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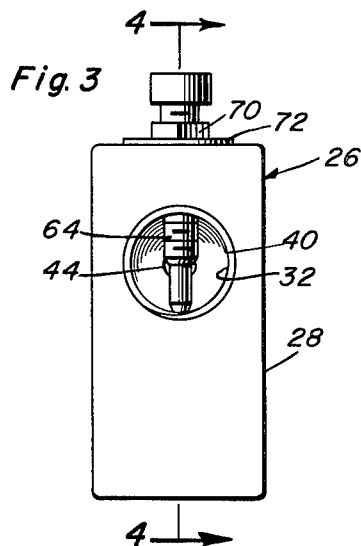
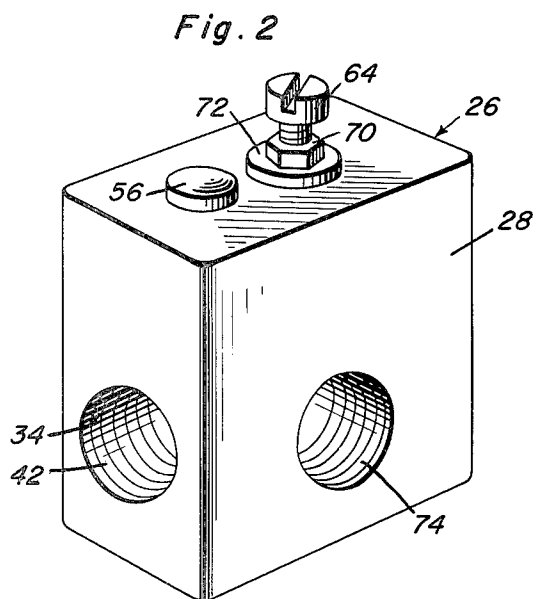
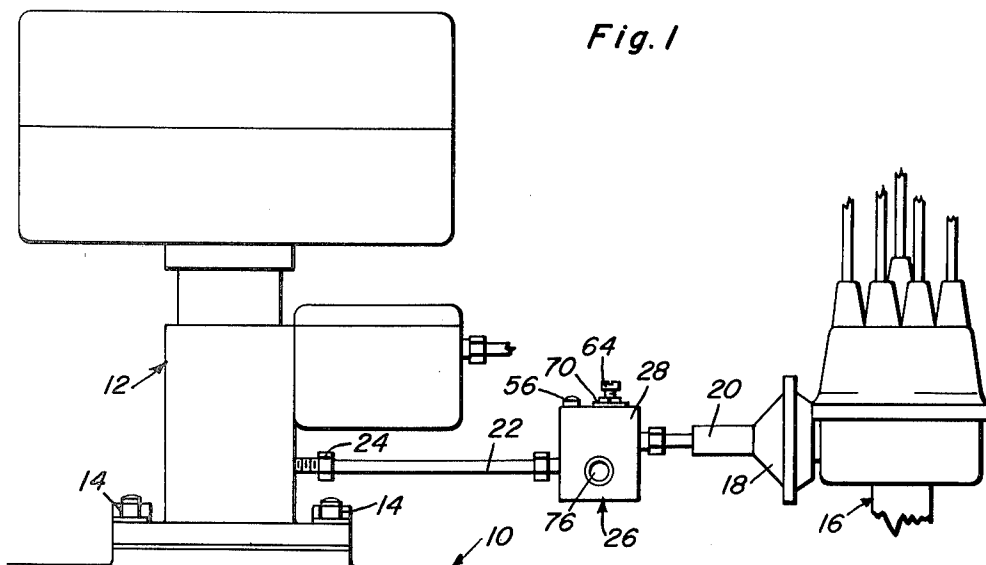
F. SARG

