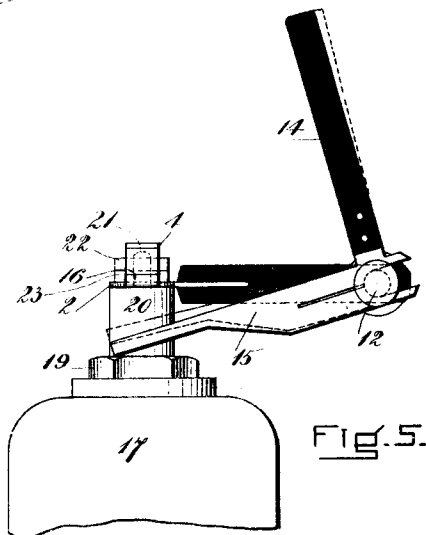
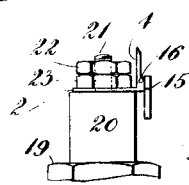
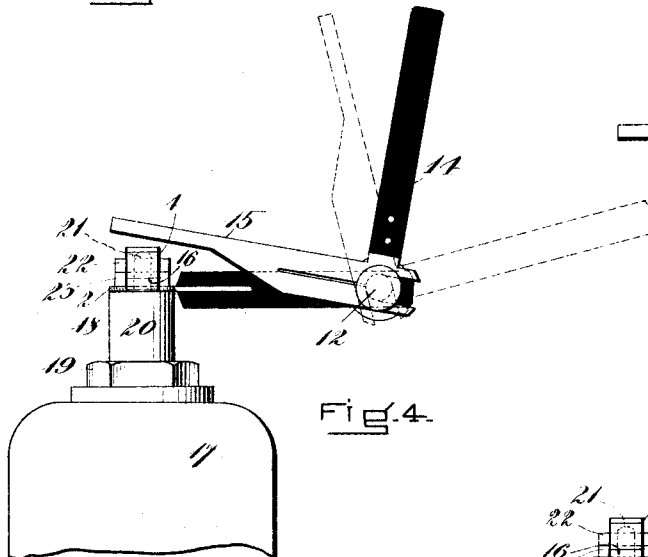
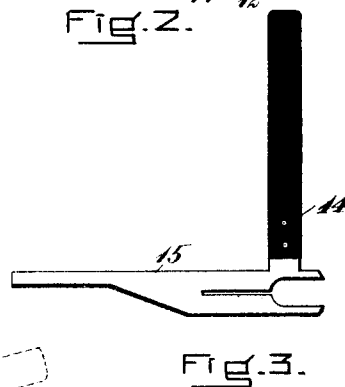
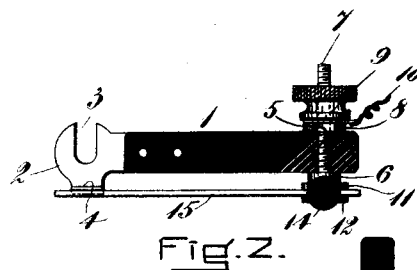
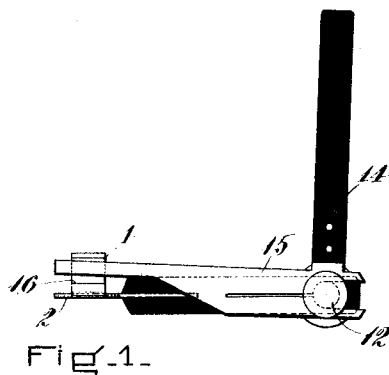


M. H. MERRILL.
 ACCESSORY FOR THE IGNITION SYSTEMS OF INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED MAY 10, 1911.

1,064,846.

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ACCESSORY FOR THE IGNITION SYSTEMS OF INTERNAL-COMBUSTION ENGINES.

1,064,846.

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To all whom it may concern:

Be it known that I, MELDON H. MERRILL, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Accessories for the Ignition Systems of Internal-Combustion Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

My invention relates to an improvement in accessories for the ignition systems of internal combustion engines.

The object of my invention is to supply the engine or rather the electrical ignition system thereof with such means or device as will obviate the difficulties arising from the misfiring of the combustible charge in any cylinder by providing whereby the spark for ignition may be cut out or eliminated from any one or more cylinders without throwing strain on the ignition system: to provide, also, a means whereby the ignition or sparking device in one or more cylinders may be readily tested for fault and which means also serves to test the wiring in connection therewith and the source of electrical supply.

