Dec. 9, 1952 G. J. WOREL 2,620,765

FIRING INDICATOR ATTACHMENT FOR DISTRIBUTORS OF INTERNAL-COMBUSTION ENGINES

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Fig. 1

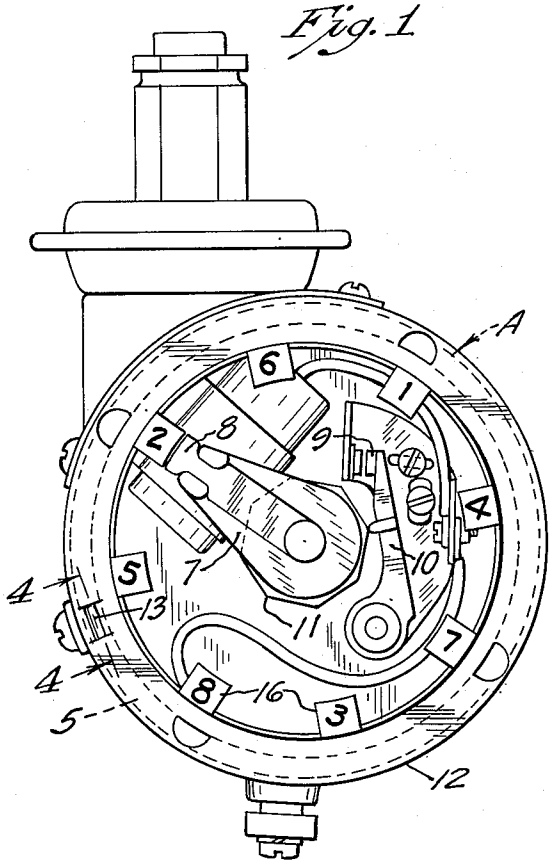


Fig. 3

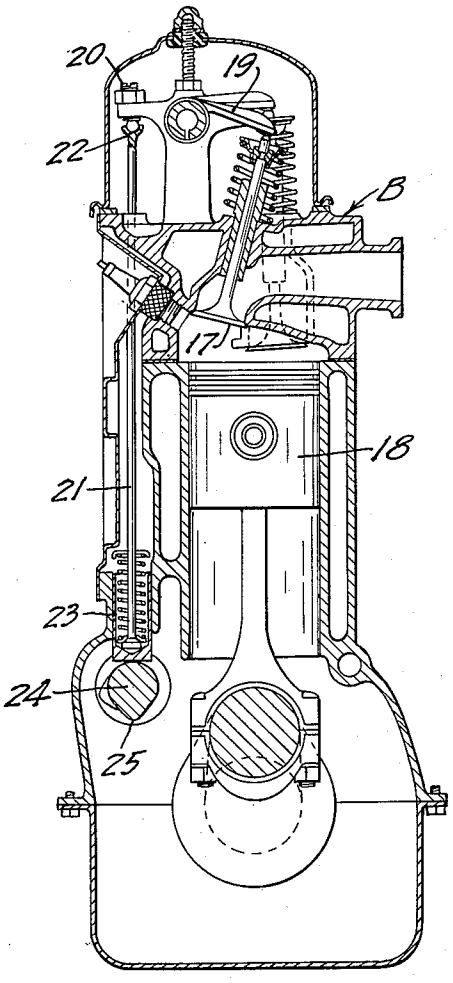


Fig. 2

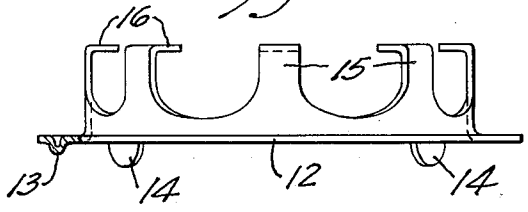
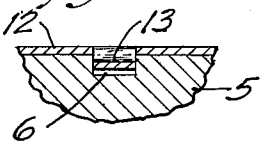


Fig. 4



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FIRING INDICATOR ATTACHMENT FOR DISTRIBUTORS OF INTERNAL-COMBUSTION ENGINES

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2 Claims. (Cl. 116—124)

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This invention relates to a firing indicator attachment for distributors of internal combustion engines.

