March 7, 1939. M. O. MUSEUS 2,149,620

TIMER CHECKING DEVICE

Filed March 10, 1937

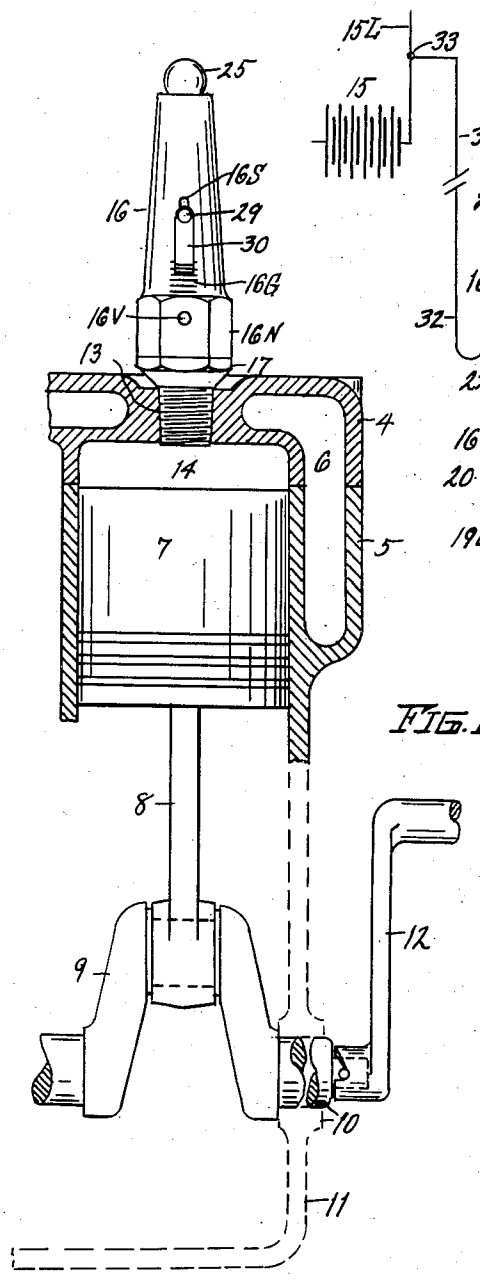


FIG. 1.

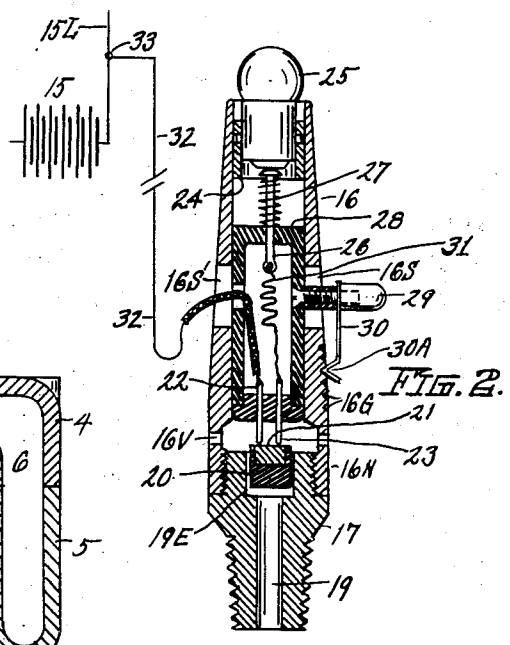


FIG. 2.

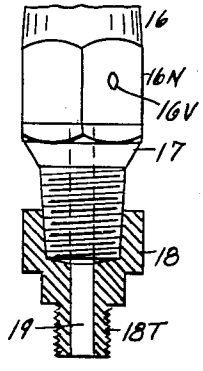


FIG. 3.

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Patented Mar. 7, 1939

2,149,620

UNITED STATES PATENT OFFICE

2,149,620

TIMER CHECKING DEVICE

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Application March 10, 1937, Serial No. 130,092

3 Claims. (Cl. 177—311)

My invention relates to a device for checking the ignition, particularly that part of ignition means of internal combustion engines commonly known as the timer, and the main object is to provide a simple, highly efficient, portable and inexpensive device the use of which enables any one to accurately determine the setting of a timer and by thus getting accurately timed spark in the compression chamber to keep an engine in smooth running condition.

