Dec. 7, 1943. W. H. SCHACHENMAN 2,336,424

IGNITION CONTROLLER

Filed Feb. 6, 1941 2 Sheets-Sheet 1

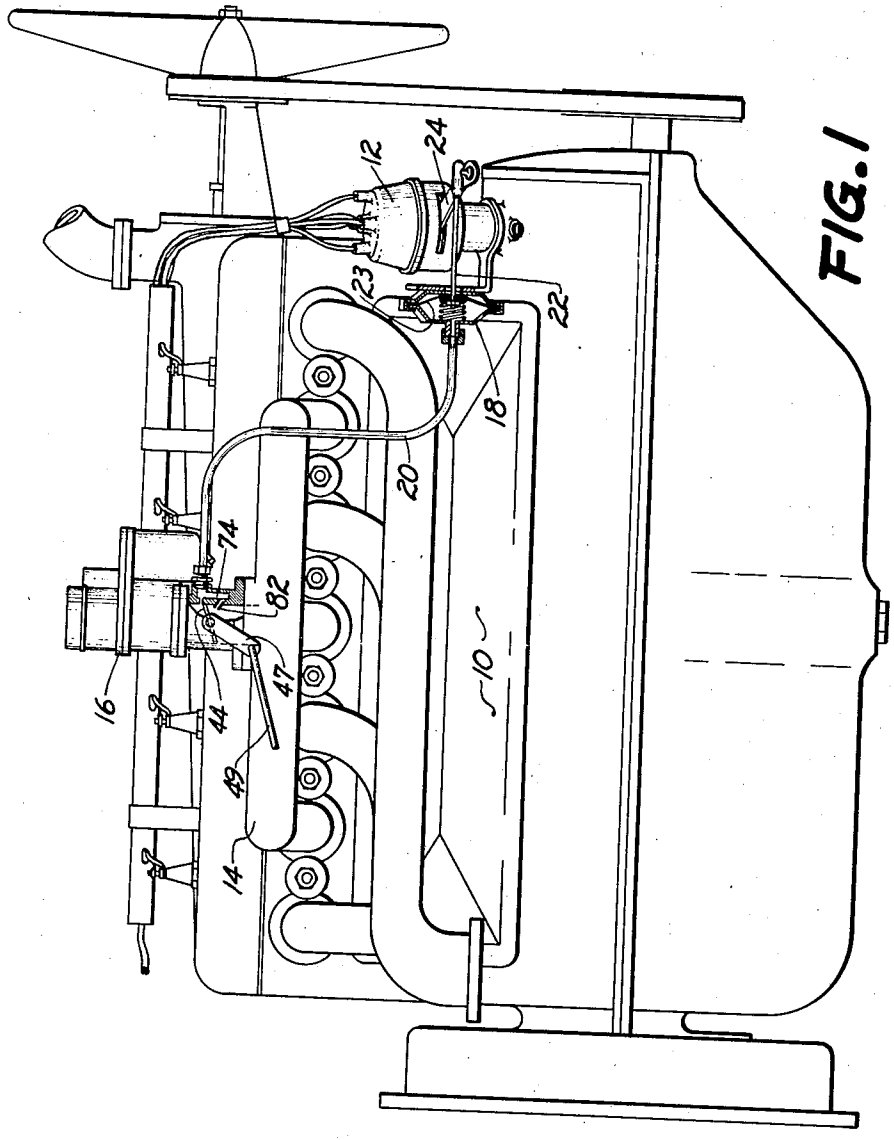


FIG. 1

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IGNITION CONTROLLER

Filed Feb. 6, 1941 2 Sheets-Sheet 2

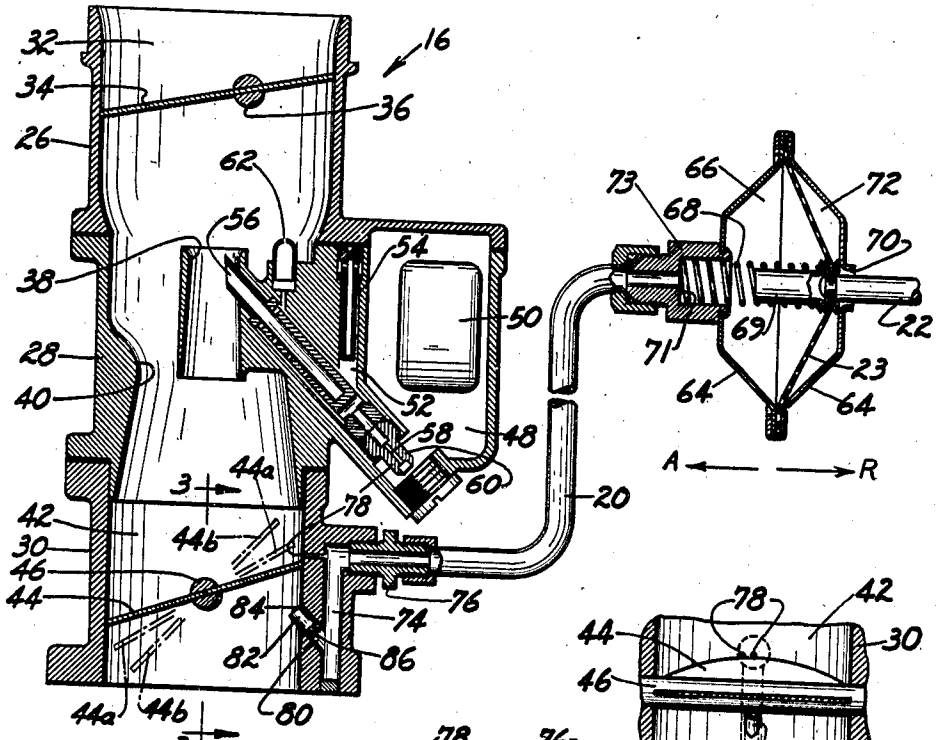


FIG. 2

FIG. 3

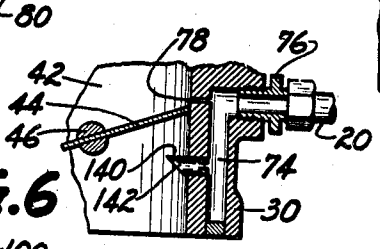


FIG. 6

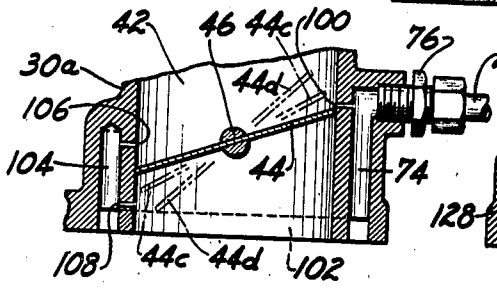


FIG. 4

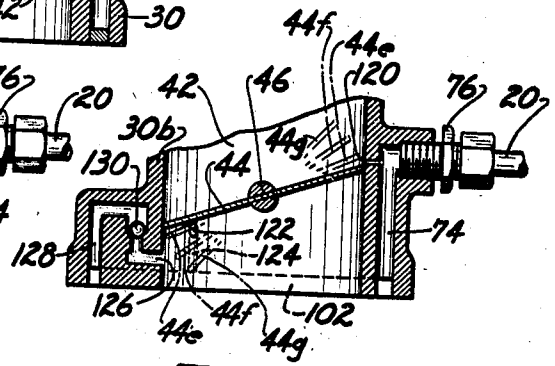


FIG. 5

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IGNITION CONTROLLER

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Application February 6, 1941, Serial No. 377,675

19 Claims. (Cl. 123—117)

This invention relates generally to ignition controllers and particularly to vacuum ignition regulating devices for modifying the action of centrifugal spark control apparatus.

The spark timing requirements of variable speed internal combustion engines vary greatly under various operating conditions and various means have been employed to obtain as nearly as possible the ideal spark timing which is just below that degree of advance which will cause detonation in the engine. Such ideal setting provides, among other things, rapid acceleration, maximum power and maximum fuel economy.

Substantially all widely variable speed internal combustion engines such as are used in passenger automobiles are provided with some type of well-known centrifugal spark control apparatus. In addition, various vacuum spark control mechanisms, which depend for their operation upon the vacuum in the intake manifold, have been used to modify the action of said centrifugal spark control apparatus in an effort to meet the various spark timing requirements of such engines. Such vacuum spark control mechanisms are spring loaded and generally require a vacuum of about three inches of mercury for their initial actuation. The mechanisms also have a manual stop which prevents additional vacuum advance when the vacuum equals approximately 14 inches of mercury, vacuums greater than the said 14 inches of mercury effecting no further advancing of the spark.