It is a further object of my invention to so adapt the cut out and testing device that it will effect also a means of preventing an operation of the engine by unauthorized parties.

My invention can best be seen and understood by reference to the drawings, in which—

Figure 1 shows the device in side elevation. Fig. 2 is a plan of the same. Fig. 3 shows in side elevation the switch blade and its operating handle. Figs. 4 and 5 show in side elevation the application of the device to the sparking plug of a cylinder, a portion of the cylinder only being shown, the figures also illustrating certain turned positions of the switch blade forming a portion of the device and to which turned positions special reference will hereinafter be made. Fig. 6 is an elevation of the forward end portion of the device shown in conjunction with a portion of a spark plug likewise shown in front elevation.

Referring to the drawings:—1 represents the body of the device consisting of a piece or bar of some suitable insulating material

such as hard rubber. At one end the bar 1 is provided with an attaching metal end piece 2 by which the bar may be secured to any one of various types of spark plugs and the metal have contact with the core of these plugs which connects with the terminal end thereof. For this purpose the end piece 2 of the bar consists of a metal plate rigidly affixed to or inserted in the end of the bar 1 with a slot 3 therein extending inwardly from one side of the piece to about the center thereof. Extending from one side of the end piece and lying in a plane outside that of the body or bar 1 is a contact 4. This contact preferably forms, as shown, an integral part of the end piece, being a part turned up from the edge thereof.

At its opposite end the body or bar 1 is provided with a hole 5 extending transversely through it and lying preferably in the same plane or parallel plane with the end piece or attaching plate 2. Connecting with the bar at the point of this hole is a stud of which 6 represents the head which bears against the side of the bar, and 7 its shank extending through the hole in the bar. The stud is held in place by a drawing nut 8 threaded upon the projecting end of its shank and which nut bears against the side of the bar opposite that against which the head 6 of the stud is bearing. The projecting shank of the stud is also provided with a binding nut 9 by which a circuit wire of an electrical system may be attached to the stud acting as a binding post, the wire being inserted between the two nuts.

The head 6 of the stud lies on the same side of the bar 1 as the contact 4 on the end piece 2 of the bar and is of such extension that there may be arranged thereon and form preferably an integral part thereof, collars or flanges 11, 12, respectively. These flanges lie snugly adjacent to one another leaving a clearance between them. Engaging the head of the stud and turning thereon as a fulcrum of support is an angular lever switch consisting of a handle 14 and blade 15. The switch connects with the head of the stud by bifurcating the inner end of the blade which fits over the head of the stud between the flanges 11, 12. The parts are preferably so made that the blade will fit tightly between the two flanges to be practically retained by them though capable of turning freely on the head of the stud. To assist, also, in the retention of the blade

and prevent its turning too freely I prefer to incise the blade from the point where it engages the stud by which the blade may be made to yieldingly grip the same, thereby imparting more or less frictional resistance in addition to that imparted by the flanges 11, 12. The blade is of such length that as the lever is turned the outer end of the blade will engage the contact 4 on the end piece 2. In this connection it will be observed that the arrangement of the parts is such that the blade may be turned either upwardly or downwardly by the face of this contact. In order to prevent the end of the blade from slipping downwardly off the contact when turned to engage the same, the contact is provided preferably with an offset or shoulder 16.

With reference to the application of the device to the spark plug of a cylinder, attention is directed to Fig. 4 in which 17 represents a cylinder, 18 a spark plug of common form connecting therewith and of which 19 represents the threaded body of the plug by which it is secured to the cylinder, 20 the insulated shell which will hereinafter be termed the side of the plug, and 21 the core which extends as shown beyond the end of the plug and connects with the terminal end thereof (not shown) inside the cylinder.

The device comprising my invention is attached to the plug by inserting its end piece 2 between the upper end of the plug and binding nuts 22, 23, arranged upon the projecting core thereof, the head straddling this core by the slot 3 in the head and contacting therewith when upon tightening the nuts the end piece will be bound hard against the upper end of the plug and in electrical contact or communication with its core and terminal end. It is also to be observed by reference to Fig. 6 that the contact 4 of the end piece 2 which the blade of the switch is adapted to engage is held at a point just adjacent to the edge of the insulated side of the plug or just beyond the same. In other words, it is so held that if the switch blade is turned down from the contact 4 it will pass downwardly by the insulated side of the plug and engage the body 19 thereof.

