

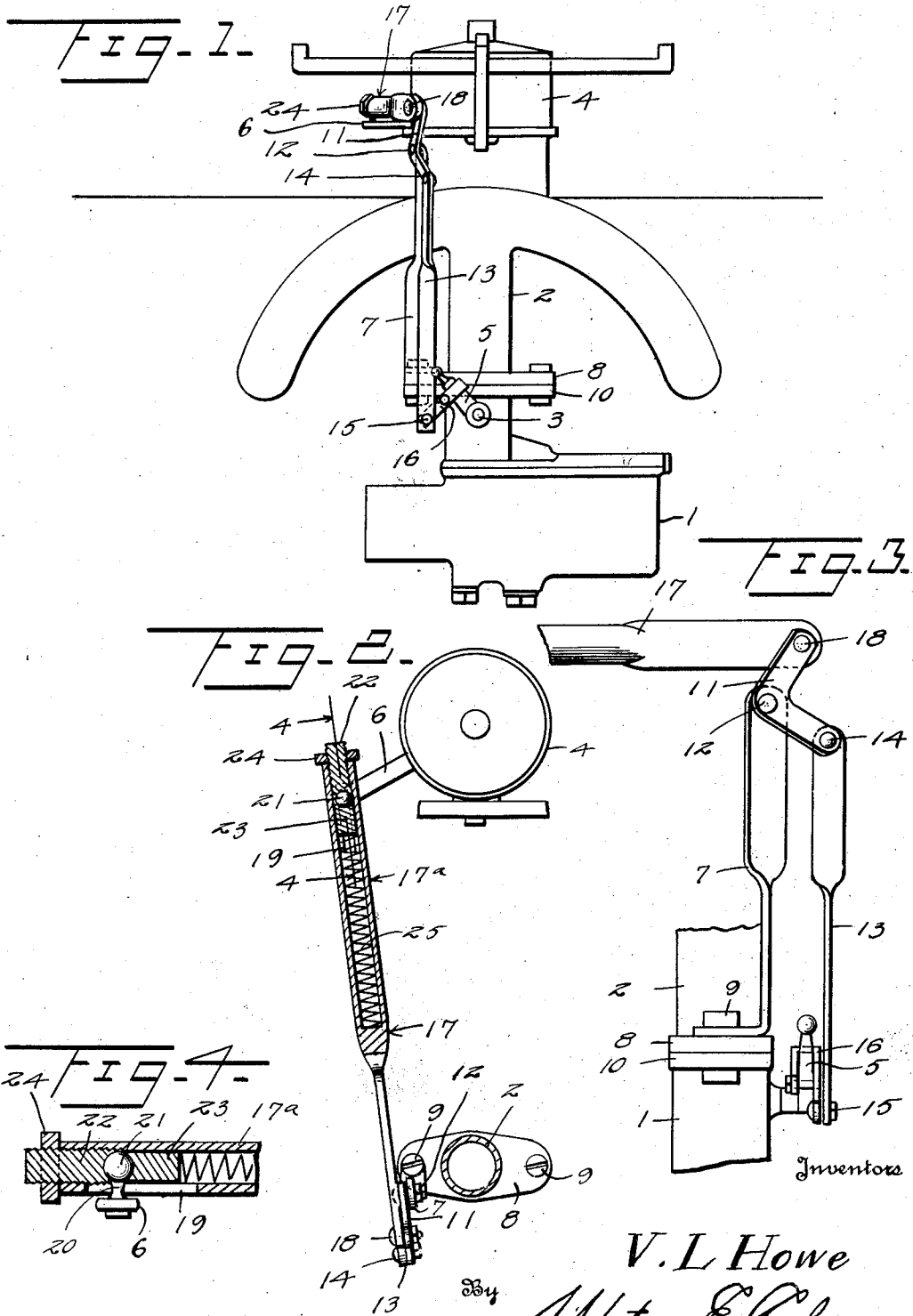
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AUTOMATIC SPARK CONTROL FOR INTERNAL COMBUSTION ENGINES

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UNITED STATES PATENT OFFICE

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AUTOMATIC SPARK CONTROL FOR INTERNAL COMBUSTION ENGINES

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This invention relates to internal combustion engines for automobiles, and more particularly to means for controlling the ignition distributor and consequently the spark of such engines.

