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TESTING AND TROUBLE ELIMINATING  
APPLIANCE FOR IGNITION SYSTEMS  
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Fig. 1.

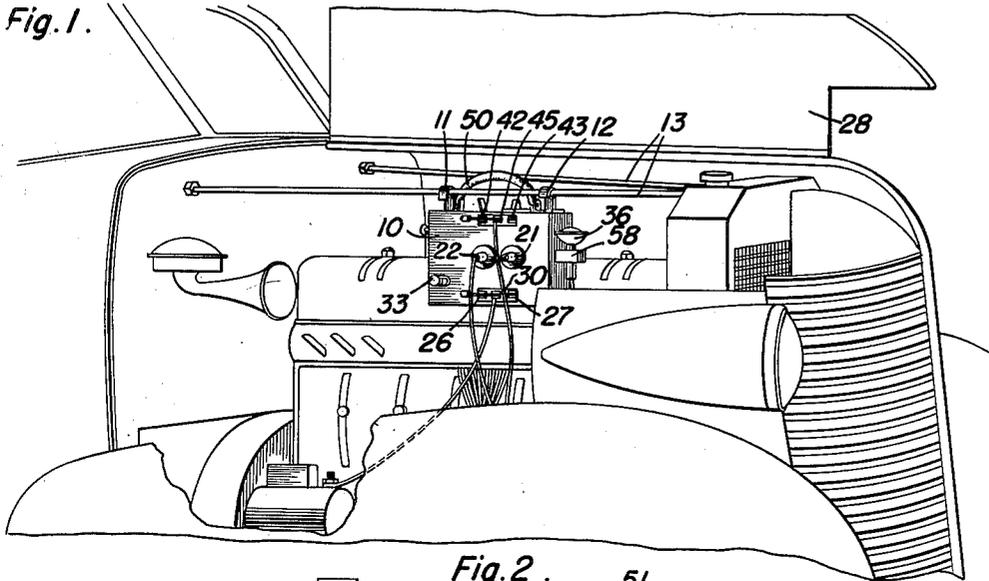


Fig. 2.

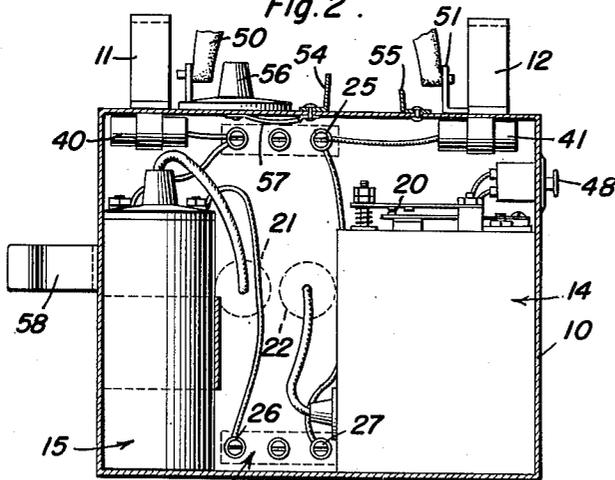
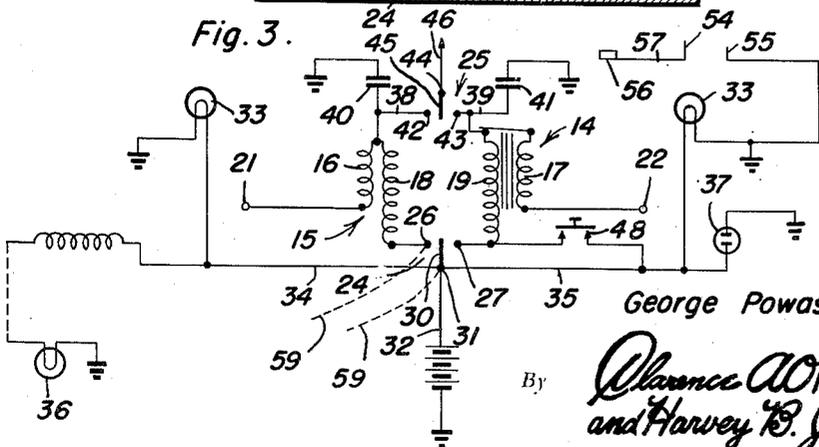


Fig. 3.



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## UNITED STATES PATENT OFFICE

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TESTING AND TROUBLE ELIMINATING  
APPLIANCE FOR IGNITION SYSTEMS

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4 Claims. (Cl. 175—183)

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This invention relates to ignition apparatus for internal combustion engines, especially for engines propelling cars, and it has for its general object to provide a small portable unit adapted for attachment to the engine of a car which is capable of locating and of eliminating quickly ignition troubles arising in the ignition system of the engine during operation of the same.