In the accompanying drawing, illustrating a preferred embodiment of my invention,—

Fig. 1 is a side elevation of my timer checking device in operative position in the spark plug hole of the forward cylinder of an internal combustion engine of the type used in motor vehicles, the upper part of the engine block being shown in section, the piston, piston rod, crank shaft, starter crank and crank case being shown in correct relative positions.

Fig. 2 is a longitudinal sectional elevation of my device and showing connection of it with a charged wire as from the battery of a car.

Fig. 3 is a modification of the lower end part of my device showing a threaded filler plug to be used to connect my device in a spark plug socket of other than standard size,

Referring to the drawing by reference numerals, 4 designates a motor-block head, 5 the main motor block, both with the usual water passages 6 for cooling. Only the front part of a motor block is shown including the front or so-called number one piston 7 from which extends the usual rod 8 journaled on the crank-shaft 9, with bearing 10 in the front wall of the crank case 11, the latter shown in dotted lines only.

12 designates the usual hand starting-crank engageable with the front end of the crank shaft. 13 designates the usual threaded spark-plug hole in the top part of the head 4 and opening directly into the compression chamber 14 within the head and over the piston 7. All of the associated parts thus far described are common to most internal combustion motors but herein first set forth to provide a more ready understanding of the functioning of my device.

15 designates any source of electric current common to any type of internal combustion engines and from which extends a lead 15L.

My device comprises a tubular metal housing or shell 16 normally upright, and preferably slightly tapered to its top end from its polygonally shaped lower part 16N the latter preferably hexagonal to provide wrench holding means.

17 is a shouldered plug threaded at both ends, upwardly with male threads adapted to be threaded into a correspondingly threaded lower end of the shell 16, the lower threads 17T of said plug corresponding to standard thread of a spark plug and therefore adapted to be fitted into the spark plug hole 13. 18 in Fig. 3 designates an intermediate plug with female threads at its upper end to engage the lower threads of plug 17 and the lower end part threaded as at 18T with threads of other than standard spark plug size. This plug may therefore be termed a reducer coupling for the purpose of holding the device in various sizes of spark plug apertures. Both plugs 17 and 18 are bored as 19 longitudinally to directly connect the compression chamber of the engine with the interior of the main shell or housing 16.

The upper part of bore 19 in plug 17 is enlarged as 19E to provide a seat and vertically disposed guide chamber for a vertically reciprocable valve plug 20 of preferably heavy but non-conductive material but having imbedded in its upper face a metallic insert 21 exposed upwardly and comprising electric circuit closing means when the plug is moved upwardly to simultaneously contact two conductor contact pegs 22—23 adjustably and reciprocally mounted in the lower part or end of the shell 16 as will presently be described. For convenience the member 20 will hereinafter be designated the circuit closing plug.

24 is a metal collar fixed in or formed integral with the upper part of the bore of shell 16 and suitably notched to receive and removably retain the shank end of an electric bulb 25.

The lower and contact end of the bulb 25 is continuously contacted by the headed upper end of a spring actuated rod 26 (see Fig. 2) encircled by a compression coil spring 27 under compression between the upper end of the rod and the top end of an elongated piston-like member 28 reciprocable within certain limits and in the bore of the shell 16, said member 28 being of non-conductive material.

In the lower end of said member 28 is retained in parallel relation the two vertically disposed contact pegs 22—23 which protrude below said end. In one side of shell 16 is provided an elongated slot 16S through which projects outwardly a stem 29 carrying a downwardly directed leaf spring arm 30 with an inward V-shaped offset 30A at its free end to frictionally engage in any one of a row of transverse notches 16G in the side of the shell. By means of the stem 29 the cylinder 28 can be adjusted longitudinally and retained at selective height within the bore of

the shell, by the spring contact 30A, thus spacing the contact pegs 22—23 accordingly and with relation to the float 20.

The bulb contacting bar 26 extends into the cylinder 28 its lower end connected to one of the contact pegs, as 23, by means of a circuit wire 31 which may be coiled as shown to compensate for variation of distance between said contact members. 32 is a wire extended from contact peg 22 within member 28 and extending outwardly from the side of the shell through an elongated aperture 16S', thence extending to any suitable type of contact as at 33 with a charged wire as 15L.