3,234,929

ADJUSTABLE VACUUM CONTROL FOR DISTRIBUTOR

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2 Sheets-Sheet 1



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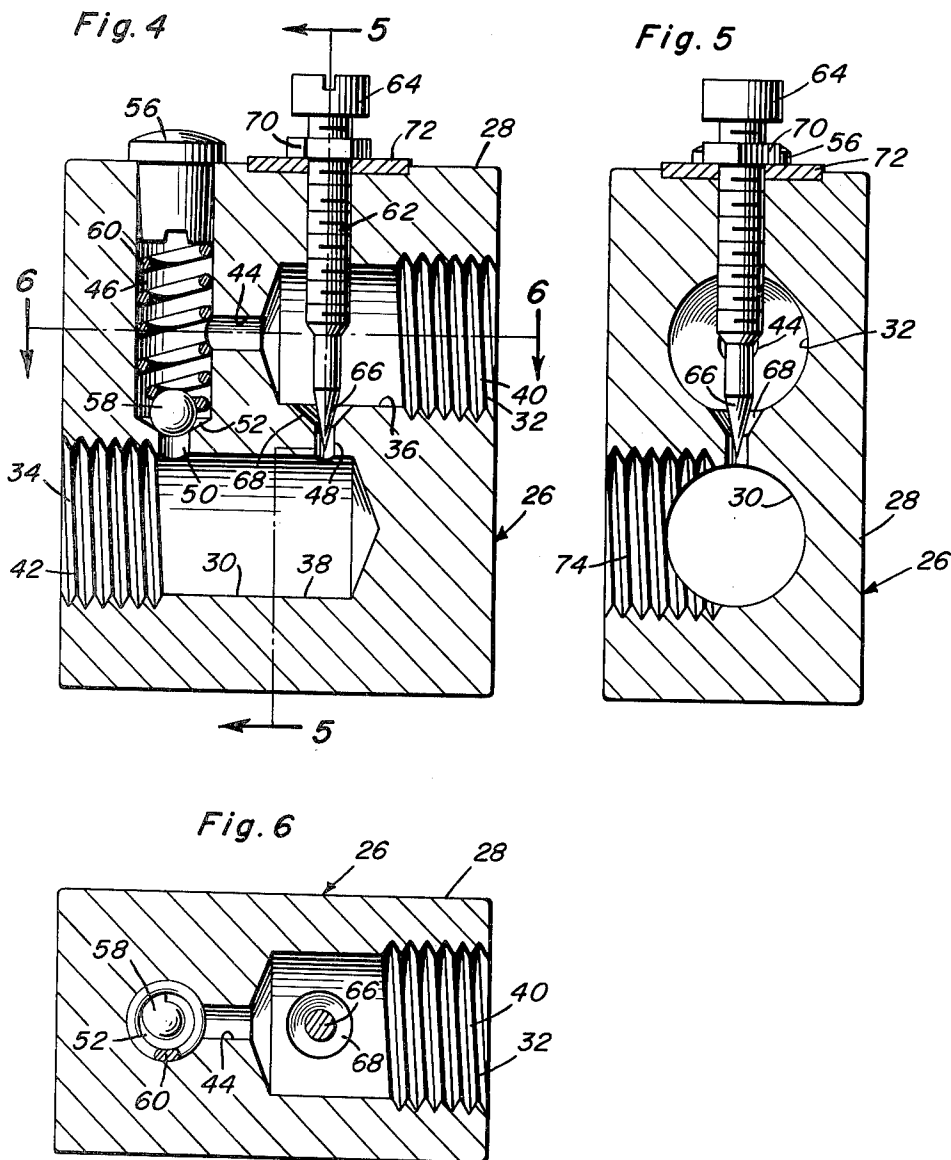
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ADJUSTABLE VACUUM CONTROL FOR DISTRIBUTOR

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2 Sheets-Sheet 2



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ADJUSTABLE VACUUM CONTROL FOR DISTRIBUTOR

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5 Claims. (Cl. 123-146.5)

This invention relates to a novel and useful adjustable vacuum control for distributor assemblies of the type including a vacuum actuated spark advance mechanism communicated with the interior of the intake manifold of an associated internal combustion engine by means of a vacuum conduit.

The vacuum control of the instant invention includes valve means operable to adjustably meter the flow of air from the distributor to the intake manifold and to allow free passage of air from the intake manifold to the distributor upon the formation of a predetermined differential in air pressure on the intake manifold side of the vacuum control above the air pressure on the distributor side of the vacuum control.

