April 10, 1928. 1,665,567

W. J. SLIFER

IGNITION TESTER

Filed April 8, 1925

FIG. 1.

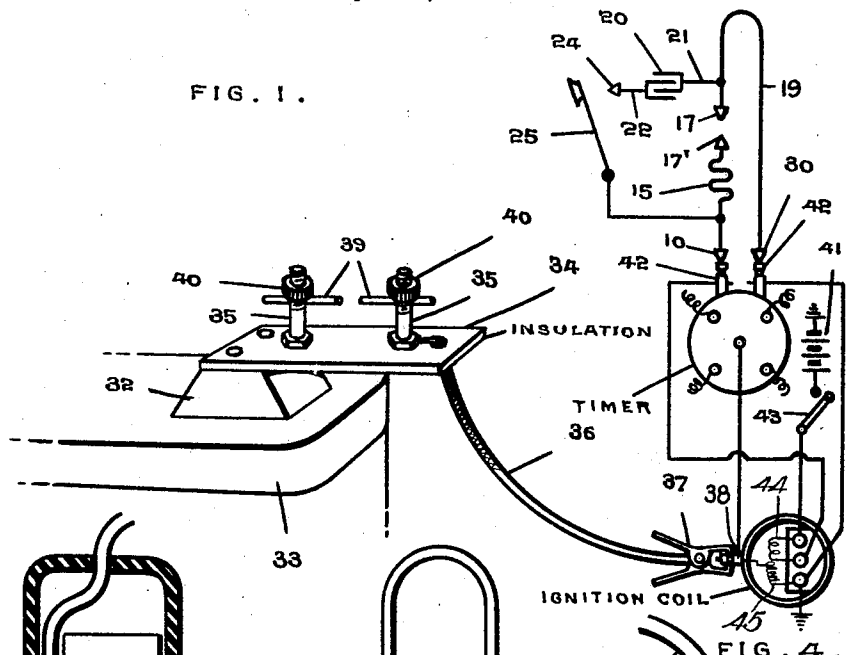


FIG. 3.

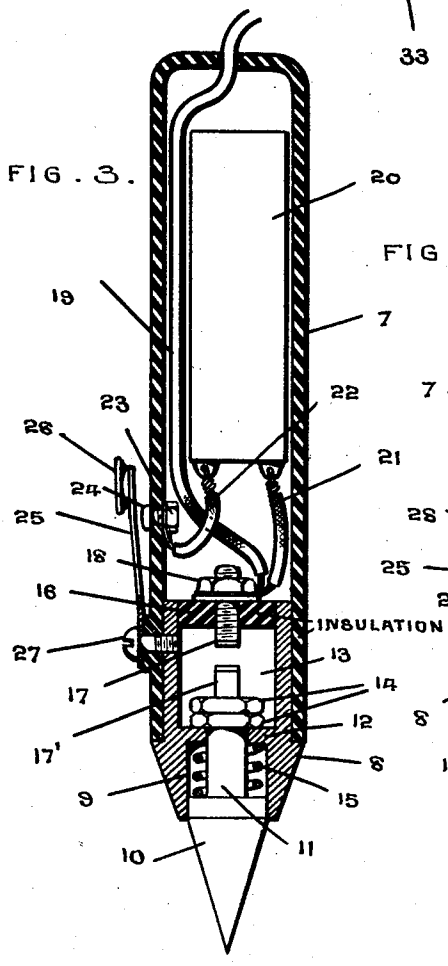


FIG. 2.

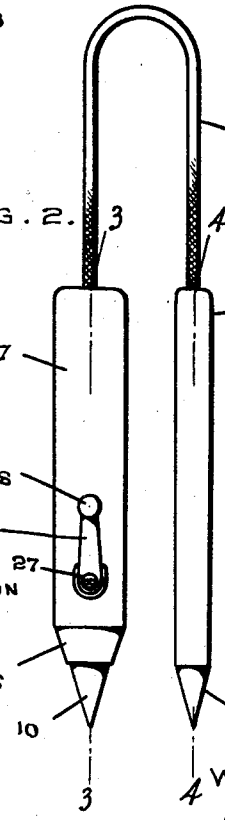
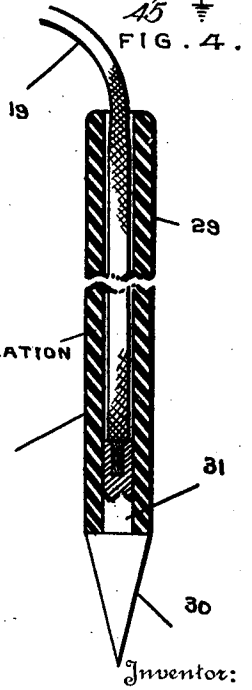


FIG. 4.



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UNITED STATES PATENT OFFICE.

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IGNITION TESTER.

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The present invention relates to appliances for testing the ignition systems of internal combustion engines, such as used in automobiles, and aims to provide a device for testing or ascertaining the condition of the ignition coil and condenser of the ignition system of modern internal combustion power plants used in automobiles (such system using the customary non-vibrating coil) without removing or disconnecting any part of the ignition equipment, regardless of how the system is arranged.

