

[54] **TIMING DEVICE**[76] Inventor: **Gerard Lane**, 2512 Birchwood Dr.,
New Port Richey, Fla. 33552[22] Filed: **Mar. 2, 1972**[21] Appl. No.: **231,166**[52] U.S. Cl. **324/16 R, 73/118**[51] Int. Cl. **F02p 17/00**[58] Field of Search **324/15-18; 73/118, 119 A;**
340/268[56] **References Cited****UNITED STATES PATENTS**

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[57]

ABSTRACT

A timing device for use in connection with a fan belt pulley and a distributor in an automotive engine with the pulley being fitted with equally spaced contacts. The timing device includes a spring-loaded plunger, a pointer, and means to move the plunger and the pointer relative to a fixed plate having markings therein for the purpose of achieving an advance or retard position, the contacts of the pulley making mechanical and electrical contact with the spring-loaded plunger when said fan belt pulley rotates. The plunger is wired in a circuit to a spark plug wire on the distributor well with an indicator light being also in the circuit whereby the flashing of the light indicates that the timing of the engine is set in accordance with the pointer position.

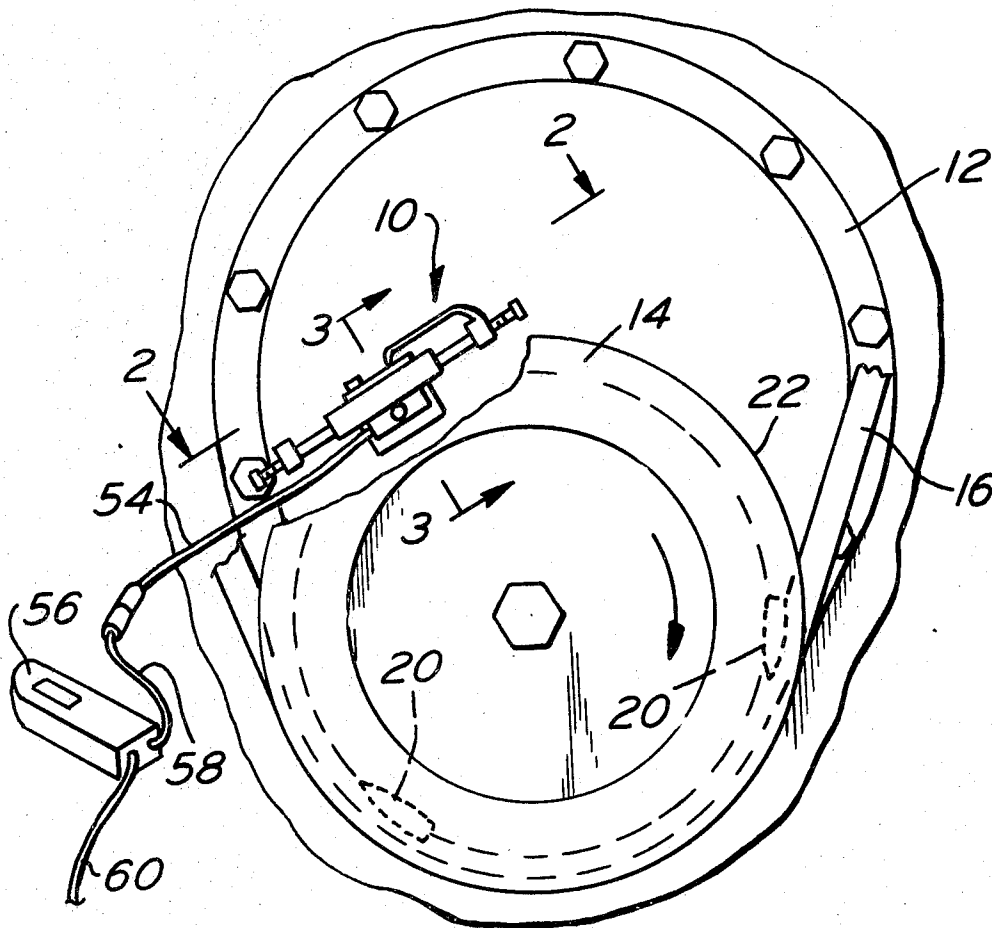
4 Claims, 6 Drawing Figures

FIG. 1

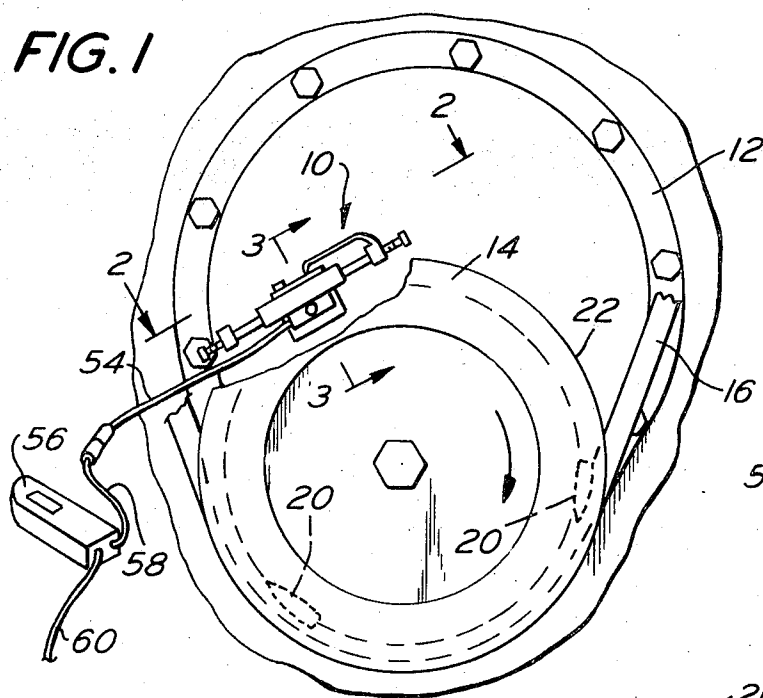


FIG. 5

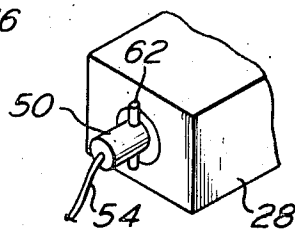


FIG. 6

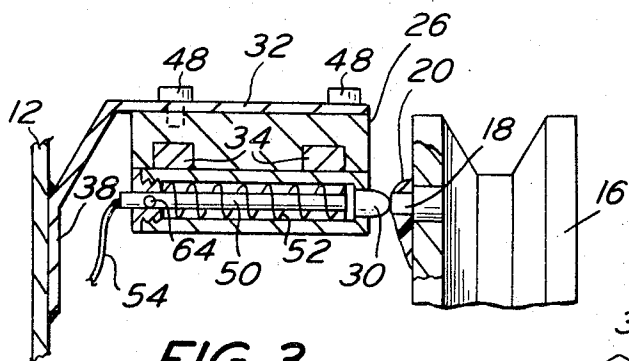
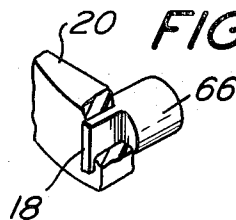