It is a further object of the invention to provide a small and self-contained unit, attachable to the engine, equipped with means for determining the nature of and for eliminating a number of engine troubles, said unit including assemblies which may be inserted instead of or as a substitute for defective assemblies.

A further object of the invention consists in providing a small and portable testing and trouble eliminating unit, adapted for attachment to a car by means of members providing a ground connection for electric circuits, said units including a number of substitute ignition coil assemblies, alternatively connectable with the engine and operating at different voltage, the voltage of at least one assembly being sufficiently high for the operation of the engine in which certain defects have developed which, under normal conditions, would prevent engine operation.

A further object of the invention consists in providing a small and portable unit adapted for attachment to the engine of a car with members establishing a ground connection for electric circuits, said unit being equipped with a plurality of ignition coil assemblies and with switches for the alternative connections of the assemblies with the source of current and with the distributor of the ignition system of a car, further outlets of said ignition coil assemblies permitting the making of connections which are shunting or completely cutting out the normal ignition coil assembly of the said car.

It is a further object of the invention to provide a small and portable unit, adapted for attachment to the engine of a car by means of members providing a good ground connection for electric circuits, said unit being equipped with a plurality of ignition coil assemblies and with switches for alternative connection of the assemblies with the source of current and with the distributor of the ignition system of the car and said unit being further equipped with a test arrangement for spark plugs, operable by means of one of the said coil assemblies and of the ground connection provided by the attachment.

Further and more specific objects will be apparent in the following detailed specification. The invention is illustrated in the drawings by way of example. Merely one modification or embodiment of the invention is shown in the drawings but it is to be understood that this embodiment has been shown mainly in order to explain the principle of the invention and the best mode

of applying said principle. It will be clear to those skilled in the art that different modes of applying the principle of the invention are possible and modifications of the example shown are therefore not necessarily departures from the essence of the invention.

In the drawings:

Figure 1 is a perspective view of the front portion of a car showing the engine, the radiator and the unit forming the invention.

Figure 2 is an elevational longitudinal section through the unit when viewed from the rear in Figure 1, the section being taken along said longitudinal plane of symmetry.

Fig. 3 is a diagram of the connections.

The unit according to the invention is preferably a portable unit, adapted to be attached to the engine of a car under the hood. The unit is enclosed within a housing 10 provided with two clamps 11, 12 projecting from the top of the housing. These clamps do not only provide means for attaching the unit but are also means for establishing a "ground" connection of elements or components on and within the housing, as they are always in conductive connection with the chassis serving customarily as a return conductor for the electric circuits of a car. The clamps are made of a relatively soft metal which may be easily bent by hand and they are screwed or riveted to the housing, the rivets or screws projecting into the interior providing ground terminals with which connections may be made.

The clamps which are usually bent to form an inverted U are used to suspend the unit for instance on the rods or braces 13 of the radiator of the car under the hood 28 as shown in Figure 1. However, the unit may also be otherwise attached and may be provided with additional attachment means, if necessary, in order to accommodate itself to cars of different types.

Within the housing 10 two ignition coil assemblies 14, 15 are arranged which are adapted to produce ignition currents of different voltage. Each ignition coil assembly comprises a primary and a secondary coil 16, 17; 18, 19 respectively. The ignition coil assembly 15 produces an ignition current of the voltage which is normally in use on a car. The other ignition coil assembly 14 produces a higher voltage and for this purpose either the coil is provided with a large number of windings or a vibrator coil may be used in which a contact spring 20 is vibrated by means of the current passing through the primary coil. The coil assembly shown in the drawings corresponds to a well known type.

The coil assemblies are connected on one side with sockets 21, 22 adapted to receive the so-called secondary wire of the ignition system of the car or any other connection which it may be desirable to make. The two sockets 21, 22 are mounted on the outside of the housing on the

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front wall thereof so that they are easily accessible.

The other connections of the spark coil assemblies, namely, the connections at the second end of the spark coil and the intermediate connections at the junction point between the primary and the secondary coils are connected with two three-point switches 24, 25 arranged on the outside of the housing on the front wall thereof at the top and at the bottom of said wall respectively. The switch 24, shown at the bottom of the front wall, comprises two fixed switch contacts 26, 27 connected with the ends of the coils 14 and 15 respectively. The two fixed contacts cooperate with a movable switch blade 30 operated by hand and connected to a terminal post 31 for connection with the battery and with signal lights 33. These signal lights are moreover connected with the terminals of the clamps so that they are grounded. They indicate that the unit is connected with the battery wire 32. Moreover, the connections 34, 35 leading to the signal light 33 may also lead to a trouble light 36 and to a test socket 37 for light bulbs, to be described below.

