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CARBURETING AND IGNITION SYSTEM

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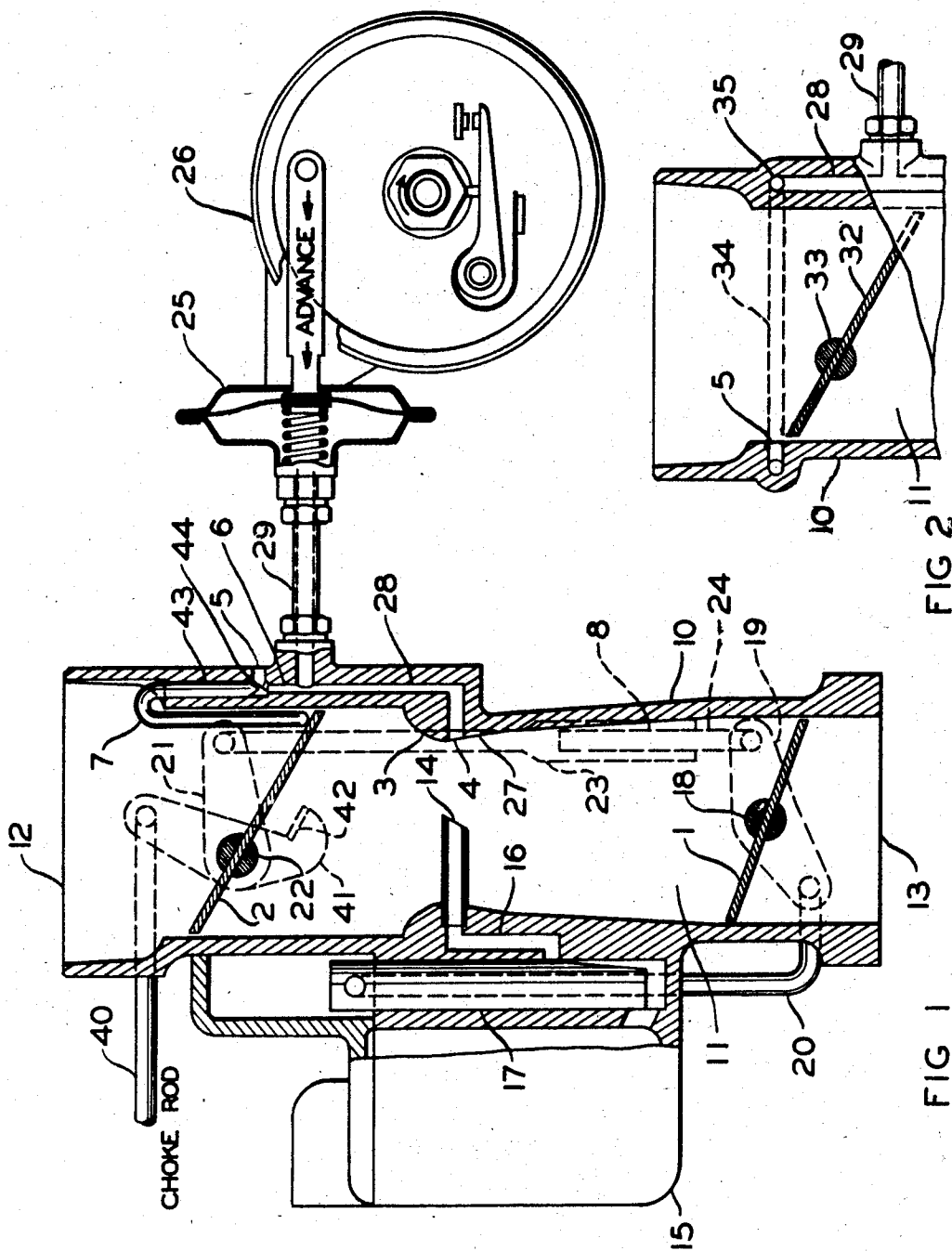


FIG 1

FIG 2

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CARBURETING AND IGNITION SYSTEM

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7 Claims. (Cl. 123—117)

This invention relates to a carbureting and ignition system and is an improvement over my carbureting and ignition system for internal combustion engines shown in my Patent No. 2,201,381, issued May 21, 1940.

In my prior patent I disclose an arrangement for bleeding the suction device to atmosphere when the engine is idling. The present improvement is concerned with retarding the spark when the engine is idling and also when the choke is closed for starting the engine. In my prior patent I did not disclose means for bleeding the suction device to atmosphere while choking the engine during starting to prevent spark advance.

In the drawing:

Fig. 1 is a view partly in section showing the combined carbureting and ignition system for an internal combustion engine.