The adjustable vacuum control of the instant invention is constructed in a manner whereby the normal rate of advance of the ignition of the associated internal combustion engine effected by an increase in manifold vacuum may be reduced. While various types of internal combustion engines include only centrifugal spark advance assemblies in the associated distributor and other internal combustion engines include a single or a pair of vacuum actuated spark advance assemblies disposed in tandem and both vacuum and centrifugal assemblies for advancing the ignition timing of an internal combustion engine, the adjustable vacuum control of the instant invention is constructed in a manner whereby it may be readily installed on substantially all types of internal combustion engine distributor assemblies including vacuum actuated spark advancing mechanisms. In addition, the adjustable vacuum control of the instant invention is further constructed in a manner whereby it may be readily installed on internal combustion engines utilizing vacuum actuated distributor ignition advance assemblies without requiring the necessity of modifying either the intake manifold, carburetor or distributor assembly of the associated internal combustion engine.

The main object of this invention is to provide an adjustable vacuum control assembly that may be utilized in conjunction with substantially all existing vacuum actuated distributor timing mechanisms to delay the spark advancing action of the vacuum actuated distributor timing mechanism in terms of degrees of rotation of the spark advancing mechanism or the measurement of time required to actuate the vacuum actuated distributor timing advancing mechanism in response to a predetermined increase in manifold vacuum.

A further object of this invention is to provide an adjustable vacuum control in accordance with the preceding object which may be readily added to the existing vacuum actuated distributor ignition timing advancing mechanism of an internal combustion engine by inserting the adjustable vacuum control in the conventional vacuum conduit extending from the intake manifold to the vacuum actuated distributor timing advancing mechanism.

Yet another object of this invention is to provide an adjustable vacuum control in accordance with the preceding objects which requires no special manifold, carburetor or distributor alterations when installing the vacuum control of the instant invention on an internal combustion engine.

Still another object of this invention is to provide an adjustable vacuum control that may be readily adjusted so as to compensate for the use of fuel having various octane ratings used in the associated internal combustion

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engine without the operation of the internal combustion engine being adversely affected by spark-knock.

Another important object of this invention is to provide an adjustable vacuum control in accordance with the preceding objects which does not replace or do away with the conventional vacuum actuated distributor timing advancing mechanism with which it is associated but which instead adds to the flexibility and action of the associated vacuum actuated distributor timing advancing mechanism.

A final object of this invention to be specifically enumerated herein is to provide an adjustable vacuum control which will conform to conventional forms of manufacture, be of simple construction and easy to install so as to provide a device that will be economically feasible, long lasting and relatively troublefree in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a fragmentary diagrammatical view of the intake manifold of an internal combustion engine and the associated ignition distributor thereof including a vacuum actuated ignition timing advancing mechanism shown with the adjustable vacuum control of the instant invention disposed within the vacuum conduit extending between the carburetor of the internal combustion engine mounted on the inlet of the intake manifold and the distributor;

FIGURE 2 is a perspective view of the adjustable vacuum control shown with both of the outlets thereof unobstructed;

FIGURE 3 is an end elevational view of the embodiment illustrated in FIGURE 2 of the drawings as seen from the right end thereof;

FIGURE 4 is an enlarged vertical sectional view taken substantially upon a plane indicated by the section line 4-4 of FIGURE 3;

FIGURE 5 is a vertical sectional view taken substantially upon the plane indicated by the section line 5-5 of FIGURE 4; and

FIGURE 6 is a horizontal sectional view taken substantially upon the plane indicated by the section line 6-6 of FIGURE 4.

Referring now more specifically to the drawings the numeral 10 generally designates the intake manifold of an internal combustion engine to which a conventional form of carburetor generally referred to by the reference numeral 12 is secured by means of suitable fasteners 14. The internal combustion engine includes a conventional distributor generally referred to by the reference numeral 16 which includes a vacuum actuated ignition timing advancing mechanism 18 which usually has its outlet 20 communicated with the interior of the intake manifold 10 by means of a vacuum conduit 22 extending between the outlet 20 and the inlet fitting 24 which is communicated with the interior of the carburetor 12.