The invention has for one of its objects to provide means of the character stated through the medium of which the ignition distributor of an internal combustion engine may be actuated by and as the result of the actuation of the accelerator pedal connected to the throttle valve of the engine, to the end that the spark may be automatically advanced when the accelerator pedal is depressed and automatically retarded when the accelerator pedal is released and thus permit the engine to be easily started and accelerated and insure the smooth operation of the engine under all speeds.

To attain the foregoing and other objects, the nature of which will appear as the description proceeds, the invention comprehends connecting the arm or lever of the ignition distributor to the arm or lever of the throttle valve.

The invention further comprehends the connecting of the ignition distributor arm or lever and the throttle valve arm or lever in a manner to permit the throttle valve to be actuated in the direction of its fully opened position after the ignition distributor has been actuated to fully advance the spark and thus enable the engine to be operated at its maximum speed which operation thereof takes place only after the spark has been fully advanced.

The invention consists in the construction, combination and arrangement of parts hereinafter described and claimed, and illustrated in the accompanying drawing, wherein:—

Figure 1 is a view in side elevation illustrating the application of the spark control means to the throttle valve and ignition distributor of an internal combustion engine.

Figure 2 is a view partly in horizontal section and partly in top plan of the spark control means, the ignition distributor and the intake manifold of the engine.

Figure 3 is a view in side elevation of a fragmentary portion of the spark control

means and fragmentary portions of the intake manifold and carburetor, and

Figure 4 is a sectional view taken on the plane indicated by the line 4—4 of Figure 2.

Referring in detail to the drawing, 1 designates the carburetor, 2 the intake manifold, 3 the throttle valve shaft, and 4 the ignition distributor of an internal combustion engine. 5 designates the throttle valve arm or lever, and 6 the ignition distributor arm or lever. In accordance with the present practice the throttle valve is under the control of a hand lever and an accelerator pedal connected to the arm or lever 5, and the ignition distributor 4 is under the control of a hand lever connected to the arm or lever 6. As the throttle valve, hand lever and the accelerator pedal, together with the means for connecting them to the arm or lever 5, may be of any well-known or appropriate construction, it is deemed unnecessary to illustrate the same. The ignition distributor hand lever is supplanted by my invention which comprehends connecting the arm or lever 6 to the arm or lever 5 to the end that the ignition distributor 4 may be automatically operated to advance the spark as the accelerator lever is depressed and to automatically retard the spark as the accelerator lever is released and moves upwardly.

The means by which the arms or levers 5 and 6 are connected comprises a bracket 7 which is secured to and extends upwardly from the coupling flange 8 of the intake manifold 2. The bracket 7 is secured to the coupling flange 8 by one of the bolts 9 by which the coupling flange 10 of the carburetor is secured to the coupling flange 8. An elbow lever 11 is pivotally connected at the juncture of its arms to the upper end of the bracket 7 by a bolt 12.

A link 13 is pivotally connected, as at 14, to one of the arms of the lever 11, and is pivotally connected, as at 15, to a clamp 16 engaged with the throttle valve arm or lever 5 at a point below the spherical bead of the latter. A rod 17 is pivotally connected, as at 18, to the other arm of the lever 11, and is connected to the arm or lever 6 of the ignition distributor 4. The rod 17 is of tubular for-

mation for the greater portion of its length, and the tubular portion 17a thereof is provided with a slot 19 for the slidable reception of a pin 20 carried by the lever or arm 6 and having a spherical head 21 located in the tubular rod portion. The head 21 is positioned between bearing members 22 and 23 carried by the tubular rod portion 17a. The bearing member 22 is screw threadedly engaged with the tubular rod portion 17a to permit it to be adjusted longitudinally with respect to such rod portion, and it is secured in adjusted position by a lock nut 24. The bearing member 23 is slidably mounted in the tubular rod portion 17a, and is constantly urged in the direction of the bearing member 22 by a compression spring 25 located within the tubular rod portion.