The operation of the device is as follows:—The initial current is received by way of the wire 10 and passes through the shank 7 and head 6 of the stud to the switch blade 15. When the blade is turned to engage the contact 4, as shown in Fig. 1, the circuit will then be completed through this contact, end piece or head 2, metallic core 21 of the sparking plug and sparking terminal thereof inside the cylinder. Assuming now that it is desired to cut out the sparking plug. In such case the switch may be turned to a position indicated in dot-

ted lines in Fig. 4 when the circuit is fully opened. The difficulty of such opening, however, is that a strain is thrown upon the electrical system. Instead of moving the switch blade as above described when cutting out the sparking plug it is moved down by the contact 4 and insulated side of the sparking plug and grounded upon the metal body 19 thereof (see Fig. 5), connecting with the cylinder and which is in electrical communication with the other terminal (not shown). By this means the sparking terminal is cut out without effecting strain upon the electrical system.

When it is desired to ascertain whether the ignition current is flowing, the switch blade may be moved into a position as shown in the full lines of Fig. 4 or just removed from the contact 4, thereby creating a sparking gap which reveals the flow or cessation of current. The same may also be accomplished by moving the switch blade into a position just short of a grounded position on the body 19 of the sparking plug, as shown in dotted lines in Fig. 5, thereby creating a sparking gap. The advantage of this is that if no spark is revealed when the switch blade is moved into a position as shown in the full lines of Fig. 4, but appears when the blade is moved into a position as shown in the dotted lines of Fig. 5, then the evidence is assured that the ignition current is flowing, but the sparking plug is out of order.

By means of the device one is enabled to ascertain which one or more of a series of cylinders are not working after a little practice. If all of the cylinders are properly working, such operation is attended with a certain regular and complete rhythmic beat or sound. If a cylinder is not working there is a perceptible variation in sound. By now successively turning down the levers of the respective devices and grounding them upon the bodies of the respective spark plugs the cylinders are necessarily cut out. If on cutting out a cylinder the variation of sound becomes more pronounced it is apparent that the cylinder cut out is in proper working order. When, however, no variation in sound is perceived on cutting out a cylinder it is apparent that such cylinder is the one not in working order.

Another important feature is that the switch blade is capable of being readily removed from the stud, thereby effecting a break in the ignition system which serves to lock the system and make it impossible to operate the switch blade or substitute an equivalent means.

The device can be used with either battery, magneto, or any suitable electrical system, as primary electrical supply. When used direct with high tension magneto for ignition it provides a means of testing the ignition outfit without calling into play the

safety spark gap usually installed on magnetos of this type and also prevents any strain on the windings of the magneto or in case a battery or generator is used no strain would be thrown on the coil or high tension wiring.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States:—

10 1. The combination with a spark plug having an attaching body, of a device having a body of some insulating material and at one end thereof secured thereto means consisting of some conducting material attached to said spark plug to have electrical connection therewith, said means being provided with a contact adjacent the line of the side of said plug, a member comprising a switch support of some conducting material in communication with a wire of an electrical system attached to the other end of said insulated body of the device, and a switch mounted to turn upon said support, said switch having a blade of some conducting material in contact with said support, said switch also being adapted and arranged to the end that as the switch is turned the blade thereof may be moved to

engage said contact or upwardly past the same or downwardly into engagement with the body of said plug or into positions just adjacent said plug or contact.

2. A device of the character specified having a body of some insulating material and at one end thereof secured thereto means consisting of some conducting material attachable to a spark plug to have electrical connection therewith, said means being provided with a contact at one side thereof, a member comprising a switch support of some conducting material secured to the other end of said insulated body of the device, said support being adapted to have electrical connection with a wire of an electrical system, and a switch mounted to turn upon said support, said switch having a blade of some conducting material in contact with said support, said switch also being adapted and arranged to the end that as the switch is turned the blade thereof may be moved to engage said contact or upwardly or downwardly past the same.

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