FIG. 3

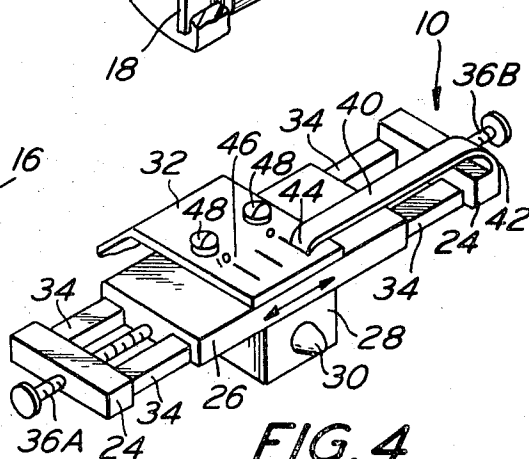


FIG. 4

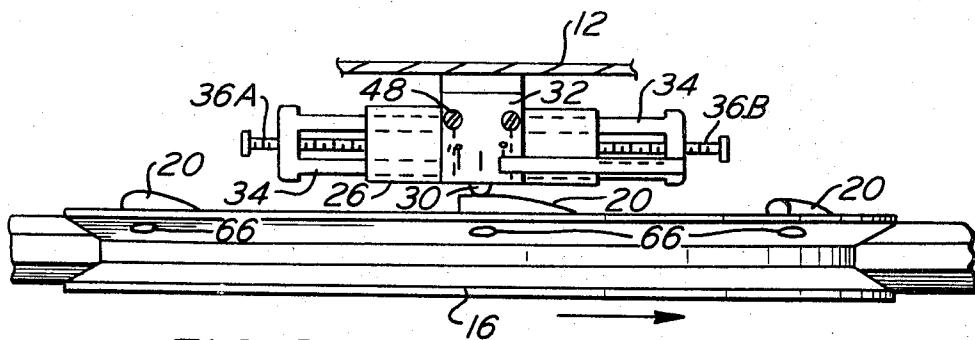


FIG. 2

TIMING DEVICE

This invention relates to a timing device that has as its objective the provision of a new and improved device of this general class.

Many timing devices have been proposed throughout the years with the most common system presently in use involving the alignment of marks on the pulley and the engine body for the use of a stroboscopic light with a view of the alignment of the aforesaid marks being visible during the periodic flashing of the light. This technique is not only somewhat dangerous, but is also not necessarily satisfactory since the net result is to set the timing at only one of the spark plugs. Furthermore, the aforesaid technique requires special equipment, such that timing normally can be accomplished only in the shop.

In contrast to the foregoing technique, the present invention provides an inexpensive and simplified device that will enable any knowledgeable motorist to adjust the timing of an automotive engine and maintain such engine at top performance. Since for instance the timing can be changed in order to accommodate various grades of gasoline for maximum performance in order to obtain greater engine efficiency. Furthermore, with the present invention the timing device is permanently mounted on the engine and can be used at any time in a matter of minutes, such that an immediate diagnosis can be made on the road of various problems such as distributor or ignition trouble.

It follows that the present invention is readily accessible on the road without the necessity of bringing expensive equipment to the location of the car. Furthermore, with the present invention the timing can be changed by as little as one-half of 1°.

It will be seen that the timing device of the present invention is safe in the sense that it is no longer necessary to reach down toward the fan belt and pulley in order to view the marking on the pulley which is difficult to see especially during the daylight.

It is therefore an object of the present invention to provide a timing device that is relatively simple in construction and easy to install either at the factory or after the automobile has been in use for some time.

Yet another object of the present invention is to provide a timing device that can be operated without the need of special tools.

Still another object of the present invention is to provide a timing device which is relatively simple in construction and maintenance.

Still another object of the present invention is to provide a timing device that is permanently mounted upon the timing gear housing, such that the timing device can be used at any time and particularly when the vehicle has to be serviced away from a garage.

The foregoing as well as other objects of the invention are achieved by providing a timing device wherein the pulley is fitted with equally spaced contacts, and the timing device includes a spring-loaded plunger, a pointer and means to move the plunger relative to the pointer, with the plunger being contacted sequentially by said pulley contacts as said pulley is rotated, means are provided to move the plunger relative to the pointer for the purpose of achieving an advance or retard position, with the plunger being wired in a circuit to a specific spark plug wire on the distributor well, and an indicator light also being inserted in the circuit whereby

the flashing of the light indicates that the timing of the engine is set in accordance with the pointer position.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a view showing the timing device installed against a timing gear case, with the fan belt pulley also being shown and with certain parts being cut away for the sake of clarity;

FIG. 2 is an enlarged sectional view taken along the lines 2—2 of FIG. 1;

FIG. 3 is an enlarged sectional view taken along the lines 3—3 of FIG. 1;

FIG. 4 is a three dimensional view showing the main elements of the timing device;

FIG. 5 is a fragmentary three dimensional view showing the attachment of a lead from the timing light to the timing device; and

FIG. 6 is a fragmentary three dimensional view showing the projection of a contact through a plastic bearing lug.

