

Nov. 18, 1930.

W. D. HAVENS

1,782,142

TIMING INDICATOR FOR INTERNAL COMBUSTION ENGINE

Filed Feb. 12, 1929

2 Sheets-Sheet 1

Fig 1

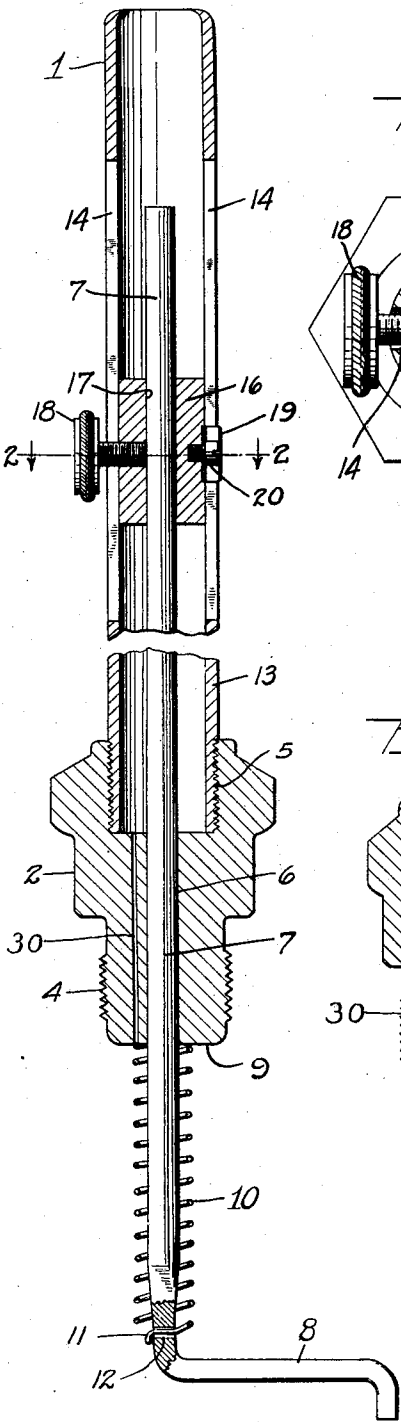


Fig 2

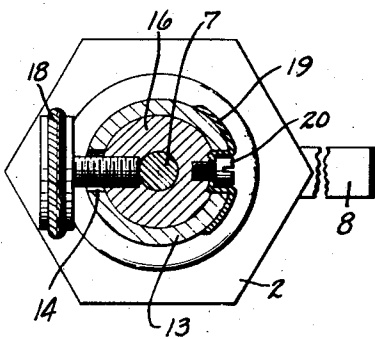


Fig 3

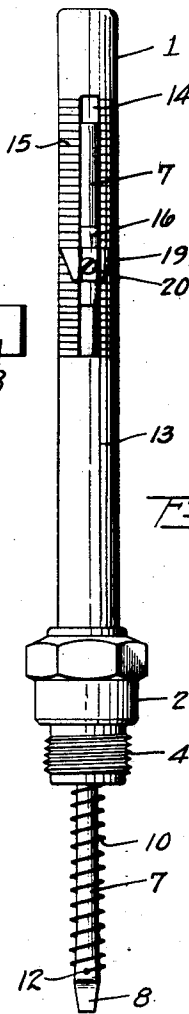
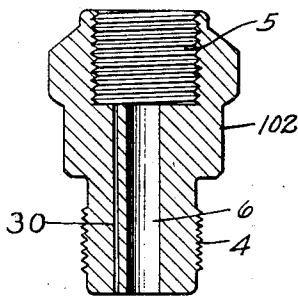