It is a common practice in such vacuum control devices to transmit no vacuum thereto when the engine is idling and to provide a relatively rapid vacuum advance when the throttle valve is opened from the idle or substantially closed position. For all open throttle positions, the degree of vacuum spark advance is regulated in direct accordance with the engine suction or manifold vacuum posterior to the throttle valve. Some variations of this practice are used but neither the control arrangement above described nor the variations thereof satisfactorily meet all the spark timing requirements of an engine.

For example, with vacuum spark control devices heretofore used to modify the action of the centrifugal control mechanism, a proper spark setting that will provide the best engine performance in the lower driving range provides too great an advance at higher speeds. Consequently, it has been the practice to advance the spark less than is desired at lower speeds to thereby obtain the proper spark adjustment at higher speeds. With such an arrangement the engine is less economical in its operation at lower speeds and does not develop its maximum power at said speeds.

In view of the foregoing it is an important object of the present invention to provide a vacuum spark modifying or control device that approximates as nearly as possible, and more closely than heretofore, the ideal spark timing of an internal combustion engine to effect maximum power and minimum fuel consumption at all engine speeds and operating conditions and wherein said device is controlled in accordance with the throttle valve position and the engine vacuum.

It is another object of the invention to provide a device of this character wherein limited vacuum is supplied to the device when the throttle valve is in the idling or substantially fully closed position, said vacuum being but slightly less than that required to initially actuate the vacuum control mechanism.

Another object of the invention is to provide a device of this character whereby a very rapid and substantially maximum advance of the vacuum device is effected as soon as the throttle valve is slightly opened from the idle position, the position of the control mechanism of the device being then adjusted according to manifold vacuum until the throttle valve has been opened a predetermined amount.

Still another object of the invention is to provide a device of this character whereby upon opening of the throttle valve beyond a predetermined position the vacuum control mechanism will be actuated to modify the spark timing relative to that which would otherwise result from the normal manifold vacuum posterior to the throttle valve.

It is a further object of the invention to provide a device of this character whereby upon opening of the throttle valve beyond a predetermined position the vacuum control mechanism will be rapidly retarded a greater amount than that which would otherwise result from the normal drop of manifold vacuum as the throttle valve is opened.

A further object of the invention is to provide a vacuum control device of this character wherein a partial retardation of the spark (greater than that resulting otherwise from the normal drop of manifold vacuum as the throttle valve is opened) is effected by bleeding air to said device as from a region of pressure greater than that prevailing posterior to the partly open throttle valve.

A still further object of the invention is to provide a device of this character wherein the bleeding of air to the device to effect such spark retardation at part open throttle is aided by impact pressure of air passing through the induction passage or manifold conduit.

It is still another object of the invention to provide a suction responsive valve for controlling one of the air passages to the device to permit the bleeding of air to the device only when it is desired to effect a vacuum retardation of the spark, at part open throttle, greater than that which would result from the normal drop in manifold vacuum posterior to the throttle valve.

Other objects and advantages of the invention will become apparent from the following description taken in connection with the accompanying drawings, in which:

Figure 1 shows in side elevation an engine of the internal combustion type to which the present invention is attached;

Figure 2 is a vertical sectional view of the carburetor and the distributor control unit of Figure 1;

Figure 3 is a partial vertical section of the carburetor throttle body taken on line 3—3 of Figure 2;

Figure 4 is a partial vertical sectional view of a carburetor throttle body showing a modification of the invention;

Figure 5 is a partial vertical sectional view of a carburetor showing another modification of the invention; and

Figure 6 is a partial vertical sectional view through a carburetor throttle body showing still another modification of the invention.

While several embodiments of the invention are shown in the accompanying drawings and herein described in detail, it is to be understood that this disclosure is given for the purpose of illustrating the invention and is not intended as a limitation thereof to the constructions disclosed, the appended claims being intended to cover all modifications and alternative constructions falling within the scope of the invention. Throughout the drawings similar reference characters represent similar parts although where such parts are modified in structure and operation they are given a further differing reference character.