Another object of the invention is the provision of such a testing device comprising, in combination, a spark gap unit to be conveniently connected to the high tension terminal of the ignition coil and to ground, and manually controlled means for bridging the breaker and for connecting a condenser across the breaker at will, to test the condition of the ignition coil and the condenser of the ignition system.

A further object is the provision of novel means, which can be readily handled or manipulated, for either bridging the breaker or connecting a test condenser across such breaker.

It is also an object of the invention to provide such a device which is simple in construction and operation, and which can be used in the same manner with all non-vibrating coil battery ignition systems regardless of the manner in which the various units are connected, so that the present device makes it unnecessary for the user to remember more than one way of conducting the tests.

With the foregoing and other objects in view, which will be apparent as the description proceeds, the invention resides in the construction and arrangement of parts, as hereinafter described and claimed, it being understood that changes can be made within the scope of what is claimed, without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawing, wherein—

Figure 1 is a perspective view of the spark gap unit, showing the bridging unit and ignition system in diagram.

Fig. 2 is a side elevation of the bridging unit.

Fig. 3 is an enlarged section, on the line 3—3 of Fig. 2, of the prod or terminal member of the bridging unit which contains the testing condenser and contacts.

Fig. 4 is an enlarged section, on the line 4—4 of Fig. 2, of the other prod or terminal member of the bridging unit.

One prod or terminal member of the bridging unit, as shown in detail in Fig. 3, includes a tubular case 7 of hard rubber or other insulating material, which provides a handle to be conveniently held in the hand and manipulated. A metal bushing 8 is fitted in the open end of the case 7, and has a recess 9 in its open end in which the pointed prod tip or plunger 10 is slidable, said plunger having a shank 11 slidable through a partition 12 of the bushing 8 located between the recess 9 and another recess 13 in the inner end portion of said bushing. The plunger 10 is yieldingly projected by means of a coiled spring 15 disposed within the recess 9 around the shank 11 and confined between the plunger 10 and partition 12, and the outward movement of said plunger is limited by means of the nuts 14 on the shank 11 which bear against the partition 12 at that side opposite to the spring 15. The nuts or stops 14 are located within the recess 13.

A contact means is provided in the recess 13, and, for this purpose, a plug or disk 16 of fibre or other insulating material is fitted in the mouth of the recess 13, and a contact screw 17 is threaded through said plug and projects into the recess 13. The shank 11 has a contact finger 17′ projecting beyond the nuts 15 to engage the contact screw 17 when the case 7 and plunger 10 are moved toward one another. A nut 18 is threaded on the screw 17 to serve as a lock nut for holding said screw in place and to provide means for the connection of the wires, as will presently appear.

An insulated wire or conductor 19 enters the case 7 from the end of the case opposite to the plunger 10, and the corresponding end of said wire is connected to the contact screw 17 by means of the nut 18.

The case 7 contains therein a testing condenser 20 which can be conveniently substituted for the regular condenser of the ignition system under test. One terminal of the condenser 20 is connected by a wire or conductor 21 with the contact screw 17, such wire 21 being held by the nut 18. The other terminal of the condenser is connected by a wire or conductor 22 with a bolt or binding post 23 engaged through the wall of the case 7 at one side.

A switch is provided for connecting the

condenser 20 between the wire 19 and the plunger or terminal element 10 of the prod. The outer end of the binding post 23 is formed with a contact 24 for the engagement of a leaf spring switch 25 which is secured by means of a screw 27 to the case 7, said screw being threaded into the bushing 8, so as to electrically connect the switch to the bushing 8 and plunger 10. The switch 25 carries a finger piece or button 28 at its free end for conveniently pressing the switch against the contact 24.

The other prod or terminal member of the bridging unit includes a tubular handle 29 of hard rubber or other insulating material and a prod point or tip 30 at one end of said handle having a shank 31 fitted in the handle. The wire 19 enters the handle 29 and is secured to the shank 31.

The spark gap unit includes a metal block or base 32 to be seated on the cylinder head 33 of the engine or other metal part, so as to be grounded, and a plate 34 of insulating material is secured on the block 32 and supports a pair of posts 35, one of which is connected electrically with the block 32. A wire 36 is connected to the other post 35 and has a clip 37 at the free terminal thereof to engage the high tension terminal 38 of the ignition coil. Electrodes 39 are slidable through the posts 35 so as to be adjusted toward and away from one another to provide a spark gap of the desired length, and nuts 40 are threaded on the posts 35 to clamp the electrodes 39 in their adjusted position.

