March 17, 1931. C. GALBUSERA 1,797,085

SPARK PLUG DETECTOR

Filed March 6, 1929

Fig. 1.

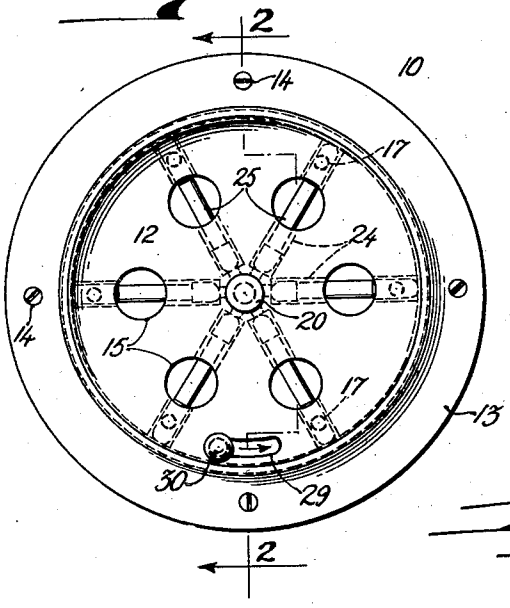


Fig 3.

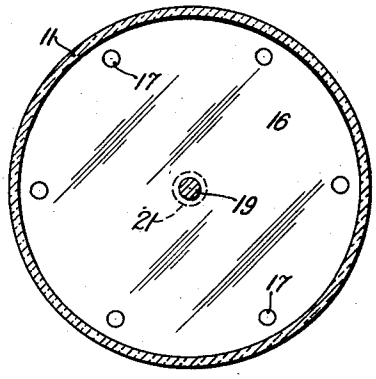


Fig. 2.

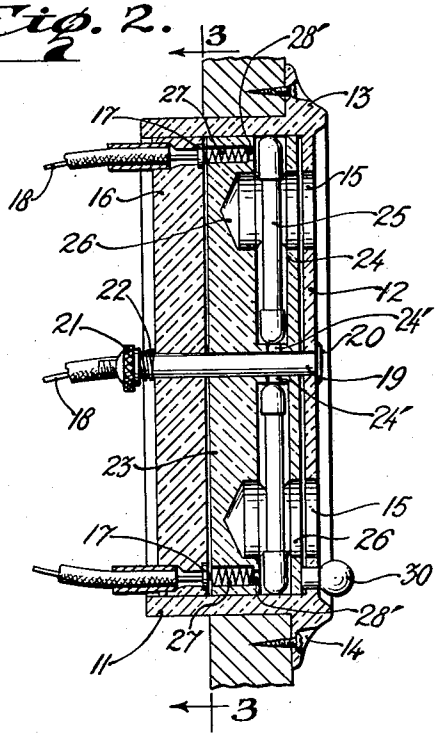
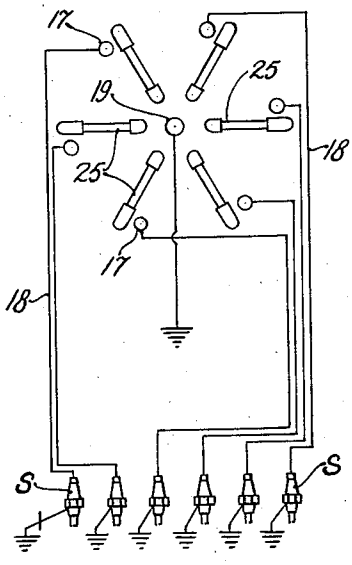


Fig. 4.



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UNITED STATES PATENT OFFICE

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SPARK-PLUG DETECTOR

Application filed March 6, 1929. Serial No. 344,838.

This invention relates to improvements in spark plug detectors.

The primary object of the invention resides in a detector device for mounting upon the instrument board of an automobile or aircraft in a position before the operator to visibly indicate whether or not the respective spark plugs of an internal combustion engine are properly functioning, and if not, just which spark plug is out of working order.

Another object of the invention is to provide a spark plug detector in the nature of a panel instrument which includes a number of radially arranged vacuum tube lamps of the Geissler type, there being one for each spark plug of an engine and which may be electrically connected to the respective spark plugs to be illuminated by the current passed thereto during the sparking interval of the spark plug, and which tubes may be shut off from operation when desired as it is not always necessary that the device be in operation.

A further object of the invention is the provision of a spark plug detector which is simple of construction, easy to apply to internal combustion engines now in use and positive in operation.

With these and other objects in view, the invention resides in certain novel construction and combination and arrangemnet of parts, the essential features of which are hereinafter fully described, are particularly pointed out in the appended claims, and are illustrated in the accompanying drawing, in which:—

Figure 1 is a front elevation of my improved detector device.

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1.

Figure 3 is a vertical sectional view on the line 3—3 of Figure 2.

Figure 4 is a diagrammatic view showing the detector electrically connected to the spark plugs of an internal combustion engine.

Referring to the drawing by reference characters, the numeral 10 designates my improved spark plug detector device in its entirety which is adapted to be mounted upon the instrument board of an automobile, aircraft, or other support used in association with an internal combustion engine. The detector 10 includes an annular housing 11 of insulating material, open at its back and closed at its front as at 12, while an annular attaching flange 13 projects beyond the peripheral edge of the housing and has openings 14 therein for the passage of fastening elements by which the device may be fixedly mounted in a panel or instrument board. The front wall 12 is provided with equi-distantly spaced openings 15 of a number equalling the number of spark plugs with which the device is to be used. Fixedly mounted within the housing 11 in spaced relation to the front wall 12, is a removable rear wall 16, also of insulating material and which has electric contacts 17 on the inner face thereof, one for each spark plug of the engine with which the device is to be used. A conductor wire 18 is electrically connected to each contact 17 and the wires 18 all pass through the rear wall 16 and connect with the terminals of the respective spark plugs S or with the conductor wires (not shown) from the distributor of the engine.