Referring to Figures 1, 2 and 3, which illustrate one embodiment of the invention, reference numeral 10 indicates an internal combustion engine having an ignition distributor 12 and an intake conduit or manifold 14 to which a downdraft carburetor 16 is attached. A vacuum control unit or device 18 is subjected to variations in vacuum derived from the carburetor through conduit 20, as will be hereinafter described. A rod 22 connects a spark advance lever 24 of the distributor 12 to a flexible diaphragm 23 in the control unit 18.

The carburetor includes an air horn section 26, a body section 28 and a throttle body section 30 and the induction passage comprises an air inlet 32 controlled by the usual offset choke valve 34 on a shaft 36 and controlled by any suitable manual or automatic means, a primary venturi 38, a secondary venturi 40, and a throttle barrel or mixture passage 42. A throttle valve 44 on a shaft 46 controls the mixture outlet in the known manner and is actuated by the usual throttle controlling mechanism (not shown) through a lever 47 and rod 49.

A fuel chamber 48 in the main body section has a float 50 mounted by any well-known means (not shown) for controlling the level of fuel in the chamber. Idling fuel is supplied the usual idling jet (not shown) through passage 52 having the well-known idling tube 54. A main fuel nozzle 56 delivers fuel from the chamber 48 into the small venturi 38 in the well-known manner, said fuel being fed to the nozzle 56 through a metering orifice 58 in plug 60, and an air bleed 62 functions in the usual manner. However, the invention may be used in connection with other types of charge forming devices such as those having an upward or a horizontal delivery.

The vacuum control mechanism, which may be of any well-known type, includes a pair of casing members 64 having a flexible diaphragm 23 marginally clamped therebetween. A vacuum chamber 66 is thereby provided at one side of the diaphragm wherein a retard spring 68 is disposed in a manner to yieldingly urge the diaphragm in a direction to increase the size of the chamber 66 and move rod 22 connected with said diaphragm 23 outwardly as indicated by the arrow R in Fig. 2, such outward movement of rod 22 moving the arm 24 of the distributor to retard the spark. The rod 22 is freely received in an opening 70 in one of the casing members 64 said opening being of sufficient size to freely admit air at atmospheric pressure into a chamber 72 on the side of the flexible diaphragm opposite that adapted to be subjected to suction. The spring 68 is calibrated to yield to suctions on the diaphragm 23 above approximately three inches of mercury and a stop member 69 attached to said diaphragm limits the vacuum advance of the spark by abutment against end wall 71 of fitting 73, the device being so constructed that the stop member 69 will abut against wall 71 when a suction of approximately 14 inches of mercury or over is applied to said device. However, the vacuum control device may be otherwise constructed and adapted to initially operate when subjected to suction other than three inches of mercury and cease its advance movement at a suction other than 14 inches of mercury.

A conduit 29 leads from chamber 66 of the control mechanism and is connected with a longitudinally extending passage 74 in the carburetor throttle body section 30 by a threaded fitting 76. A pair of ports 78 connects the passage 74 with the induction passage anterior to the throttle valve 44 when the latter is in the closed or idle position, said ports being just anterior to the leading edge of the valve 44. A pair of ports are here shown to illustrate one method of obtaining the desired effective port area in a region closely adjacent the edge of the throttle valve. It is to be understood, however, that only one port or more than two ports may be provided or a narrow slot may be provided, if desired. In a bore 80, posterior to the throttle valve and communicating with passage 74, is an impact tube 82 extending angularly into the induction passage on the same side of said passage as ports 78, and the opening 84 in the extended end portion of tube 82 opens toward the air stream. The tube 82 which is preferably round in cross section, but may be of any cross sectional shape, is provided with a restricted orifice 86, the effective area of which is approximately one-half that of the combined effective area of the ports 78. It should be noted that the distributor is equipped with the usual centrifugal spark control mechanism (not

shown) which may be of any well-known type which adjusts the spark in accordance with engine speed.