The adjustable vacuum control of the instant invention is generally designated by the reference numeral 26 and includes a valve body 28 defining passage means 30 extending therethrough including an inlet end 32 and an outlet end 34. The passage means 30 is defined by first and second blind bores 36 and 38 formed in the body 28 and defining first and second passage means sections, respectively. The outer end of the blind bore 36 is internally threaded as at 40 and the outer end of the blind bore 38 is also internally threaded as at 42. The inner end of the bore 36 is diametrically reduced as at 44 and first passage means 46 communicates the inner end of the bore 36 with the bore 38 intermediate its opposite ends while second passage means 48 communicates the inner end of the bore 38 with the bore 36 intermediate its oppo-

site ends. The first passage means 46 comprises a bore including a reduced diameter inner end portion 50 which opens into the bore 38 and defines a valve seat 52 at its end remote from the blind bore 38. The end of the bore 46 remote from the blind bore 38 opens outwardly of the body 28 and is closed by means of a headed expandable rivet 56, a check valve member 58 being disposed in seated engagement with the seat 52 and spring urged into seated engagement with the seat 52 by means of a coil spring 60 disposed between the inner end of the rivet 56 and the ball check valve 58. The bores 36 and 38 and the second passage means 48 define a main passage while the bores 44 and 50 and the first passage means 46 define a bypass passage.

The body 28 has a threaded bore 62 formed therein in axial alignment with the second passage means 48 and a threaded needle valve member 64 threadedly engaged in the bore 62 which includes a pointed end portion 66 which may be adjusted and positioned relative to the flared end 68 of the second passage means 48 remote from the bore 38.

A lock nut is threadedly engaged on the threaded portion of the needle valve member 64 and projects outwardly of the body 28 and a sealing washer 72 is disposed on the needle valve member 64 between the lock nut 70 and the body 28. Therefore, it may be seen that the needle valve member 64 adjustably meters the flow of air through the main passage 36, 38 and 48 and that the check valve 58 allows air to flow through the bypass passage 44, 46 and 50 in only one direction from the outlet end 34 to the inlet end 32.

With attention now directed to FIGURES 2 and 5 of the drawing it will be seen that a further bore 74 is formed in the body 28 disposed at substantially right angles to the bore 38 and in communication with the latter at its inner end. In normal operation, a plug 76 is threadedly secured in either the bore 38 or the bore 74, the unobstructed bore then being communicated with the interior of the carburetor 12 by means of the valving conduit 22. The provision of the bores 38 and 74 disposed at right angles to each other enables the vacuum control to be installed on a greater number of existing internal combustion engines without effecting a rerouting of the vacuum conduit 22 thereof.

In operation, the needle valve 64 may be adjusted as desired so as to restrict the flow of air through the valve body 28 from the inlet to the outlet thereof and thereby delay the advancing of the ignition timing effected by the distributor timing advancing mechanism 18. In addition, the compression spring 60 may be replaced by other compression springs capable of effecting more or less thrust on the check valve member 58 to urge it into seating engagement with the seat 52 and thereby vary the pressure differential required to unseat the valve member 58 from its seat 52 and thereafter afford substantially unrestricted flow of air through the body 28 from the outlet to the inlet thereof.

These adjustments of the vacuum control enable the action of the vacuum actuated timing advancing mechanism to be varied as desired and with the use of an ap-

paratus which is simple in construction and thereby reliable in operation, inexpensive to produce and easy to adjust.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. An adjustable vacuum control for distributor assemblies of the type including a vacuum actuated spark advance mechanism communicated with the interior of the intake manifold of an associated internal combustion engine by means of a vacuum conduit, said vacuum control comprising a valve body defining a main passage extending therethrough including an inlet end and an outlet end, said valve body being adapted to be disposed in said conduit with said inlet end opening outward toward said distributor and said outlet end opening outward toward said manifold, said valve body including first adjustable fixed valve means operable to adjustably meter the flow of air through said main passage from said inlet end toward said outlet end, said valve body also defining a bypass passage bypassing said adjustable fixed valve means and opening into said main passage intermediate its inlet and outlet ends, said valve body including second pressure differential responsive check valve means directly communicated with said outlet end and operable, only upon the formation of a predetermined differential in air pressure in said inlet end below the air pressure in said outlet end, to allow free passage of air in one direction only through said bypass passage from said outlet end toward said inlet end.

2. The combination of claim 1 wherein said first valve means is also operable to adjustably meter the flow of air from said outlet toward said inlet.

3. The combination of claim 2 wherein said second valve means includes a spring urged check valve member.

4. The combination of claim 3 wherein said first valve means comprises an adjustable needle valve assembly.

5. The combination of claim 1 wherein said second valve means comprises a spring urged check valve assembly defining a valve seat opening toward said inlet and a check valve element movable into seated engagement with said seat, spring means yieldingly urging said check valve element into seated engagement with said seat.

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