and may be replaced or if desired a different style of ignition element may be substituted therefor and the plate 4 may then be swung back to uncover the aperture; ordinarily, however, the plate would be left in position and the charge would be ignited by the heat of the chamber walls. Several of these closure plates, one for each cylinder of the engine, may be connected to operate together or each may be independently operated. Even in such engines as continuously employ an externally energized ignition element, during the short time the aperture 10 would be closed combustion will usually proceed in the chamber 1 due to the heat of its walls being communicated to the charge.

It will be noted that the plate 4 is shown as being swung in the plane of the finished surface 13. This will cause it to remove from the surface 13 any accumulation of oil, carbon, or other material and to sweep its seat free each time it is moved into position to close the aperture. This will insure perfect seating each time.

What I claim as my invention is:

1. In an internal combustion engine, a boss raised above the inner wall of the combustion chamber and having its raised surface finished smoothly to form a seating surface, the wall having an aperture therethrough terminating in said boss, a removable igniter receivable in said aperture, a resilient closure for the inner end of said aperture having a sliding engagement with and adapted to seat upon said finished surface, said closure being pressed into close contact therewith at all points by pressures within the combustion chamber, and means for sliding said closure from without the combustion chamber to open or close the inner end of the aperture.

2. In an internal combustion engine, a boss raised from the inner wall of the combustion chamber and having its raised surface finished smoothly to form a plane seating surface, the wall having an aperture therethrough terminating in said boss, an igniter receivable in said aperture, a closure plate for the inner end of said aperture pivoted to slide over said finished seating surface in the plane thereof and to seat thereon, and means for swinging said plate to slide it over said surface from without the combustion chamber, thereby to open or close the inner end of the aperture.

Signed at Seattle, King County, Washington this 11th day of January 1922.

HENRY W. SUMNER.