The present vacuum control device modifies the spark adjustment of the centrifugal control mechanism in accordance with various pressures or combinations of pressures in the induction passage of the carburetor adjacent to the throttle valve, and the position of the throttle valve is one of the factors which controls such pressures. With the throttle valve in the idle or substantially closed position shown in solid lines in Figures 1, 2 and 3, the impact tube 82 opens posteriorly of the throttle valve into the region of full manifold vacuum of the idling engine. However, only a small portion of this suction is transmitted to chamber 66 through passage 74 and conduit 20 due to the air which is bled to passage 74 through ports 78 which open into the induction passage in the region of relatively low suction anterior to the throttle valve. The suction that is transmitted to the chamber 66 is below three inches of mercury and is therefore insufficient to effect advance movement of the diaphragm but subjects said diaphragm to an initial pressure. It is preferred that this vacuum pressure be but slightly below that which will initially operate the device although any other suitable pressure below this value may be provided.

Inasmuch as it is desirable to advance the spark suddenly and as rapidly as possible when the throttle valve is initially opened and to substantially the fullest extent possible by the vacuum control device, the holes or ports 78 are positioned just anterior to the leading edge of the inclined throttle valve so that upon initial opening movement of the valve as to the position shown by dotted lines 44*a* in Figure 2, the valve edge passes said ports which are immediately exposed to the high vacuum of the engine. Vacuum transmitted through said ports and the impact tube to the vacuum control mechanism thereby effects a very rapid and sudden spark advance, rod 22 being moved in the direction indicated by the arrow A in Fig. 2. By initially subjecting the vacuum device to limited suction at curb idle, it is obvious that when the throttle valve is initially opened past the ports 78 and full vacuum posterior to the throttle valve is applied to the diaphragm 23 the advance movement of said device will be much more rapid than where no vacuum has been applied to the diaphragm prior to the opening of the throttle valve.

A soon as the throttle valve is opened and the vacuum control mechanism has moved to the fully advanced position or such position as the vacuum pressure posterior to the throttle valve will effect, the timing of the spark is adjusted according to the speed of the engine and the manifold vacuum posterior to the throttle valve until said valve has been opened to a predetermined position, preferably about half throttle although any other desired position may be selected.

As the speed of the engine increases, it is desirable to retard the spark and this is effected to a certain extent with present vacuum control devices which retard the spark as the vacuum in the induction passage drops with the opening of the throttle valve. However, it has been found that generally with present-day engines such vacuum control devices do not retard the spark soon enough or fast enough for the higher engine speeds.

To effect a quick retardation of the vacuum spark control device by the present invention at the desired engine speed, the opening 84 of the impact tube 82 is exposed to the full impact force of said air stream at substantiallly half throttle (as shown in dotted lines 44*b* of Figure 2) or beyond. Up to approximately half throttle, or such other predetermined position as may be desired, the opening 84 has been substantially protected by the throttle valve from material impact of the air stream. The impact of the air stream after the opening 84 is fully subjected thereto is sufficient to forcibly bleed air into the passage 82 and reduce the suction on diaphragm 23 below that in the induction passage posterior to the throttle valve. Hence the spark is retarded a greater amount than that which would otherwise result from the normal drop of manifold vacuum as the throttle is opened beyond said predetermined position or any other position whereat it may be desired to thus effect retardation of the spark.

A somewhat similar vacuum spark control is obtained with the modification of the invention shown in Figures 4 and 5. In the embodiment shown in Figure 4, a single port 100 communicates with passage 74 from a position immediately adjacent the leading edge of the throttle valve and anterior thereto when closed. A duct 102 connects the passage 74 with a passage 104 in the opposite side of throttle body section 30*a* which extends longitudinally of said section. A port 106 positioned anterior to the trailing edge of the throttle valve communicates with the passage 104 and a second port 108, positioned posterior to the trailing edge of said valve, also communicates with passage 104.

When the throttle valve is in the curb or slow idle position port 108 is exposed to the low pressure of the region posterior to said valve and transmits suction to the vacuum control device through conduit 20. However, this suction is limited by air bled into passages 74 and 104 through ports 100 and 106, respectively, from the low suction region anterior to the throttle valve. Hence, only a limited amount of suction less than that which will effect initial operation of the device is transmitted to the vacuum device.

When the throttle valve is initially opened, as shown in dotted lines 44*c*, two ports, 100 and 108, are exposed to the low pressure or high suction region posterior to the throttle valve and only port 106 bleeds air to the vacuum transmitting conduits of the control device. The suction is therefore sufficient to quickly and fully advance the vacuum control mechanism. When the throttle valve has been opened to some predetermined position such as approximately half throttle, as shown in broken lines 44*d* of Figure 2, port 100 is exposed to high suction posterior to the throttle valve and two ports, 106 and 108, are exposed to relatively low suction anterior to said valve and bleed air to the vacuum device. Hence, the vacuum mechanism will be retarded a greater amount than that which would normally result from the drop of manifold vacuum posterior to the throttle valve.