Reference is now made to the various figures of the drawing wherein like reference characters refer to like parts, with the timing device of the present invention being shown at 10 in FIGS. 1 and 4. The timing device 10 is installed against timing gear case 12, with the timing device 10 being located in spaced relationship to pulley 14 from which belt 16 extends.

It can be seen from FIG. 1 that the pulley 14 is fitted with spaced contacts 18 which project through plastic bearing lugs 20. It is essential that the contacts 18 be precisely spaced from each other, with three contacts 18 being utilized for a six-cylinder engine, and four contacts being used for an eight-cylinder engine such that the number of contacts equals the number of cylinder firings per revolution of the pulley. The plastic lugs 20 may be secured against the side face 22 of the pulley 14 by adhesives of the epoxy type or other adhesives as may occur to those skilled in the art. Alternatively, the continuous strip of plastic may be secured against the side face 22, with annular slots being provided in the plastic to allow access to the contacts 18. It is important that the contacts 18 be precisely spaced from one another.

The details of the timing device 10 are best seen in FIG. 4 wherein the timing device 10 is shown to comprise end blocks 24 which are spaced from main body 26. Main block 28 depends from the body 26, with spring-loaded plunger contact 30 being fitted within the main block 28 as better seen in FIG. 3.

The end blocks 24 are spaced from the main body 26 by means of arms 34 and the main body 26 with plunger 30 is adjustable along arms 34. Adjustment screws 36 pass through the end blocks 24, with the free ends of the adjustment screws abutting against the main body 26. It should be noted that the end blocks 24 are integral with the arms 34 and can be adjusted thereon. For the sake of clarity the two adjustment screws have been designated as 36A and 36B in order to explain the adjustability of the timing device 10.

As seen in FIG. 4 the plate 32 is fixedly mounted and includes an extension 38 (FIG. 3) which may be welded or otherwise secured against the timing gear case 12. However, the main body 26 along with the plunger contact 30 is permitted to slide with respect to the fixed

plate 32 along the arms 34 under the action of screws 36A and 36B.

In the preferred embodiment of the invention only two arms 34 are utilized, with each arm 34 passing through slots in the main body 26 from one side to the other, with the main body 26 being provided with slots to receive each of the arms 34.

In view of the foregoing, it can be seen that adjustment of the main body 26 and movement of plunger contact 30 is achieved by turning the adjustment screws, for instance, screw 36A so as to move the screw 36A from left to right as seen in FIG. 4. This adjustment proceeds only when the other adjustment screw 36B is turned also to move the screw 36B from left to right as seen in FIG. 4. In other words, screw 36A is advanced whereas screw 36B is retracted. The net effect of this action is to shift the main body 26 along the arms 34, such that the main body 26 is movable or adjustable relative to the end blocks 24. Keeping this in mind, it is to be noted that a pointer 40 is provided having one end secured to an end block 24, with the free end 44 of the pointer 40 overhanging one or more of the marks on the plate 32 as can be seen in FIG. 4. Thus, as the main body 26 is adjusted relative to the end blocks 24, the pointer 40 also moves with respect to markings 46 on the fixed plate 32.

