C. T. GAITHER & L. H. BLACK.

SPARK PLUG ATTACHMENT.

APPLICATION FILED JAN. 5, 1911.

999,022.

Patented July 25, 1911.

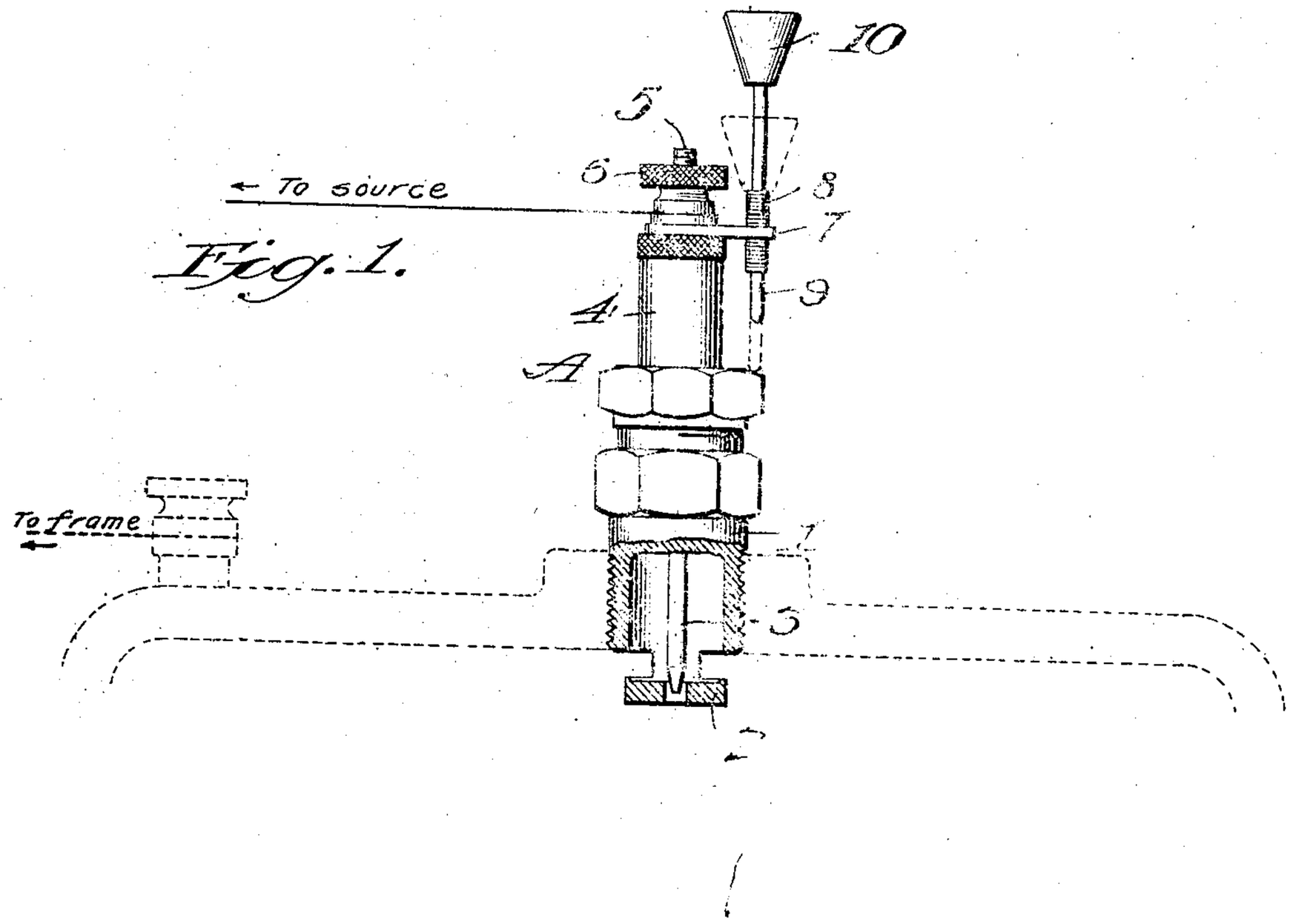


Fig. 1.

Fig. 2.