In the embodiment of the invention disclosed in Figure 5, a further different arrangement of suction ports is provided. When the throttle valve 44 is in idle position, as shown in Figure 5, port 120 is anterior thereto and immediately adjacent the leading edge thereof. A port 122 is

positioned posterior to the throttle valve and spaced from the trailing edge thereof, said port communicating with duct 102 by means of a connecting passage 124. Spaced further from the trailing edge of the throttle valve and posterior thereto is a third port 126 which preferably has a somewhat greater effective area than port 122 although it may have substantially the same effective area which also communicates, through a passage 128, with the duct 102. However, ports 122 and 126 may be substantially the same distance from the throttle valve if desired, or they may be otherwise suitably arranged. A check valve 130 controls the passage 128 as will be hereinafter described.

When the throttle valve is in the idle position, port 122 is exposed to high suction and port 120 is exposed to relatively low suction and therefore bleeds air into passage 74. Hence, only a limited suction is transmitted to the vacuum control mechanism, which is insufficient to initially actuate the vacuum device. The suction through port 122 is, however, insufficient to open check valve 130. As the throttle valve is opened from the idle position, as shown by dotted lines 44e in Figure 5, port 120 is exposed to the high suction posterior to said valve and the full engine suction is transmitted to the vacuum mechanism 18 to effect full advance movement thereof. Further opening movement of the throttle valve to the position indicated at 44f will expose port 122 to the low suction region anterior to the throttle valve, port 120, however, being exposed to high suction. A partial retard of the spark further than that resulting from the normal drop of manifold vacuum posterior to the throttle valve will be effected due to the bleeding of air from a relatively high pressure region anterior to the throttle valve through port 122. The suction through passages 102 and 128 is still insufficient to open valve 130 against the high suction to which port 126 is exposed. A further opening of said valve to the position indicated at 44g will, however, expose port 126 to the relatively high pressure region in the induction passage so that air will be bled to duct 102 through ports 122 and 126, the suction to which port 126 is then exposed being so low that valve 130 will be opened by the suction to which port 120 is exposed. The air thus bled to the suction transmitting passages reduces the suction to the control device 18 thereby causing a further retarding of the spark from that corresponding to the normal drop of manifold vacuum posterior to the throttle valve.

Figure 6 shows a further adaptation of the invention which may be desirable for some engines and is adapted to modify the spark timing by providing, when the throttle valve has been opened to a predetermined position, a vacuum advance of the spark relative to the adjustment that would otherwise be effected by the normal vacuum posterior to the throttle valve. In this embodiment of the device, a tube 140 extends into the passage 42 posterior to the throttle valve and said tube communicates with the passage 74 with which ports 78 also communicate although only one port may be provided or if desired more than two may be used and arranged in any suitable manner relative to the leading edge of the throttle valve. The vacuum control device is supplied with limited vacuum when the throttle valve is at curb idle or substantially closed as in the other embodiments herein described. Upon slight initial opening of the throttle valve the full vacuum posterior to said valve is transmitted to the vacuum control device. Up to a predetermined throttle valve position, as half throttle or any other desired degree of opening, the tube 140 is substantially protected from the force of the air stream. Opening of the throttle valve beyond said predetermined position exposes tube 140 to substantially the full force of said air stream. As the opening 142 of tube 140 is in the general direction of the air stream movement, it does not receive the impact thereof being protected therefrom by the leading side of said tube. Hence, the velocity effect of the air stream provides additional suction to the vacuum control device and advances said device relative to the adjustment that would otherwise be effected by the normal suction posterior to the throttle valve.

While the throttle valve position at which the retarding of the spark further than that which would otherwise result from the normal drop of manifold vacuum posterior to the throttle valve has been shown and described as approximately half throttle, the invention may be so arranged that such spark retarding will occur at any other desired predetermined throttle position according to the requirements of the engine which requirements vary according to the characteristics of the engine to which the invention is attached.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the forms herein illustrated and described being merely for the purpose of disclosing several modifications of the invention.