A shaft 19 having a flat head 20 at one end passes axially through the front wall 12 and rear wall 16, while the other end of the shaft is screw threaded and projects beyond the rear wall to threadedly receive a removable thumb nut 21. An expansion spring 22 is interposed between the nut and the rear wall 16 to yieldingly hold the rear wall in position, the tension of the spring being adjusted by the thumb nut 21. Turnably mounted upon the shaft 19 within the housing 11 is a disk 23 of insulating material, the same being provided with radially arranged recesses 24 opening onto the periphery of the disk and onto the shaft 19 through openings 24′, and seated in each recess is a vacuum tube lamp 25 of the Geissler type. There is one lamp for each spark plug of the engine with which the device is to be used. The recesses 24 open through the front of the disk by reason of openings 26 provided therein and which are of a size to register with the openings 15 in the front wall of the housing

to expose the respective tube lamps to view from the front of the device. Helical springs 27 are mounted in bores in the disk 23, as shown, and these springs lead from the recesses 24 to the rear face of the said disk 23. The front ends of the springs engage shoulders 28' at one end of the bores, and their rear ends are movable into engagement with the respective contacts 17.

For allowing manual turning movement to be imparted to the disk 23 to connect and disconnect the spring contacts 27 with the stationary contacts 17, I provide an arcuate slot 29 in the front wall 12 of the housing through which a manipulating knob or pin 30 extends, the said knob being fixed to the disk 23. The slot is of such length that when the knob is moved to one end thereof, the openings 15 and 26 will be in alignment and the contacts 27 and 17 engaged at which time the device is set for operation, while movement of the knob to the opposite end of the slot will cause the contacts to break, and the openings 15 and 26 are to be disposed out of alignment at which time the openings 26 are covered and the device is in an inoperative position.

From the foregoing description, it will be seen that when the device is set for operation in the manner above mentioned, the intermittent electric current will flow to the respective spark plugs and through the wires 18, contacts 17, springs 27, to the outer ends of the tubes by a Voltaic arc, through the tubes to the shaft 19 by a similar Voltaic arc, and thence to the ground. This will cause the tube lamps to successively illuminate as they are of the type which produce a luminous effect when subjected to an electric current. An operator of an automobile or aircraft may know at a glance whether the spark plugs are properly functioning and if not, he is able to learn which particular spark plug is not functioning even though the cause of the trouble is independent of the magneto current or spark coil. The device may not be set for operation at all times but only when it is desired to check up on the functioning of the spark plugs.

In the drawings, I have shown a detector for use in connection with a six cylinder motor but if desired the same may be constructed for a four or eight cylinder engine without in any way departing from the spirit of the invention.

While I have described what I deem to be the most desirable embodiment of my invention, it is obvious that many of the details may be varied without in any way departing from the spirit of my invention, and I therefore do not limit myself to the exact details of construction herein set forth nor to anything less than the whole of my invention limited only by the appended claims.

What is claimed as new is:—

1. A spark plug detector comprising a housing having window openings in the front wall thereof, a series of fixed electrical contacts on said housing adapted to be electrically connected to the respective spark plugs of an internal combustion engine, a member turnably mounted within said housing provided with radially disposed pockets and having window openings communicating with the pockets for registration with the said window openings in said housing, electric tube lamps within the respective pockets, and electric contact elements in said member adjacent the respective tube lamps and engageable with said fixed electric contacts when said member is turned into operative position to bring the window openings therein into register with the window openings in said housing, said respective contacts being disengageable upon movement of said turnable member to a position when said windows are out of registration, substantially as and for the purpose specified.

2. In an electric current impulse detector comprising a housing having window openings provided therein, electric tube lamps, means within said housing for supporting said electric tube lamps therein for movement into and out of registration with the respective window openings, and contact means carried by said first means and disposed adjacent said electric tube lamps in the various electric circuits in which they are adapted to be arranged when said electric tube lamps are in register with the respective window openings.

3. A spark plug detector comprising a housing having window openings in the front wall thereof, said means having a slot therein, a series of fixed electrical contacts on said housing adapted to be electrically connected to the respective spark plugs of an internal combustion engine, a member turnably mounted within said housing provided with radially disposed pockets and having window openings communicating with the pockets for registration with the said window openings in said housing, electric tube lamps within the respective pockets, and electric contact elements adjacent the respective tube lamps and engageable with said fixed electric contacts when said member is turned to bring the window openings therein into register with the window openings in said housing, and disengageable therewith upon movement of said turnable member to a position when said windows are out of registration, and a manipulating element on said member extending through the slot in said housing by which manual turning movement may be imparted to said member, substantially as and for the purpose specified.

4. In a spark plug detector comprising a housing having window openings, electric circuit wiring including terminals fixedly

carried by the housing, said housing having a slot therein, a carrier turnably mounted in the housing and housing recesses therein, tube lamps disposed in said recesses and movable into or out of alignment with said windows on turning movement of the carrier, there being also in the latter windows for registry with said first windows, conductors also mounted in said carrier and adapted to removably contact at one of their respective ends with said terminals, the opposite ends of said conductors adapted to be disposed adjacent said tube lamp, and manipulable means rigid with said carrier and disposed in said slot, whereby on manipulation of said means to turn said carrier in one direction, said conductors are effective to close the circuit for lighting the tube lamps and for moving the windows into registry.

In testimony whereof I affix my signature.

CHARLES GALBUSERA.