

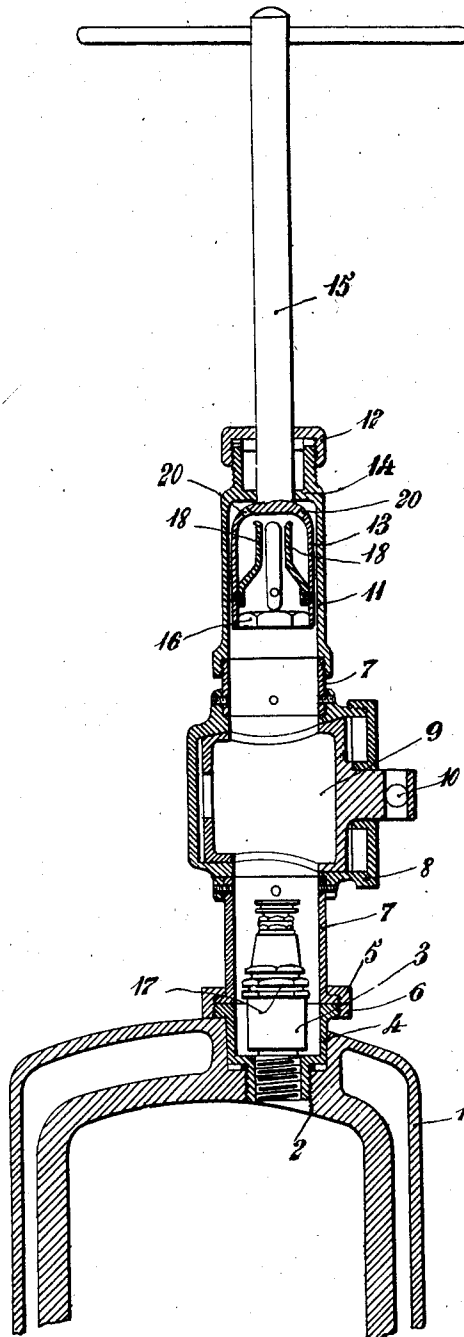
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APPARATUS FOR REPLACING SPARK PLUGS

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APPARATUS FOR REPLACING SPARK PLUGS

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The present invention relates to an apparatus for facilitating the removal and replacement of spark plugs for motor cars without having to stop the motor.

5 The apparatus according to the invention can be used in all types of known motors but it is more particularly adapted to motors for aerial navigation, since it makes possible the changing of the spark plugs while the plane
10 is in flight.

The apparatus according to the invention is characterized by the combination of a wrench capable of gripping and handling the spark plug, of a closed conduit fitted in a removable
15 manner on the cylinder head and in which the said wrench can be moved, of means for opening this conduit to the atmosphere, and of a movable closer in the said conduit in order to divide the same into two chambers.

20 According to one embodiment of the invention, the conduit above referred to is composed of two tubes screwed into one another, the lower tube being fixed in a removable manner to the cylinder head, for example, by
25 means of a fitting secured by screw-threaded means or by means of a bayonet joint.

According to another embodiment of the invention, the socket portion of the socket wrench has at its lower end an opening whose
30 dimension corresponds to that of the body of the plug to be removed or to be replaced and, furthermore, the inner part of said socket wrench is provided with spring blades for gripping and retaining the plug in the
35 socket wrench.

According to one form or embodiment of the invention, the closer of the closed conduit is composed of a stop cock, the key of which is provided with a cylindrical opening enabling the socket wrench, together with the
40 spark plug, to be passed, the said stop cock, when open, enabling the wrench and plug to be passed therethrough, whereas when closed, it prevents the escape of gases from the cylinder when the plug is removed.

The above mentioned stop cock can be replaced by any other suitable closer and in particular by a slide valve.

50 Other advantages and features of the invention will be apparent from the following

description in connection with the annexed drawing illustrating the invention diagrammatically and merely by way of example, the only figure of which is a vertical section
55 through the apparatus according to the invention mounted with a view to removing a spark plug.

Referring to the drawing, 1 designates the cylinder head of an internal combustion engine and 2 the screw threaded opening to receive a spark plug 3. In the present instance, the spark plug 3 is fixed to the head 1 by means of a sleeve 4 screwed into the threaded opening 2. According to the invention, this
60 sleeve 4 is screw-threaded on its upper portion at 5.

The apparatus being mounted (as shown in the drawing), a tube 7 is fixed on the sleeve 4 by means of a fitting 6 provided at a suitable point of its length with a stop cock 8
70 the key 9 of which has a cylindrical opening of a diameter equal to the internal diameter of the tube 7. The key 9 of the stop cock 8, the function of which will be explained hereafter, has its axis horizontal and is actuated
75 by operating the head 10.