Fig 4



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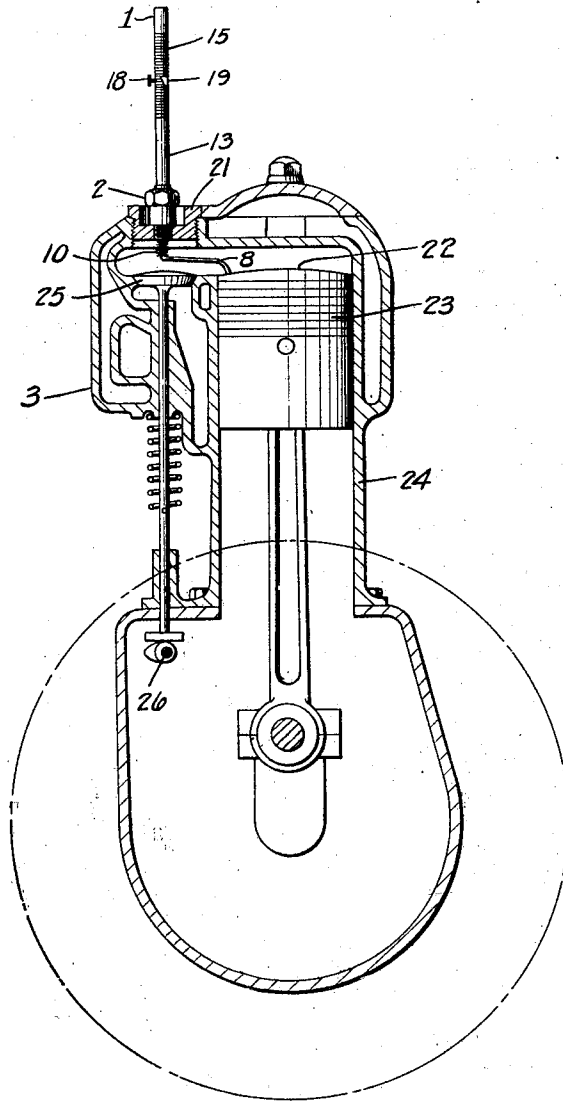
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2 Sheets-Sheet 2

Fig 5



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TIMING INDICATOR FOR INTERNAL-COMBUSTION ENGINES

Application filed February 12, 1929. Serial No. 339,372.

My invention relates to internal combustion engines and more particularly to a timing indicator for such engines.

My invention further relates to certain combination, sub-combinations, and articles of manufacture, and details of construction, all of which will be more fully hereinafter described and pointed out in the claim.

In the drawings I have shown one embodiment of my invention, but it is, of course, to be understood, that my invention is not to be confined to this particular embodiment, shown by way of illustration.

Figure 1 is a vertical section through my preferred form of timing indicator.

Figure 2 is a horizontal section, on an enlarged scale, on line 2, 2 of Figure 1.

Figure 3 is a front elevation.

Figure 4 is a vertical section of a different size plug which may be used, together with the other elements, in a different make of internal combustion engine.

Figure 5 is a vertical section, through a standard form of internal combustion engine, showing the manner of using my timing indicator.

In the internal combustion engine art, and more particularly in such engines for automobiles, it is essential that the timing mechanism, governing the explosion in the different cylinders, be accurately adjusted to get the best results from the engine. Incorrect timing will not only lessen the horse power of the engine, but, among other disadvantages, often results in injury to the self-starting mechanism and other parts of the engine.

In practice, the adjusting of the timing mechanism has, heretofore, been more or less a hit-or-miss proposition and, at best, simply an approximation.

A rough, or approximately correct, adjustment for low speed gas engines would be more or less ruinous on high speed gas engines now commonly used in automobiles.

By my invention I remove all the guess work or approximation in the timing mechanism, so that the timing mechanism of the engine can be positively and accurately adjusted for the particular engine, whether the engine be a low or high speed one.

My invention is also valuable in finding the exact location of the piston when timing an engine for installing a new timing chain, or placing new gears, without removing the cylinder head.

Other advantages will, of course, be apparent to those familiar with the art.