Various makes of automobile engines such as Buicks and Chevrolets have recently been equipped with hydraulic valves at the lower portion of their respective push or tappet rods. These hydraulic valves are designed to compensate for the normal expansion and contraction in length of the tappet rod resulting from variations in temperature, and hence to eliminate tappet noises which usually occur despite careful adjustment of the tappet rods since the play required for this expansion is not properly taken up. Since they are designed to lessen or eliminate tappet noises when these hydraulic valves are not working properly, the engine is very noisy. A little dirt in the oil of the engine will quickly foul such hydraulic valves. The dirt can sometimes be blown out with compressed air but within a short time the valve will again be fouled. It is preferable and almost imperative to be assured of good working operation that the valves be cleaned and that the oil be changed. In order to remove and clean these valves properly they must be taken completely apart. After they have been cleaned and reassembled, it is then necessary to readjust the tappet rods and their connections with the valves of the engine to prevent tappet noises. Such adjustment is ordinarily accomplished by fine adjustments of the tappet adjustment screw, which in the conventional engine connects the upper end of the tappet rod with its rocker-arm. This adjustment must be made when the tappet rod is at its lowest position. The position of the tappet rod is determined by the position of the cam-shaft with respect thereto. The position of the cam-shaft, in turn, is determined by the positions of the cylinders of the engine. When a cylinder is at firing position the cam-shaft is in such position that the tappet rod associated with that cylinder is in its lowest position.

However, it is difficult for the average mechanic to determine which cylinder is in firing position by merely referring to the position of the rotor of the distributor and hence to determine which tappet rod is in proper position for adjustment. Only through many years of experience can a mechanic determine this by observation, and even then he cannot be certain of his convictions. He will occasionally be mistaken with the result that he will adjust a tappet rod which is not at its lowest position, and therefore the adjustment will be faulty. My invention eliminates any possibility of such an error.

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It is an object of my invention to provide a firing indicator attachment for distributors of internal combustion engines which will readily, positively and accurately identify the cylinder of the engine being fired while the rotor of the distributor is at any one of its respective firing positions.

Another object is to provide a novel firing indicator attachment for distributors of internal combustion engines of an extremely cheap and simple construction and operation.

Another object is to provide a novel firing indicator attachment for distributors of internal combustion engines which can be readily and simply positioned for use in conjunction with the distributor and even more readily removed therefrom.

Another object is to provide such an attachment having inherent means for orienting the same with respect to the distributor in a predetermined relative position and having inherent means for retaining the same in such position.

Another object is to provide a firing indicator attachment for distributors of internal combustion engines which will provide indication of the identity of the cylinder being fired directly opposite the free end of the rotor regardless of the position of the rotor.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views and in which:

Figure 1 is a top plan view of a distributor with one embodiment of my invention mounted thereon.

Figure 2 is a side elevational view of one embodiment of my invention.

Figure 3 is a central, vertical sectional view of a valve-in-head type engine showing the optimum position of the cam-shaft for proper adjustment of the tappet screw and the relative positions of the various related parts of the engine.

Figure 4 is a fragmentary sectional view taken along line 4—4 of Figure 1.

Figure 1 shows a distributor indicated generally as A of the conventional type currently used on most automobile engines. As shown, this distributor A includes a generally cylindrically-shaped wall 5 having a recess 6 formed thereon to guide the cover (not shown) of the distributor into proper relative position for proper operation.

Ordinarily this distributor cover (not shown) carries a plurality of contacts, one for each cylinder. As shown in Figure 1 this distributor A includes a rotor 7, the free end 8 of which revolves to pass rapidly and successively past the contact points of the distributor cover. Also included in the distributor A are the breaker points indicated as 9, one of which is carried by a breaker arm 10. The rotor 7 has a plurality of cam-lobes 11 which cause the breaker points 9 which ordinarily register with each other to separate intermittently as shown in Figure 1.

Mounted on the distributor A in Figure 1 is shown one embodiment of my invention. Figure 2 more clearly shows the structure of my firing indicator attachment. It consists of an annulus 12 disposed in a substantially horizontal plane and being of the same or slightly larger diameter than the exterior wall of the distributor A. As shown in Figure 2 this annulus 12 has a lobe 13 formed therein, by stamping or by some other suitable means, to depend therefrom slightly. This lobe 13 is of a size to permit it to be snugly received within the recess 6 of the distributor A. Also depending from the annulus 12 is a plurality of spaced gripper ears 14 which are disposed adjacent the inner surface of the wall 5 of the distributor A to firmly grip the inner wall surface and retain the annulus 12 in proper position with respect thereto. As shown these gripper ears 14 are formed by punching out portions of the annulus 12 at substantially right angles thereto so that the gripper ears will constantly urge outwardly against the inner surface of the distributor wall 5.