The bracket 7 is located rearwardly of the throttle valve arm or lever 5, the lever 11 is pivoted to the bracket at a point above the arm or lever 5, and the clamp 16 extends rearwardly from the arm or lever 5, to the end that when the throttle valve is moved in the direction of its fully opened position the lever 11 will be rocked in one direction, and to the end that when the throttle valve is moved in the direction of its fully closed position the lever 11 will be rocked in the opposite direction.

The rod 17 extends from the lever 11 to the arm or lever 6 of the ignition distributor 4, and imparts the movements of the lever 11 to the arm or lever 6, to the end that the ignition distributor will be actuated to advance the spark as the throttle valve is opened and retard the spark as the throttle valve is closed. The spring 25 establishes a yielding connection between the arm or lever 6 and the rod 17, and this connection permits the rod to move with respect to the arm or lever after the ignition distributor 4 has been actuated to fully advance the spark. The spark will be fully advanced before the throttle valve has been moved into its fully opened position and when the engine has attained the driving speed of approximately thirty miles per hour. The yielding connection between the rod 17 and the ignition distributor arm or lever 6 will permit the throttle valve to be moved further in the direction of its opened position when it is desired to increase the speed of the engine.

From the foregoing description, taken in connection with the accompanying drawing, it will be understood that, as the ignition distributor arm or lever 6 is connected to the throttle valve arm or lever 5, and as the throttle valve is actuated by a pedal lever connected to the arm or lever 5, the ignition distributor 4 is under the control of the pedal lever and will consequently be actuated automatically to advance or retard the spark, the ignition distributor being actuated to advance the spark when the accelerator

pedal is depressed, and being actuated to retard the spark when the accelerator pedal is released. When the engine is at rest or when it is idling, the throttle valve occupies its fully closed position, and the ignition distributor 4 will be, due to its connection with the throttle valve, in full spark retarding position, with the result that the engine may be easily started or accelerated.

During the acceleration of the engine up to a predetermined speed, the ignition distributor 4 will be, due to its connection with the throttle valve, actuated to advance the spark, and the advancing of the spark will be in direct proportion to the increase in speed of the engine, with the result that the engine will perform efficiently under quick or slow acceleration. The automatic control of the ignition distributor 4 provided by my invention obviates the manual control of the distributor and the disadvantages incident thereto. The ignition distributor 4 may be adjusted to direct the tensioning of the spark through the medium of the bearing member 22.

While I have described the principle of the invention, together with the structure which I now consider the preferred embodiment thereof, it is to be understood that the structure shown is merely illustrative and that such changes may be made, when desired, as fall within the scope of the invention as claimed.

What is claimed is:—

1. In combination, the throttle valve and ignition distributor of an internal combustion engine, and means connecting the distributor to the valve so that the distributor will be moved into spark retarding condition as the valve is closed and into spark advancing condition as the valve is opened, said means being yieldable when the distributor is in position to fully advance the spark when the valve is partly open so that the valve may be fully opened.

2. Means for connecting the arms of a throttle valve and ignition distributor, comprising a pivoted lever, a link connected to the lever and adapted to be connected to one of said arms, a rod connected to the lever, and means yieldingly connecting the rod to the other of said arms.

3. Means for connecting the arms of the throttle valve and ignition distributor of an internal combustion engine, comprising a bracket adapted to be secured to a part of the engine, an elbow lever pivoted to the bracket, a clamp adapted to be secured to the throttle valve arm, a link connected to the lever and clamp, a rod connected to the lever, and means carried by the rod and adapted to yieldingly connect it to the distributor arm.

4. Means for connecting the arms of the throttle valve and ignition distributor of an internal combustion engine, comprising a

bracket adapted to be secured to a part of
the engine, an elbow lever pivoted to the
bracket, a clamp adapted to be secured to
the throttle valve arm, a link connected to
5 the lever and clamp, a rod connected to the
lever, said rod having a tubular portion,
bearing members carried by said rod portion
and adapted for connection with the igni-
tion distributor arm, one of said bearing
10 members being adjustably engaged with and
the other slidably mounted in said arm por-
tion, and a spring mounted in said arm por-
tion and bearing against the slidable bear-
ing member to constantly urge it in the di-
15 rection of the other bearing member.

In testimony whereof I hereunto affix my
signature.

VICTOR L. HOWE.

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