Fig. 2 is a fragmentary sectional view of a portion of the carburetor showing a modified form of the invention.

The carburetor housing 10 is provided with an air and fuel passageway 11 therethrough. The intake opening of the carburetor is designated 12 and the outlet end of the intake manifold of the engine is designated 13. The passageway is controlled by a throttle valve 1 and an air valve 2. The fuel jet 14 is positioned in the passageway 11 between valves 1 and 2. The float bowl 15 communicates with the fuel jet 14 by means of passageway 16 controlled by the metering pin 17. Throttle valve 1 is supported on shaft 18 journaled in the housing 10.

A lever 19 is fixed on an end of the shaft 18 exteriorly of housing 10. One end of lever 19 is connected to metering pin 17 by link 20. The other end of lever 19 is connected by link 8 with lever 21 fixed on the end of shaft 22 outside the housing 10. Shaft 22 supports air valve 2, which is preferably but not necessarily an unbalanced valve, within housing 10. Air valve 2 also serves as a choke valve in this carburetor. To this end the link 8 that connects valves 1 and 2 together comprises two telescopic members 23 and 24 which provide a loose or lost motion connection between levers 19 and 21 so that the throttle valve 1 can be opened while the air valve 2 is held closed for choking the engine during starting. Air valve 2 is held closed for choking by choke rod 40 pivotally connected to lever 41 which is loosely and pivotally mounted on shaft 22. When the choke rod is pulled to the left, Fig. 1, heel 42 on lever 41 contacts lever 21 and holds valve 2 closed.

The suction device 25 and the timing mechanism, generally designated 26, is identical with that shown in my prior Patent No. 2,201,381. The suction device 25 is connected into and communicates with the venturi 27 of the carburetor by orifice 4, passageway 28 and tube 29. Passageway 28 also is in continuous communication with passageway 6 formed in a wall of the housing 10

exterior of the passageway 11. Passageway 6 communicates with atmosphere through outlet 5 and is controlled by a valve 7 of U shape. One leg 43 of valve 7 is slidably mounted in the upper end of passageway 6 and the other leg rests upon the air valve 2 when closed for idling. When valve 2 is closed for idling, valve 7 is raised thereby to open passageway 6 to atmosphere through orifice 5. The same action occurs when valve 2 is used as a choke valve. When air valve 2 is opened beyond idle position, valve 7 seats against passageway 6 as at 44 to close the same from atmosphere.

The operation of the device is as follows: Assuming the engine is idling, throttle valve 1 and air valve 2 will be practically closed or in idling position. The suction device 25, which communicates with the venturi 3 at orifice 4 at all times, will now be air bled through orifice 5 and passageway 6. Bleeding the suction device to atmosphere in this manner causes the suction device to move the timing mechanism clockwise into fully retarded position, as shown in Fig. 1. As throttle 1 is opened, air valve 2 will be opened by link 8 and by the unequal air pressures on the top and on the bottom of this unbalanced valve 2. As air valve 2 swings to open position, valve 7 moves to closed position thereby shutting off passageway 6 so that it does not communicate with atmosphere through orifice 5. The suction device, due to the suction at orifice 4, will now operate to rotate the timing device counterclockwise to advance the spark.

The modification shown in Fig. 2 relates only to the air bleeding of the suction device 25 to atmosphere. In this form the air valve 32, which corresponds to valve 2 in the principal form of the device, is connected to throttle valve 1 in the above described manner. Valve 32 is mounted in passageway 11 by means of shaft 33. The wall of the housing 10 is provided with an interior passageway 34 which communicates with passageway 28 as at 35 and with atmosphere through orifice 5 when the engine is being choked or idling.

It will be noted when air valve 32 is in idling or choking position, as shown in Fig. 2, that orifice 5 is on the atmosphere side of valve 32. At such time orifice 5 and passageway 34 will air bleed the suction device 25 to atmosphere thereby causing the timing mechanism to go into fully retarded position. As the throttle opens, air valve 32 will be opened by connecting link 8 and the unbalanced pressures on the unbalanced air valve 32. As unbalanced air valve 32 swings open, orifice 5 is placed in the mixing chamber suction of the carburetor between valves 32 and 1 thereby cutting off the air bleed to atmosphere of suction device 25 which causes suction device 25 to advance the spark.

