

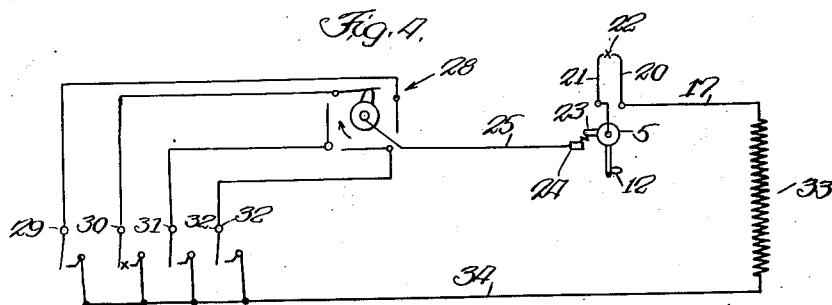
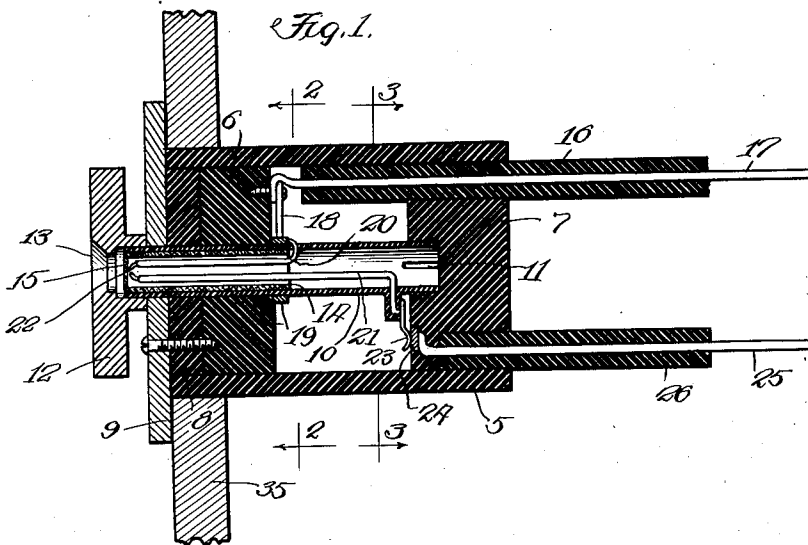
Dec. 8, 1925.

1,565,025

H. J. MOLONEY

IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

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HERBERT J. MOLONEY, OF CHICAGO, ILLINOIS.

IGNITION SYSTEM FOR INTERNAL-COMBUSTION ENGINES.

Application filed June 5, 1920. Serial No. 386,857.

To all whom it may concern:

Be it known that I, HERBERT J. MOLONEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Ignition Systems for Internal-Combustion Engines, of which the following is a specification.

This invention relates to improvements in ignition systems for internal combustion engines.

One of the objects of the invention is to provide means for varying the resistance of the secondary circuit of an ignition system, whereby to reduce the potential difference between the electrodes of the spark plug to prevent short circuiting thru the carbon deposited between said electrodes.

Another object is to provide, in a system of the character described, means that may conveniently be located on the instrument board of a self propelled vehicle accessible to the operator of the vehicle by which the resistance of the secondary ignition circuit may conveniently be varied and a visual indication showing the varying characteristics of the effective sparks as a result of such adjustment.

Another object is to provide an auxiliary intensifying spark gap, in the secondary circuit, between the transformer, or induction coil, and the distributor, so that any adjustment made in the secondary circuit will be effective in all of the spark plug branch circuits.

Another object is to provide means for reducing the potential of the sparking circuit to lessen the disastrous effects following incipient leaks or grounds in the circuit, due to accumulation of grease, dirt or from other causes.

Other, further and more specific objects of the invention will become readily apparent, to persons skilled in the art, from a consideration of the following description, when taken in conjunction with the drawings, wherein:-

Fig. 1 shows a longitudinal, sectional view of the adjusting device.

Fig. 2 is a transverse section taken on line 2-2 of Fig. 1.

Fig. 3 is a similar view taken on line 3-3 of Fig. 1.

Fig. 4 is a conventional diagram of the secondary circuit of an ignition system showing the location of the device.

In all the views the same reference characters are employed to indicate similar parts.

I have observed from long experience that when spark plugs become fouled, by free carbon from the products of combustion being deposited between the electrodes thereof, the very high potential current will pass thru the carbon deposited, without producing an abrupt discharge thru the spark gap within the engine, and thus fail to fire the fuel charges therein, and when the difference of potential between the spark gap electrodes is reduced, the spark will return to the gap and properly ignite the fuel charges.

Furthermore, I have noticed, under the conditions mentioned that the deposits of carbon will be rapidly removed by the successive explosions.