The switch 25 comprises the two fixed contacts 42, 43 and the movable contact blade 45. The latter is connected with the fixed terminal 44 and with the distributor of the car by means of conductor 46.

Both switches 24 and 25 are adapted to be brought into three positions. One of these positions is a neutral position in which no contact is made between the movable blade and the two fixed contacts, while the other two positions connect the blade terminals 31, 44 with one of the two fixed contacts 26, 27; 42, 43 respectively.

The two fixed contacts 42, 43 are connected with leads 38, 39 leading to the junction of the primary and secondary coils 16, 18 and 17, 19 respectively, which are in turn connected with the condensers 40, 41 which may be so mounted that they are held by or connected with the bolts, rivets or screws which are fixed in the two clamps 12, as shown in Figure 2.

Moreover, the housing also contains a push button switch 48 which serves mainly the purpose of testing the spark plugs, as described below, and which permits to energize the high voltage coil assembly 14 at the desired intervals during the testing operation in which the switch 24 is in its neutral position.

On the top of the housing a handle 50 is provided mounted in suitable holders, lugs or clasps 51 which are mounted on and projecting from the top of the housing. Likewise on the outside and more specifically on the front side of the housing the two sockets 21, 22 are mounted forming connectors for the coil assemblies. Moreover, on the bottom and on the top of the front side of the housing the two switches 24 and 25 are mounted with the handles of the switch blades 30, 45 in such a position that they are easily accessible to the operator.

In addition to the members already described test lugs or test prongs 54, 55 are mounted on the top of the housing and spark plugs may be placed on them for testing purposes and may be held there during the testing operation. The two test prongs are so arranged that they will be in contact with the metallic parts of the spark plugs connected with the two electrodes of the same when the spark plug is simply placed on the prongs. Preferably, the prongs are of different height. One of said test prongs is directly and

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permanently connected with one of the ground connections made by one of the clamps 12. The other prong 54 is connected by means of a special conductor 57 with a socket 56, adapted to receive one end of the so-called secondary wire of the ignition system. Obviously, the other end of said wire is inserted into the socket 22, for instance; the spark plug may then be tested using in this case the high voltage coil assembly 14 with which it is now connected.

A clamp 58 is moreover provided for holding the trouble light 36 which is preferably associated with the unit and which is provided with a sufficient length of cord permitting exploration of all parts of the engine and of the front end of the car.

A further switch (not shown) may be provided which is a separate unit and which is preferably mounted on or near the dashboard or at any other place to which the driver has access. This switch is connected with unit by means of the two special conductors 59, which are attachable to the terminal posts connected with the contacts of switch 24. The conductors 59 are preferably attached to one contact 26 or 27 on one hand and to contact 31 on the other hand, the selection being made according to the type of unit which is used.

This switch may be used for several purposes. On the one hand the switch may replace the main ignition switch in the event that the latter has become defective. The switch may also be used to give the driver control over the ignition system of the engine while driving in the event that it was necessary to replace the normal ignition coil by one of the coil assemblies of the unit.

The testing and trouble eliminating unit as above described will allow the driver to determine most ignition troubles and will provide a remedy for the majority of these troubles. The unit will also enable the driver to test spark plugs and to determine defects of the same. It will moreover be possible to test appliances not connected with the ignition system such as light bulbs and other elements of the car which are operated by electric currents.

Only a few examples of the operation will be described. Assuming, for instance, that the fault consists in "fouled" plugs, in plugs producing only weak sparks, or having carbon or oil deposits, in wires which have been soaked or got wet, in a faulty gap between electrodes, in a faulty gap in the circuit breaker or the like, it will be clear that all these defects may be determined and may be cured by using the high voltage ignition current.

In order to overcome the trouble the ordinary secondary wire leading from the ignition coil to the distributor is taken out and is placed in the socket 22 of the ignition coil assembly 14. Moreover the switches 24 and 25 are moved to the contact points 27 and 43 respectively. Obviously with such an adjustment the high voltage coil assembly 14 is now connected with the engine and has taken the place of the ordinary coil and a "hotter" spark is now produced which is able to overcome larger gaps of the electrodes or larger gaps in the circuit breaker, and which is able to break down the insulating oil or carbon deposits etc.