The tube 7 is screw threaded at its upper portion in order that a second tube 11 having a screwed stopper 12 at its upper end may be screwed thereon. The diameter of the tube 11 is equal to that of the tube 7 and, consequently, to the diameter of the opening of the key 9.

The assemblage of parts being completed as above indicated, and the key 9 being rotated in such a manner that the opening therein is in the prolongation of the tubes 7 and 11, a continuous closed conduit is thus provided within which a socket wrench 13 can be manipulated. The guiding of this wrench is ensured by a transverse wall 14 in the outer end of the tube 11 and provided with a hole through which the actuating rod 15 of the socket wrench 13 extends.
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The socket of the wrench 13 has an opening 16 of hexagonal shape at its lower end corresponding to the shape of the hexagonal body 17 of the plug 3. Furthermore, the said socket is provided above said opening
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with spring blades 18 to frictionally engage the outer portion of the spark plug.

For the removal of a spark plug, the mode of operation is as follows: The apparatus being mounted and the opening of the key 9 being aligned with the bores of the tubes 7 and 11, the socket wrench 13 is inserted so that its hexagonal portion 16 engages the hexagonal body 17 of the spark plug. In this position, the head of the spark plug extends between the spring blades 18 which exert a pressure on this head on all sides thereof. In order to remove the plug 3 the socket wrench 13 is rotated in the direction to unscrew the plug 3 from the sleeve 4, and once this unscrewing operation is ended, the socket wrench 13 is raised and thus withdraws the spark plug 3 by means of its spring blades 18.

The spark plug 3 having passed the stop cock 8, this latter is closed so that the gases in the cylinder are prevented from escaping. In order to remove the plug 3 from the socket wrench 13 the tube 11 is unscrewed from the tube 7 and the spark plug is removed therefrom by hand.

In order to insert a new spark plug, this latter is placed by hand in the socket wrench and the tube 11 is screwed on to the tube 7. The reverse operation to that described above is then effected.

The pressure prevailing in the cylinder and in the tube 7 when the spark plug 3 is removed, is high. In order to reduce the resistance to be overcome when inserting a new plug, exhaust holes 20 are provided in the socket wrench 13.

Although in the drawing the tube 7 has been shown as being screwed on to the sleeve 4, it is to be understood that any other attaching means may be used, such as a bayonet joint. The enlarged head of the sleeve 4 may be replaced by a boss obtained by casting on the cylinder head 1 when this latter need not be provided with sleeves such as 4.

It is moreover self-evident that the invention has only been described and represented here in a merely explanatory but by no means limited manner, and that it could be subjected to various modifications of detail without departing from the spirit of the invention.

I claim:

1. An apparatus of the character described, comprising a tubular spark plug holding member of which one end is attachable to a spark plug opening of an internal combustion engine, a conduit having one end detachably secured to the other end of said member, manually operable means in said conduit for closing the passageway there-through, and means operable from the other end of said conduit for inserting a spark plug through said conduit and tubular member into said spark plug opening.

2. An apparatus of the character described comprising a tubular member having one end adapted for connection with the spark plug opening of an internal combustion engine and internally screw threaded adjacent said end to receive the screw threaded portion of a spark plug, a conduit having one end detachably connected to the other end of said tubular member and its other end closed, valve means between the ends of said conduit dividing said conduit into two chambers, and a spark plug wrench rotatable in and movable through said conduit, valve and tubular member and operable from the closed end of said conduit.

3. Apparatus for replacing spark plugs comprising, in combination, a lower tube, tubular means for receiving a spark plug and for engaging the spark plug opening of the engine cylinder, and for securing said lower tube to a cylinder head, a stop-cock in said lower tube, an upper tube removably screwed on to the lower tube above said stop cock, a socket wrench mounted slidably and rotatably in said upper tube, and gripping means in said socket wrench for bodily holding the spark plug during removal and insertion.

4. Apparatus for replacing spark plugs comprising in combination a lower tube removably secured to a cylinder head, closing means in said tube, an upper tube removably secured to the lower tube, a gas-tight stopper for said upper tube, a socket wrench slidably and rotatably mounted in said upper tube, and spring blades within the socket of said socket wrench for gripping the spark plug, said gas-tight stopper having an opening for the passage of said socket wrench.

5. Apparatus for replacing spark plugs comprising, in combination, a lower tube, means for securing said lower tube to a cylinder head, a stop-cock in said lower tube, an upper tube removably screwed on to the lower tube above said stop-cock, a socket wrench mounted slidably and rotatably in said upper tube, and gripping means in said socket wrench for a spark plug, the socket of said wrench having exhaust holes.

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