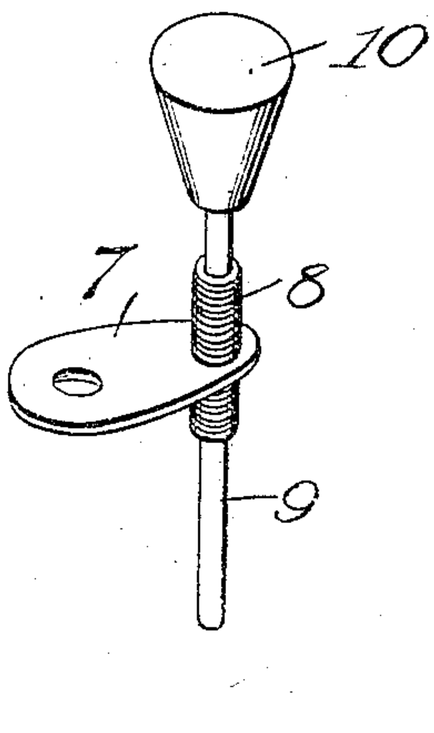
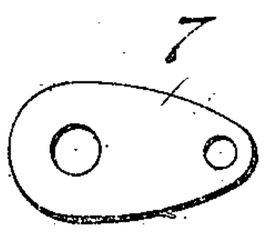


Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES T. GAITHER AND LOUIS H. BLACK, OF YOUNGSTOWN, OHIO.

SPARK-PLUG ATTACHMENT.

999,022. Specification of Letters Patent. Patented July 25, 1911.

Application filed January 5, 1911. Serial No. 601,035.

To all whom it may concern:

Be it known that we, CHARLES T. GAITHER and LOUIS H. BLACK, citizens of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented certain new and useful Improvements in Spark-Plug Attachments, of which the following is a specification.

The present invention relates in general to spark plugs such as are employed in connection with internal combustion engines for igniting the explosive charges, and more particularly to a spark plug attachment which embodies novel features of construction whereby an operator can accurately and quickly determine which cylinder of a multi-cylinder engine is missing fire, and which will also indicate whether the trouble is due to faulty battery connections or to accumulations upon the poles of the plug.

One of the objects of the invention is the provision of an attachment of this character which is simple and inexpensive in its construction, which can be readily applied to any conventional form of spark plug without interfering with the action thereof or necessitating any alterations therein, and which will form an effective means for indicating which cylinder of an engine is missing fire.

With these and other objects in view, the invention consists in certain combinations and arrangements of the parts as will more fully appear as the description proceeds, the novel features thereof being pointed out in the appended claims.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawing, in which:—

Figure 1 is a side elevation of a spark plug having the attachment applied thereto, the lower end of the spark plug being shown in section, and the attachment being shown in an inoperative position by full lines and in an operative position by dotted lines. Fig. 2 is a detail view showing the attachment removed from the spark plug, and Fig. 3 is a plan view of the plate forming a part of the attachment.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawing by the same reference characters.

Specifically describing the embodiment of the invention illustrated upon the accompanying sheet of drawing, the letter A designates a spark plug which is of the conventional construction and embodies a base 1 which is exteriorly threaded so as to be screwed into the head of an engine cylinder in the usual manner. Carried by the inner end of the base 1 and designed to project into the engine cylinder when the spark plug is applied thereto is a perforated disk 2 which constitutes one of the poles of the plug, the opposite pole of the plug being in the nature of a pointed stem 3 which projects into the opening of the disk 2 but is spaced therefrom. This stem 3 extends through a sleeve 4 of porcelain or similar material by means of which it is insulated from the base 1, and is in electrical connection with the usual binding post at the top of the spark plug, the said binding post including the threaded stem 5 and the nut 6 which is applied thereto. One of the terminals of the circuit is designed to be connected to the binding post in the usual manner, while the opposite terminal of the circuit would be connected to the frame of the engine, the circuit being completed by the electrical current jumping across the air gap between the pointed stem 3 and perforated disk 2 and thereby producing a spark for igniting the explosive charge. These plugs give considerable trouble to automobile drivers and the like owing to the fact that the circuit is liable to become interrupted by accumulations upon the poles of the spark plug, and also by a poor contact between the terminal wire and the binding post. With a multi-cylinder engine considerable difficulty is frequently experienced in discovering which one of the cylinders is missing fire, it being usually necessary to successively disconnect all of the spark plugs but one until the engine stops running, when the cylinder causing the trouble will have been located. The present invention obviates the trouble of disconnecting the spark plugs or breaking the electrical circuit through the same, and this result is accomplished by an attachment by means of which the current can be short circuited in such a manner as to render the spark plugs inoperative.