Extending upwardly from the annulus 12 are a plurality of indicator arms 15, each of which has an inwardly extending horizontal end portion 16. As best shown in Figure 1, each of these horizontal end portions 16 is provided with indicator means by stamping or in some other suitable manner to indicate the identity of the cylinder of the engine which will be fired when the free end 8 of the rotor is directly opposite that end portion. The length of the indicator arms 15 is such that the horizontal end portions 16 are on substantially the same plane as the free end 8 of the rotor 7 as it revolves in its orbit.

Figure 3 shows an engine indicated generally as B of the valve-in-head type with the various parts thereof in their proper relative positions for optimum adjustment. As shown, such an engine includes valves 17, pistons 18, rocker-arms 19, tappet adjustment screws 20 and push or tappet rods 21. These push rods 21 are provided at their upper ends with a seat 22 to receive the lower end of the tappet adjustment screw 20. The lower end portions of the push rods are provided, as shown, with a hydraulic valve 23 of the type previously described herein. The push rod 21 is actuated by the cam-shaft 24 which has a cam 25 thereon for that purpose for each of the push rods.

Whenever one of the hydraulic valves 23 has been removed for cleaning or whenever the rocker-arm 19 or the valve push rod 21 have been removed from the engine it becomes necessary to make an initial adjustment for each of the push rods 21. This adjustment must be made when the push rod is on the base circle of the cam-shaft 24, as shown in Figure 3. In other words, the cam 25 should be at its lowest position so that the push rod 21 will likewise be at its lowest position. In order to determine when this condition exists a mechanic simply applies my firing indicator attachment shown in Figure 2 to the distributor so that the lobe 13 will fit into the recess 6 and thereby guide the annulus 12 with its indicator arms 15 into a pre-determined position with respect to the distributor. The gripper ears 14 firmly clamp against the inner surface of the wall 5 of the distributor. The engine is then cranked while the mechanic watches the rotor 7. When the free end 8 of the rotor is directly opposite one of the horizontal end portions 16 of the indicator arms 15, as shown in Figure 1, the mechanic knows that the cylinder of the engine indicated by a number on that end portion is in firing position and that therefore both of the valves associated with that cylinder can then be adjusted. Accordingly he will adjust the tappet adjustment screws 20 associated with these valves as required. The engine is then cranked until the free end 8 of the rotor 7 is opposite one of the other end portions 16 and the mechanic then proceeds to make similar adjustments on the tappet adjustment screws 20 associated with the valves of the cylinder indicated on the end portion 16. The numbers on the end portions 16, of course, correspond to the number of the cylinder which is in firing position when the rotor 7 extends in that direction.

Thus it can be seen that I have provided a very simple device which, when properly attached to the distributor, will enable even a relatively inexperienced mechanic to readily and accurately identify the cylinder of the engine being fired while the rotor of the distributor is at any one of its respective firing positions. It should be noted that this device is of extremely cheap and simple construction. In addition, it is very simple to utilize, and there is no possibility of error in its attachment or in its use. It should also be noted that the horizontal end porion 16 is disposed directly opposite the free end 8 of the rotor 7 as it revolves so as to make the reading thereof more readily possible. My firing indicator attachment can also be used to check sticky valves or in any other maintenance operation in which it is important to know the positions of the various cylinders of the engine.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of my invention.

I claim:

1. A firing indicator attachment for distributors of internal combustion engines comprising an annularly arranged framework adapted to be fitted to an uncovered distributor in a pre-determined position relative thereto and in encircling relation with respect to the rotor of the distributor, and indicator arms extending upwardly from said framework opposite each of the respective firing positions of said rotor and terminating at the same plane as that in which the rotor moves, each of said arms having inwardly and horizontally extending end portions bearing indicator means thereon to readily indicate which cylinder of the engine will be normally fired when said rotor is at that position to enable a mechanic to readily and accurately determine the identity of such cylinder.

2. A firing indicator attachment for distributors of internal combustion engines for use in adjusting the tappet rods of such engines, such distributors being of the type having a recess in the wall thereof, said framework comprising an annularly arranged frame-work adapted to be fitted to an uncovered distributor, a lobe depend-

ing from said framework and adapted to be received in said recess of said distributor to cause said framework to be oriented in a pre-determined relation with respect to said distributor when fitted thereon, a plurality of arms extending upwardly from said framework to a point directly opposite and at exactly the same level as the free end of said rotor as it revolves within its orbit, each of said arms having inwardly and horizontally extending end portions bearing indicator means thereon to readily indicate the identity of the cylinder being fired when said rotor is directly opposite said arm to enable a mechanic to readily determine which tappet rod to adjust while the rotor is at that position, and a plurality of depending gripper ears carried by

said framework and adapted to cooperate with the wall of said distributor to retain said framework in said pre-determined position relative to said distributor.

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