Why these conditions prevail I am unable to state, but the fact remains that the reduced potential at the spark gap will assure explosions and clean away the accumulated carbon around the gap.

The explosions, under the circumstances described, are not so vigorous as when the plugs are clean and operating under the maximum voltage. They are, however, more certain and it is well to operate under the less favorable conditions for a time until the plugs have thus been thoroughly cleaned, after which the potential may be again increased with better efficiency.

The visual spark, occurring at frequent regular or irregular periods, may be observed by the driver of the car. He therefore knows, or soon learns to distinguish the difference in the characteristics of the sparks exhibited at the indicator as to the kind of sparks that are being made at the electrodes of the spark plugs.

In the drawings, I have shown the preferred means by which my invention may be carried into effect, wherein 5 is a casing in the form of a cylinder of insulating material having ends 6 and 7, preferably, of the same material, or the material, 6 and 7, may be molded or poured into the cylinder, thus hermetically sealing the cylinder, while the closure 8 is secured to an outer plate 9. An insulating tube 10, preferably of fiber passes thru the axial center of the cylinder 5 and has bearings in the ends 6 and 7. It is split at one end as at 11, to produce some resilience so that the resistance to its rota-

tion thus effected is yieldingly constant. On the outer end of the tube 10, is a knob or handle 12, having a central opening 13. In the front end of the tube 10 is a glass tube 14, closed at its front end, as at 15, so that the interior of the tube 10 may be observed by looking thru the closed end 15 of the transparent tube 14. A small tube 16 is secured to the cylinder 5 and thru this a wire 17 passes to a blade or brush 18. On the tube 10 is a ring 19 upon which the brush 18 bears so as to carry the current from the wire 17 to a wire 20. Another wire 21 passes into the tube 10, parallel with the wire 20, and the terminals of these two wires form electrodes for an auxiliary spark gap 22 which may be observed thru the end 15 of the tube 14. Secured to the tube 10 is a spring brush 23 which is connected to the wire 21. Normally the brush 23 bears upon the contact 24 which is connected to a leading in wire 25 that passes thru a tube 26 into the interior of the cylinder.

Now, when the brush 23 is moved away from the contact 24, a spark will be produced between these two parts and this spark is in series with the spark 22 of the instrument and these two sparks are in series with the sparks of the respective spark plugs. The length of the spark made between 23 and 24 may be varied to change the difference of potential at the spark gap of the plugs.

In Fig. 4 I have shown a diagram of circuits in which 28 is a distributor and 29, 30, 31 and 32 are spark plugs, connected to the distributor by branch circuits as clearly shown. 33 is the secondary winding of a transformer, or induction coil of the type used for this purpose. 34 is the common return from the respective spark plugs, usually the frame of the car.

The operation of the device is clearly apparent. By changing the distance of separation between the switch terminals 23 and 24, more or less resistance is thus introduced into or removed from the main secondary circuit and hence the difference of potential, between the terminals of the spark plugs, is correspondingly varied.

A part of an automobile instrument board is shown at 35.

The device may conveniently be used for stationary engines and for engines, or gas

motors used on other vehicles such as aeroplanes, boats and the like. Sealing the instrument, within which the adjustable spark is made, protects the spark from atmospheric changes, due to altitude, moisture and corrosive effects of salt air.

While I have herein shown a single embodiment of my invention for the purpose of clear disclosure, it will be manifest to persons skilled in the art, that considerable variations may be made in the general arrangement and configuration of the parts within the scope of the appended claims.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. An instrument of the character described comprising a cylinder; a rotatable tube; a contact arm carried by said tube; a relatively stationary contact cooperating therewith to close an electric circuit; and an observation opening thru the tube.

2. An instrument of the character described comprising a cylinder; a head in each end of the cylinder; a rotatable tube within the cylinder; a contact arm carried by the tube; a relatively stationary contact cooperating therewith to close an electric circuit; an observation opening thru the tube and a handle on the outside of the cylinder to rotate the tube.

3. An instrument of the character described comprising a cylinder; a head in each end of the cylinder; a rotatable tube of insulating material within the cylinder; a contact arm carried by the tube; a relatively stationary contact, cooperating therewith, comprising a switch to close an electric circuit; a knob, outside the cylinder to rotate the tube, having an axial perforation; a glass tube having a closed end closing said perforation and within the insulating tube; a spark gap within the glass tube and in series circuit with the aforesaid switch.

4. A casing; a rotatable member having a handle extending from the casing and having an observation opening; a pair of spark-gap terminals visible thru the opening; another pair of terminals within the casing variably separated by rotation of said rotatable member.

In testimony whereof I hereunto subscribe my name.

HERBERT J. MOLONEY.