The attachment is shown as including a plate 7 one end of which is perforated to receive the threaded stem 5 of the binding post and is clamped against the top of the spark plug by means of the binding nut 6.

The opposite end of the plate 7 projects laterally from the top of the spark plug and carries a friction sleeve 8 within which a contact stem 9 is slidably mounted. The frictional engagement between the stem 9 and the sleeve 8 causes the stem to remain in any set position, and the upper end of the stem is provided with a finger piece 10 by means of which the stem can be readily manipulated without danger of the operator receiving a shock. In the present instance this friction sleeve 8 is in the nature of a closely wound coil spring which extends through an opening in the outer end of the plate 7 and has an intermediate portion thereof soldered or otherwise rigidly secured to the said plate. Under normal conditions, the contact stem 9 is drawn upwardly away from the base of the spark plug so that the attachment does not interfere in any manner with the usual operation of the spark plug. However, it will be entirely obvious that by sliding the stem downwardly into contact with the base 1, a short circuit will be produced and the spark plug rendered inoperative. It will also be obvious that by moving the stem 9 downwardly close to the base of the spark plug, but not in contact therewith, it may be determined whether or not the battery connections are defective. If the connections are perfect, sparks will pass between the stem and the base of the spark plug, while if the connections are defective, there will be no sparks. The strength of the batteries will also be indicated by the intensity of the spark and the length of the air gap which the sparks will cross.

Should it be desired to determine which cylinder of a muti-cylinder engine is missing fire, the stems 9 of all of the spark plugs with the exception of one would be moved downwardly into contact with the bases of the spark plugs so as to render the said spark plugs inoperative. If the engine still continued to run, it would indicate that the single spark plug in operation was working perfectly, and that the trouble was with another cylinder. All of the cylinders would thus be successively tested until the engine stopped, when the cylinder causing the trouble would have been located. In other words, the engine will stop as soon as all of the cylinders with the exception of the troublesome cylinder have been rendered inoperative by short circuiting the spark plugs. The necessity of actually disconnecting the wires from the spark plugs and breaking the circuit through the spark plugs is thereby eliminated, and an effective means provided for quickly and accurately locating the trouble.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent, is:—

1. A spark plug attachment including a slidably mounted contact rod carried by the head of the spark plug and adapted to be moved into contact with the base thereof to render the spark plug inoperative.

2. A spark plug attachment including a sleeve, means for mounting the sleeve upon the head of the spark plug, and a contact rod slidably mounted within the sleeve and adapted to be moved into contact with the base of the spark plug to render the said spark plug inoperative.

3. A spark plug attachment including a plate detachably applied to the head of the spark plug and projecting laterally upon one side thereof, a friction sleeve carried by the plate, and a contact rod slidably mounted within the friction sleeve, the said contact rod being adapted to be moved into contact with the base of the spark plug to short circuit the said spark plug and render the same inoperative.

4. A spark plug attachment including a plate constructed to fit around the stem of the binding post and be clamped in position by the binding nut, a friction sleeve carried by the plate, and a contact rod slidably mounted within the friction sleeve and adapted to be moved into contact with the base of the spark plug to short circuit the said spark plug and render the same inoperative.

5. A spark plug attachment including a spiral spring, means for mounting the spiral spring upon the head of the spark plug, and a contact rod slidably mounted within the spiral spring and adapted to be moved into contact with the base of the spark plug to short circuit the said spark plug and render the same inoperative.

6. A spark plug attachment including a plate adapted to fit around the stem of the binding post and be clamped in position by the binding nut, a spiral spring mounted upon the plate, and a contact rod slidably mounted within the spiral spring and adapted to be moved into contact with the base of the spark plug to short circuit the said spark plug and render the same inoperative.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

CHARLES T. GAITHER.
LOUIS H. BLACK.

Witnesses:
CHAS. F. SCHLARB,
W. J. ROBERTS.