I claim:

1. In an internal combustion engine the combination of an ignition timer, a fuel mixture intake passageway including a venturi, a combination air and choke valve and a throttle spaced apart in series in said passageway one on each side of the venturi arranged to open and close in unison, suction controlled means for varying the position of the timer, and a passageway connecting the suction means with the venturi whereby the said means is controlled to vary the position of the timer by the suction produced by the flow of air through the venturi at wide open throttle and by the suction of the mixing chamber for part open throttle, a second passageway connecting the first passageway with atmosphere when the air valve is in choking position and the throttle valve open whereby the timer is retarded.

2. In an internal combustion engine the combination of an ignition timer, a fuel mixture intake passageway including a venturi, a combination air and choke valve and a throttle valve spaced apart in series in said passageway one on each side of the venturi arranged to open and close in unison, a suction chamber for varying the position of the timer, and a passageway connecting the suction chamber with the venturi, and means responsive to a predetermined suction in said chamber to advance the timer whereby the said means is controlled to vary the position of the timer by the suction produced by the flow of air through the venturi at wide open throttle and by the suction of the mixing chamber for part open throttle, a second passageway connecting the first passageway with atmosphere when the air valve is in idling or choking position and the throttle valve open whereby the timer is retarded.

3. In an internal combustion engine the combination of an ignition timer, a carburetor having a fuel and air mixing chamber with a fuel inlet into said chamber, a combination air and choke valve and a throttle valve spaced apart in series on opposite sides of the fuel inlet, suction controlled means for varying the position of the timer, a passageway connecting the suction means with the mixing chamber between the said valves whereby the said suction means is controlled to vary the position of the timer by the suction produced by the flow of air through the mixing chamber at wide open throttle and by the suction of the mixing chamber for part open throttle, a second passageway one end of which communicates with atmosphere when the air valve is in choking or idling position and the other end of which communicates with the first mentioned passageway, and means for closing the second mentioned passageway to atmosphere when the air valve opens.

4. In an internal combustion engine the combination of an ignition timer, a carburetor having a fuel and air mixing chamber including a venturi with a fuel inlet into said venturi, a combination air and choke valve and a throttle valve spaced apart in series on opposite sides of the fuel inlet and arranged to open and close in unison, suction controlled means for varying the position of the timer, a passageway connecting the suction means with the venturi adjacent the fuel nozzle inlet whereby the said suction means is controlled to vary the position of the timer by the suction produced by the flow of air through the venturi at wide open throttle and by the suction of the mixing chamber for part open

throttle, a second passageway connecting the first passageway with atmosphere when the air valve is in idling or choking position whereby the timer is retarded.

5. In an internal combustion engine the combination of an ignition timer, a fuel mixture intake passageway including a venturi, a combination air and choke valve and a throttle valve spaced apart in series in said passageway one on each side of the venturi arranged to open and close in unison, suction controlled means for varying the position of the timer, and a passageway connecting the suction means with the venturi whereby the said means is controlled to vary the position of the timer by the suction produced by the flow of air through the venturi at wide open throttle and by the suction of the mixing chamber for part open throttle, a second passageway communicating at one end with the first passageway and at the other end with atmosphere when the air valve is in idling or choking position, and valve means for closing the said second passageway from atmosphere when the air valve is moved from idling toward open position.

6. In an internal combustion engine the combination of an ignition timer, a fuel mixture intake passageway including a venturi, a combination air and choke valve and a throttle valve spaced apart in series in said passageway one on each side of the venturi arranged to open and close in unison, suction controlled means for varying the position of the timer, and a passageway connecting the suction means with the venturi whereby the said means is controlled to vary the position of the timer by the suction produced by the flow of air through the venturi at wide open throttle and by the suction of the mixing chamber for part open throttle, a second passageway communicating at one end with the first mentioned passageway and at the other end with the throat of the carburetor on the atmosphere side and adjacent the air valve when the air valve is in idling or choking position whereby the spark is retarded during idling or choking of the engine and whereby as the air valve is moved toward open position the end of the said passageway is subjected to the mixing chamber pressure and the spark is advanced.

7. In an internal combustion engine the combination of an ignition timer, a carburetor having a fuel and air mixing chamber with a fuel inlet into said chamber, a combination air and choke valve and a throttle valve spaced apart in series on opposite sides of the fuel inlet, suction controlled means for varying the position of the timer, a passageway connecting the suction means with the mixing chamber between the said valves whereby the said suction means is controlled to vary the position of the timer by the suction produced by the flow of air through the mixing chamber at wide open throttle and by the suction of the mixing chamber for part open throttle, a second passageway one end of which communicates with atmosphere when the air valve is in choking or idling position and the other end of which communicates with the first mentioned passageway, and a valve controlled by the air valve for closing the second mentioned passageway to atmosphere when the air valve opens and for closing the second mentioned passageway to atmosphere when the air valve closes to idling or choking position.

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