If the condenser or ignition coil of the car or the primary winding should be defective, a connection is made with socket 21 while the switches 24 and 25 are moved to the other side into contact with the contacts 26, 42 respectively. The engine may now operate with a coil assembly

15 under the same voltage with which it was operated before when the ignition current was produced in the normal coil of the car, but now the defective portions of the coil, condenser etc. are by-passed.

If the customary ignition switch should be defective, the switch connected with the two conductors 59 is used, the switch blade 30 being brought into a neutral position and a suitable connection of the conductors 59 being made. This connection runs either to contact 26 or to contact 27 according to the nature of the defect or combination of defects which prevail. As above stated the switch connection may also be used whenever it is necessary to provide a control of the system while the substitute coil assemblies are operating the engine.

If spark plugs have to be tested they are laid on the test prongs 55, 54 and the secondary wire is in this case used to connect socket 22 to socket 56. The switches 25, 24 are in this case in neutral position. Upon pressing of the button switch 48 the coil assembly is energized and sparks are produced across the gaps of the spark plugs to test the firing ability of the same.

Light bulbs are tested on the special light bulb tester 37, while electrical appliances may be attached to the central contact terminals of one of the switches on one hand, while the bulb tester or the grounded clamp or housing may be used on the other side.

Obviously the construction of the elements of the unit is not material and construction and changes may be made without departing from the essence of the invention.

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

1. A portable ignition trouble eliminator unit for internal combustion engines of cars, operated by an ignition system, including a source of current and a distributor, comprising a housing provided with a handle, two ignition coil assemblies, operating at the normal ignition voltage of the engine and at a higher voltage respectively, each ignition coil assembly having three outer connections, one of said connections leading to the secondary winding, the second connection leading to the primary winding and the third connection being made with a point which is connectable with both windings, connector outlet means on the outside of the housing, for establishing a connection with the first named of the said outer connections of each coil assembly, means for connecting alternatively one of the outer connections mentioned in the second place of the two coil assemblies with the source of current, further means for alternatively connecting the third one of the outer connections above mentioned of the two coil assemblies with the distributor, condensers connected with each coil assembly, and attachment clamps for the housing provided with connection terminals for providing ground connections for said condensers.

2. A portable auxiliary trouble eliminator unit and testing appliance for the ignition system of internal combustion engines of cars, including a source of current and a distributor, comprising a housing, provided with a handle, and further provided with attachment clamps for attaching said housing, mounted on the same, and provided with terminals to establish a ground connection through said clamps, two ignition coil assemblies, operating at a normal ignition voltage of the engine and at a higher voltage

respectively, each ignition coil assembly having three outer connections, one of said connections leading to the secondary winding, another connection leading to the primary winding and a third connection being made with a point which is connectable with both windings, a connector socket arranged on the outside of said housing for connection with the first named outer connection for each coil assembly, two three-point switches, arranged on the outside of the housing, each provided with two fixed and one movable contact, the latter adopting positions of contact with the two fixed contacts and a neutral position, the two fixed contacts of each switch being connected with the second and third one of the outer connection of the two above mentioned coil assemblies respectively, the movable contact of the two switches being connected with a source of current and the distributor of the ignition system respectively, so as to substitute alternatively each of the coil assemblies for the ignition coil of the ignition system, condensers connected with the last mentioned of the connections of the coil assemblies, said condensers being connected with the terminals on the clamps to establish ground connection.

3. A portable auxiliary trouble eliminating and testing unit for ignition systems of internal combustion engines of cars, said systems including a source of current and a distributor, comprising a housing, two ignition coil assemblies operating at the normal ignition voltage of the engine and at a higher voltage respectively, each ignition coil assembly having three outer connections, one of said connections leading to the secondary winding of the coil, another to the primary winding of the coil and a third connection being made with a point which is connectable with both windings, a connector socket arranged on the outside of the housing for connection with the first named of said outer connections of each coil assembly, two three-point switches arranged on the outside of the housing, each provided with two fixed and one movable contact, the two fixed contacts of each switch being connected with the two last mentioned connections of the two windings of the coil respectively, a push button switch parallel to one of said three-point switches, attachment clamps for attaching the housing, mounted on the same and provided with terminals to establish a ground connection through said clamps, spark plug test prongs, mounted on the housing, and a further connector means connected with one of said test prongs and adapted for connection with one of the first mentioned connector sockets of the coil assemblies on the housing.

4. A portable trouble eliminating and testing unit as claimed in claim 3 with the addition of a trouble light and a test socket connected with the switch terminal which in its turn is connected with the source of current.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,202,532	Keller	Oct. 24, 1916
1,433,488	Smith	Oct. 24, 1922
1,948,925	Klingler	Feb. 27, 1934
2,000,830	Farren	May 7, 1935