I claim:

1. In ignition controlling apparatus for an internal combustion engine having an intake controlled by a throttle valve and a timer device, a timer setting device responsive to engine suction and requiring suction of a predetermined value to actuate said device, means for transmitting limited engine suction to the timer setting device just below that required to actuate same when the throttle valve is in idle position, means for suddenly and substantially increasing said suction to the timer setting device when the throttle valve is initially moved from the idle position and within a predetermined range of movement, and means for suddenly reducing the suction to the timer setting device to a value less than that of engine suction when the throttle valve is opened further than said predetermined range of movement.

2. In spark controlling apparatus for an internal combustion engine having an induction passage with a throttle valve therein, the combination with a timer device, of a timer controlling device actuated automatically by the suction of the engine, and means for transmitting limited suction to the timer setting device when the throttle valve is in idle position, said suction being insufficient to initially actuate said setting device, said means including passages the respective ports of which communicate with the intake conduit on opposite sides of the throttle valve when the latter is in said idle position, the anterior port being so positioned that upon slight opening of the throttle valve from idle position the edge of the valve will pass said port which will then be posterior to the valve and substan-

tially full posterior suction will be communicated to the timer setting device by means of both passages, the other port being in communication at all times with the induction passage posterior to said throttle valve.

3. In an ignition controller for an internal combustion engine having an intake conduit and a throttle valve in said conduit, a suction operated setting device, means connecting the setting device with the conduit anterior to the throttle valve, said means including a plurality of ports just anterior to the leading edge of said valve when in the idle position, and a duct connected with the setting device and communicating with the conduit posterior to said valve, the combined effective area of the ports having substantially twice the effective area of the duct.

4. In suction actuated control mechanism, a setting device responsive to suction, a fluid flow conduit having a valve therein, means for transmitting limited suction from said conduit to the setting device when the valve is substantially closed, means including a port adjacent the valve for suddenly and rapidly increasing the suction to the setting device when the valve is initially opened, and means for forcibly bleeding air to the setting device when said valve is opened beyond a predetermined position.

5. In a carburetor for an internal combustion engine having a timer control device actuated by engine suction, an induction passage, a throttle valve controlling said passage, a duct opening into the induction passage through the wall thereof anterior to the closed throttle valve, said duct being adapted to be exposed to the pressure in said passage posterior to the throttle valve when said valve is slightly opened, and an impact conduit posterior to the throttle valve having an opening adapted to be exposed to the impact of the air stream in the induction passage after the throttle valve has been opened to a predetermined position, said duct and impact conduit being adapted to be connected with the timer control device.

6. In firing control mechanism, the combination with an internal combustion engine having an intake conduit and throttle valve, of an ignition timer, a suction device for setting same, a duct therefrom communicating with the intake conduit anterior to and adjacent the leading edge of the throttle valve when the latter is closed, a second duct communicating with the intake conduit anterior to the trailing edge of the throttle valve, and a third duct communicating with the intake conduit posterior to the throttle valve and spaced from the trailing edge of said valve when closed, the first mentioned duct communicating with a low pressure region upon initial opening of the throttle valve and the third duct communicating with a high pressure region when the throttle valve is further opened to a predetermined position.

7. In a carburetor for internal combustion engines having a timer setting device actuated by suction, an induction passage, a throttle valve, and a plurality of interconnected ducts communicating the device with the induction passage at various points and so arranged that when the throttle valve is substantially closed twice as many ducts communicate with the high pressure region of the induction passage as communicate with a low pressure region thereof, when the throttle valve is opened within a predetermined range of movement twice as many ducts communicate with a low pressure region in the induction passage as communicate with the high pressure region thereof, and when the throttle valve is opened beyond said predetermined range twice as many ducts communicate with the high pressure region as communicate with the low pressure region, said ducts being adapted to be connected with the timer setting device.

8. In a carburetor for an internal combustion engine having a vacuum controlled setting device, an induction passage controlled by a throttle valve, and a plurality of control passages adapted to be connected to the setting device, said control passages opening into the induction passage adjacent to the throttle valve and being so arranged that one control passage is in communication with a region posterior to the throttle valve at all positions thereof, and the other control passages communicating with regions on opposite sides of the throttle valve in accordance with certain valve positions.