In the use of my device, it will be readily understood that after first removing the spark plug over piston No. 1, my device is inserted, replacing the spark plug (see Fig. 1). Then wire 32 is connected to any available live wire 15L, and it may be assumed that at this time the piston 7 is in lowermost position for a low compression engine. Also at this time plug 20 is seated. Now the operator grasps the hand crank and rotates the crank-shaft starting and moving the piston upwardly causing compression in the compression chamber. The compressed air is immediately transmitted into the bore 19 raising the plug 20 which contacts the pegs 22—23, thus closing electric circuit and lighting bulb 25.

The bulb 25 remains lighted until the piston reaches its top position. At this point no more pressure is generated by the piston 7 and plug 20 falls back to its lower position (out of contact with pegs 22—23), opening circuit and bulb 25 goes out.

16V are vents in the lower part of shell 16 for outlet of compressed air when the plug 20 rises to a position permitting escape thereof and when compression ceases allowing prompt lowering of the plug 20, and breaking of circuit.

The operator should rotate the crank very slowly until the bulb goes out and then he stops cranking, the piston being positioned at a point where the spark in the combustion chamber should take effect.

With the piston thus positioned at the point required for a spark the operator can adjust the timer of the automobile engine (not shown) to provide a spark at this instant or at this set position of number one piston. With the timing of spark for No. 1 cylinder of the engine it is obvious that the timing of the other sparks in other cylinders of the engine is automatically corrected. The plug 20 being of heavy material will rise according to compression in the engine. If the engine is of the high compression type the circuit contact holding piston 28 is first set at a relatively high position and requiring greater lift or movement of the plug 20 to close circuit. If the light flickers because of unsteady buoyancy of the plug 20 the operator will know that the piston member 28 must be adjusted downwardly a notch or two.

Obviously my device eliminates the use of customary markings as on the fly-wheel rim as is well known in the art.

Modifications of structure may be embodied, as for example, other circuit opening means actuated by the contact of the plug 20.

It will be readily understood that the vertical adjustment and placement of the inner cylinder 28 is necessary to compensate for various degrees of compression in engines. For example, if the compression is relatively high the cylinder 28 is moved upwardly to provide initially a larger gap between the contact pegs 22—23 and the plug 20, yet circuit means are in continuous contact with the light bulb.

Modifications within the scope of the construction described may be embodied without departing from the scope and spirit of my invention.

This device is invaluable for factory, garage or individuals use, for checking timing on any type of compression engine regardless of the number of cylinders. Its simple and efficient features of construction and operation will be readily understood by any one familiar with the construction and operation of internal combustion engines, and it is further obvious that this simply constructed device is applicable to rotary or air-plane motors.

I claim:

1. An ignition checking device for internal combustion engines, said device comprising a tubular body adapted to be removably mounted with its lower end in communication with the combustion chamber of the engine, an electric circuit, an electric bulb in the open, upper end of said body and in said circuit, a piston-like member reciprocably and adjustably retained in the bore of said body, electrode means in the circuit and fixed in the lower end part of said piston member, electroconductive means longitudinal of the bore and in continuous yieldable contact with said bulb, means in the lower end part of said body adjacent the compression chamber end and reciprocated by compression therein to contact and close circuit through the electrode means to said yieldable contact means and the bulb and to break contact when compression ceases.

2. The structure specified in claim 1, in which said circuit closing and opening means comprises a reciprocable float member of non-conductive material and seated in a reduced bore of the body in vicinity of the compression chamber end thereof and in spaced relation to said electrode means of the piston member, an insert of electroconductive material in said float and arranged to contact the electrode means and close circuit when compression is effective as described.

3. The structure specified in claim 1, in which said yieldable bulb contact means comprises a conductor bar longitudinally within the bore of the said body its upper end continuously contacting the bulb, said bar reciprocally retained in the upper end of the piston member, a compression coil spring about said bar and between the head end thereof and the upper end of the piston member, to maintain continuous electric contact with the bulb, and means for adjusting said piston member longitudinally in the bore of said body for the purpose set forth.

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