When using the device, the contact or timer elements of the breaker or timer of the ignition system are moved to open position, or a sheet or plate of insulation is disposed between them, so as to open the regular ignition circuit. The clip 37 of the spark gap unit is connected to the high tension terminal 38 of the ignition coil and the block or base 32 is placed on a metal or grounded part of the engine. The length of the spark gap between the electrodes 39 is then adjusted by properly positioning the electrodes. The ignition switch 43 is then closed to connect the battery 41 in circuit with the primary winding 44 of the ignition coil and the breaker terminals 42, and the spark gap unit being connected between the high tension terminal 38 of the ignition coil and ground will take the place of the spark plugs in circuit with the secondary winding 45 of the ignition coil. The prod tips or points are then engaged with the contact or breaker members or elements 42, and the bridging unit then takes the place of the regular breaker, one prod containing a manually operated breaker to close and interrupt the primary circuit of the ignition coil. Thus, by pressing down on the case or handle 7, with the prod plunger or tip 10 bearing on the respective breaker member 42, the spring 15 is compressed, and the contact screw 17 is brought into engagement with the contact finger 17', thereby connecting the wire or conductor 19 with the plunger 10, and closing the primary circuit of the ignition coil through the bridging unit. The switch 25 is left open, and now, by releasing pressure on the handle or case 7, the spring 15 will separate the handle or case 7 and plunger 10, thereby separating the contacts 17 and 17', to open the primary circuit. A spark should then jump the gap between the electrodes 39, the same as when jumping the gap of a spark plug, and such sparking will occur if the ignition system is in good condition. If, however, no spark is obtained, this is an indication that the ignition system is defective. The procedure above described is then repeated, with the switch 25 held closed against the contact 24, so that the condenser 20 is substituted in the primary ignition circuit for the regular condenser of the ignition system, the condenser 20 being shunted when the contacts 17 and 17' engage one another, and when said contacts are separated the charge of the condenser is discharged across the spark gap between the electrodes 39. Should a spark occur when making the test with the condenser switch 25 closed, this will indicate that the condenser of the ignition system is defective. If no spark is obtained or one of required length is not obtained, with the switch 25 closed, the ignition coil or both the coil and condenser of the ignition system may be defective, providing the primary circuit is complete and in good condition, as proven by the amount of discharge indicated by the ammeter (not shown) or the presence of current at the breaker contact members 42.

This tester may be used by most inexperienced mechanics and will quickly indicate the condition of the ignition coil and condenser, inasmuch as the units cannot be tested merely by inspection or examination, which is the usual method of locating faults in the general mechanism of automobiles. The test is also made without removing any units from the ignition system or without disconnecting any part thereof. The test is always made in the same manner, so that it is unnecessary to remember more than one way of testing.

Having thus described the invention, what is claimed as new is:—

1. An ignition tester comprising a bridging unit for the breaker of an ignition system having two terminal prods to be independently manipulated by hand and a flexible connection between said prods, one prod comprising a handle, a testing condenser in said handle, means associated with said handle for connecting the condenser in circuit with the prods, and means associated with

said handle for connecting the prods in a circuit without including said condenser.

2. An ignition tester comprising a bridging unit for the breaker of an ignition system having terminal prods to engage members of said breaker and a flexible connection between said prods, said prods being adapted to be manipulated by hand, one prod comprising a handle, a testing condenser in said handle, and two circuit closers assembled with said handle, one circuit closer being connected in series with the condenser and prods and the other circuit closer being connected in series with said prods and bridging said condenser.

3. An ignition tester comprising a bridging unit for the breaker of an ignition system and having two terminal prods to be independently manipulated by hand and a flexible connection between said prods, one prod including a handle, a testing condenser in said handle, and means associated with said handle for connecting said condenser in circuit with said prods and controlling the flow of current.

4. An ignition tester comprising a bridging unit for the breaker of an ignition system and having a terminal prod, said prod including a handle and a spring projected plunger to contact with one member of the breaker, means for closing the primary ignition of said system by pressure on the handle to move the handle toward said plunger, a condenser within the handle, and means carried by the handle for connecting the condenser in circuit with the bridging unit independently of the firstnamed means.

5. An ignition tester comprising a bridging unit for the breaker of an ignition system and having a terminal prod, said prod including a handle, a testing condenser in said handle, and two independently operable circuit closers assembled with said handle, one circuit closer being connected in series with the condenser and bridging unit and the other circuit closer being connected in series with the bridging unit and bridging said condenser.

6. An ignition tester comprising a bridging unit for the breaker of an ignition system, having a terminal prod, said prod including a handle, a spring projected plunger to engage one of the breaker members, normally separated contacts carried by the plunger and handle to be disposed in the primary ignition circuit of said system for closing said circuit when the handle and plunger are moved toward one another, a condenser within the handle, and means for connecting said condenser across said contacts.

7. An ignition tester comprising a bridging unit for the breaker of an ignition system, having a terminal prod, said prod including a handle, a bushing in one end of the handle, a plunger slidable in the bushing to engage one member of the breaker, spring means between said plunger and bushing for separating the handle and plunger, contacts within the handle and bushing, one contact being carried by the plunger, for closing the primary circuit of said system when the handle and plunger are moved toward one another, a condenser in the handle and connected to the other contact, and a switch carried by the handle for connecting said bushing and condenser for bridging the condenser across said contacts.

In testimony whereof I hereunto affix my signature.

WILMER JENNINGS SLIFER.