9. In an ignition controller, the combination with an internal combustion engine having an intake conduit with a throttle valve therein, of an ignition timer, a suction actuated device therefor, means for communicating suction to the device from a region of high suction when the throttle valve occupies a position less than a predetermined open position, and check valve controlled means for bleeding air to said setting device from a region of suction less than that of the first mentioned region when the throttle valve is opened beyond said predetermined position.

10. In a carburetor for an internal combustion engine having a suction operated setting device, an induction passage having a throttle valve, a plurality of air passages opening into the induction passage adjacent the throttle valve and adapted to be connected with the setting device, a valve controlling one of said passages, said valve being held in closed position by suction when the throttle valve is in a predetermined lower throttle range and being opened by suction when the throttle valve is in a predetermined upper throttle range.

11. In a device for controlling the time of ignition in a spark ignition internal combustion engine having an induction passage controlled by a throttle, a control element including a movable member responsive to variations of suction for regulating the time of ignition, and suction transmitting means connecting one side of the movable member with the induction passage anterior and closely adjacent the leading edge of the throttle valve when in the idling position and with the induction passage posterior to the throttle.

12. In an ignition controller, the combination with an internal combustion engine having an induction conduit and throttle valve dividing the induction conduit into high and low pressure regions, of a timer device, a timer adjusting device connected with the low pressure region of the induction conduit and responsive to engine suction, air transmitting means for bleeding air to the setting device from the high pressure region when the throttle valve is substantially closed, said means being brought into communication with the low pressure region upon opening of the throttle valve, and means effective at approximately half open throttle for increasing the pressure in the setting device relative to that in the low pressure region of the induction passage.

13. In a spark controller for an internal combustion engine having an intake conduit and a

throttle valve, an ignition timer device, a vacuum actuated setting device for adjusting the timer device and connected with the intake conduit, means for controlling the setting device according to engine suction posterior to the throttle valve over a lower throttle range, means for partially retarding the setting device relative to the adjustment that would otherwise be effected by said engine suction after the throttle valve is further opened a predetermined amount, and means for still further retarding the setting device relative to the adjustment that would otherwise be effected by said engine suction upon still further opening of the throttle valve.

14. In spark controlling apparatus for an internal combustion engine having an induction passage controlled by a throttle valve, a suction actuated timer setting device, and means connecting the setting device with the induction passage anterior and closely adjacent to the leading edge of the throttle valve when in the idling position and with the induction passage posterior to the throttle valve when in the idling position and throughout at least a substantial lower throttle range, said means including ducts through the wall of the induction passage spaced longitudinally of said passage.

15. In an ignition controller for an internal combustion engine having a throttle valve controlled induction passage, a movable wall member responsive to variations in suction on one side thereof for regulating the time of ignition, and suction transmitting means for transmitting suction from the induction passage to said one side of the movable wall, said suction transmitting means including connections with the induction passage on opposite sides of the throttle valve when the latter is in the idling position, the anterior connection being made through the wall of the induction passage adjacent the leading edge of the throttle valve when in said idling position, and the posterior connection being arranged to transmit suction of a different value than that posterior to the throttle valve when the latter is opened beyond a predetermined position.

16. The invention defined by claim 15 wherein said posterior connection includes an impact tube.

17. The invention defined by claim 15 wherein the posterior connection includes a tube extending into the induction passage with the free end thereof adjacent the posterior side of the throttle valve and at least partly protected from the full force of air flow in said induction passage when said throttle valve is within a predetermined lower range of movement.

18. In an ignition controller for an internal combustion engine having an intake controlled by a throttle valve, a timer setting device requiring suction of a predetermined value to initially actuate the same, means for subjecting the setting device to suction of a degree slightly below said predetermined value when the throttle valve is in the idling position, and means including a port adjacent the closed throttle valve for suddenly and appreciably increasing the vacuum to the setting device to effect advance of said device upon initial opening movement of the throttle valve from said idling position.

19. In ignition controlling apparatus for an internal combustion engine having an intake conduit and a throttle valve controlling the same, a timer setting device adjustable to advance the spark according to engine suction in said conduit throughout a predetermined lower throttle range, and means including a tube having an end extending into the induction passage adjacent the throttle valve for modifying the suction transmitted to the setting device relative to the normal engine suction in the conduit when the throttle valve is opened beyond said predetermined range.

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