In the particular embodiment of my invention shown in the drawings 1 is my timing indicator comprising a plug 2, or other suitable means, to secure it temporarily to an engine 3, Figure 5. This plug has external screw threads 4 and internal screw threads 5 with an axial bore 6 in which is loosely mounted the indicating rod 7, which, for certain makes of engines, is provided with an off-set foot 8. Between the lower end 9 of the plug and the off-set foot, a coil spring 10 is mounted surrounding the indicating rod 7, one end 11 of the spring being preferably threaded through the hole 12 in the rod 7.

A tube 13 provided at one end with external male screw threads is screwed into the upper end of the plug 2, co-operating with the female threads 5 in said plug. This tube is slotted at 14, 14 and provided with a scale 15.

Mounted to slide freely within the tube 13 is a cylindrical block 16 provided with an axial hole 17 through which the indicating rod 7 may be freely moved when the set screw 18 is loose.

Mounted immovably on this cylindrical block 16 is an indicator 19, which, in my preferred construction, is a bent piece of metal and is secured to the block 16 by the screw 20.

In use the block 16 is secured to indicating rod 7, by the set screw 18. One of the spark plugs of the engine is removed and the lower end of the plug 2 is secured in the cylinder head by the threads 4 engaging the threads in the cylinder head, just previously engaged by the spark plug. In some standard engines, as in Figure 5, a supplemental plug 21 is employed. In such an engine, the spark plug is mounted in the supplemental plug 21, and, in such an engine my plug 2 would be mounted in the supplemental plug in place of the removed spark

plug, and the foot 8 would be brought over into the path of the top 22 of piston 23.

The engine is then turned over by hand and as piston 23 ascends it will engage with the foot 8 and lift it, against the action of the spring 10 which will be compressed. At the same time the indicating rod 7 with the cylindrical block 16, is lifted vertically in the tube 13, causing the indicator 19 to move along the scale 15. This movement of the indicator will be positively controlled by the upward movement of the piston 23 and will visibly indicate the movement of the piston on the scale 15. The moment that the indicator 19 ceases to rise, will clearly indicate the peak of the upward stroke of the piston 23.

With this point positively and visibly fixed, the timing mechanism can then be accurately adjusted for the particular engine, whether it be a high or low speed engine, to obtain the maximum efficiency of that particular engine.

When the piston 23 passes this maximum stroke and starts to descend, the spring 10 will cause the foot 8 to follow the piston for a short distance, which will be instantly indicated by the retrograde movement of the indicator 19 on the scale 15. This also assists the operator in finding the exact point of maximum upward movement of the piston, so that all guess work, or approximation, in setting the timing device of the engine is eliminated.

The engine 24, valves 25, cam shaft 26, and other parts of the internal combustion engine illustrated in Figure 5 are all of standard construction, and form no part of my invention.

My invention may be used with engines having different size spark plug openings by varying the size of plug 2. For example, I have shown in Figure 4 a different size plug 102. In practice different sizes of plugs may be sold with one of my timing indicators. If the plug 2 does not fit the particular opening in the engine, the tube 13 can be unthreaded from the plug 2 and threaded into the plug 102 and the rod 7 be located in that plug. While I have shown only two sizes of plugs 2 and 102, various sizes may be employed, if necessary, as well as different shapes of indicator rod 7 and feet 8. The plug 2 may be provided with a small port 30, so that the escaping air will indicate the compression stroke.

Having thus described this invention in connection with illustrative embodiments thereof, the details of which I do not desire to be limited, what is claimed is new and what is desired to secure by Letters Patent is set forth in the appended claim.

What I claim is:—

In a timing indicator for internal combustion engines, the combination of a hol-

low plug adapted to screw into a spark plug opening, a tube screwed to the plug and provided with two slots, said tube being provided with a scale, a hollow block mounted to slide freely in said tube, an indicator mounted on said block and adapted to slide in one of the slots, and to co-operate with the scale on the tube, an indicating rod mounted to slide within the plug, tube and block, a set screw carried by the hollow block and adapted to slide in the other slot of the tube to adjustably connect the indicator rod to the hollow block, an offset foot carried by the indicator rod to engage a piston out of line with the plug, and a spring normally pressing the offset foot away from the plug.

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