Other details to be observed particularly in FIG. 3 include bolts 48 which secure the plate 32 to main body 26. Also, the plunger 30 includes a rearwardly extending stem that extends through a passageway in main block 28 with a coil spring 52 being provided to achieve the resilient action of the plunger 30. Electrical contact is made to the stem 50 by means of a wire 54 which leads (FIG. 1) to a timing light that may be a simple short tester, bulb or other illuminating device. As shown in FIG. 1, the wire 54 is secured to one of the leads 58 of the timing light 56. The other lead 60 of the timing light 56 is attached to one of the spark plug wires in the distributor. It is seen that the lead 60 may be attached to any particular spark plug wire, and in this way the device 10 can be used to check the timing of any cylinder.

As shown in FIG. 5, the lead 54 is releasably held within the stem 50 of the pin 30 by means of an anchor pin 62 that passes through an opening 64 (FIG. 3) in the stem 50.

As shown in FIG. 6 the contact 18 extends from a cylindrical lug and may be an integral part of the cylindrical lug 66. The cylindrical lug 66 is held within an appropriate opening in the pulley 16 by a simple press fit, with the contact 18 extending essentially flush with the surface of a plastic bearing lug 20 as shown in FIG. 3.

In use the adjustment screws 36A and 36B are turned in order to locate the pointer 40 in the desired position with respect to the markings 46 on the plate 32. The leads 58 and 60 of the indicator light 56 are installed, with the lead 58 being attached to the wire 54 and the lead 60 being attached to an appropriate spark plug wire on the distributor well. The distributor bolt is then loosened and tightened by hand to hold in place and the motor is started. If the light 56 does not flash, the distributor should be rotated in either direction until the light flashes. The motor is then stopped and the dis-

tributor bolt is tightened. The motor is again started and if the light is flashed, the timing is completed. The timing light 56 is then removed.

With reference to FIG. 2 it can be seen that the riding of the spring-loaded plunger 30 upon each plastic bearing lug is understood as occurring by virtue of the inclined surface of the plastic bearing lug. Thus, when the pulley rotates in the direction of the arrow of FIG. 2, the plastic bearing surfaces 20 ride one by one against the plunger 30. When contact is made between plunger 30 and the contact 18, the light in the timing light 56 will flash, assuming that the distributor has been properly rotated before the procedure starts. It can be seen that each spark plug can be checked by simply running the lead 60 of the timing light to an appropriate spark plug wire. Since the timing device 10 is permanently mounted against the timing gear case, the timing device 10 is ready for use at any time.

Without further elaboration, the foregoing will so fully illustrate my invention that others may, by applying current or future knowledge, readily adapt the same for use under various conditions of service.

What is claimed as the invention is:

1. In an automotive engine having plural cylinders, a fan belt pulley and a distributor, the combination of a plurality of equally spaced contacts on the pulley, the number of said contacts corresponding to the number of cylinder firings per revolution of said pulley and a timing device permanently mounted in said engine for enabling the timing of any cylinder to be adjusted to a predetermined condition, said device being fixedly mounted in said engine adjacent said pulley and comprising a plate carrying markings corresponding to the desired timing position fixedly mounted in said device, a movable body member coupled to the plate for lateral movement with respect thereto and carrying a spring-loaded plunger, adjustable means connected to said body to move said body and said plunger carried thereby laterally in the direction of rotation of said pulley and in the opposite direction thereto, said adjustable means also including a movable pointer that moves together with said body and plunger and across said fixed plate, said plunger being electrically connected to a timing light and to a spark plug wire in the distributor, whereby upon rotation of said pulley said plunger makes electrical and mechanical contact with said equally spaced contacts on said pulley to cause sequential flashing of said timing light to indicate whether the distributor has been adjusted sufficiently to achieve the desired timing corresponding to the position of the pointer relative to the markings on the fixed plate.

2. The timing device of claim 1 wherein said pointer is aligned with said plunger.

3. The timing device of claim 1 wherein said device also includes at least one arm and adjustable screws, said body member is slidably mounted on at least one arm and said adjustment screws bearing against said body member to move it to a desired position.

4. The timing device of claim 1 wherein said pulley contacts are provided in an inclined plastic bearing surface with said plunger riding on said surface to make electrical contact with a pulley contact that is exposed.

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