Jan. 15, 1957 W. BERCHIN ET AL 2,778,007

MULTI-CARBURETOR SYNCHRONIZER

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FIG. 1.

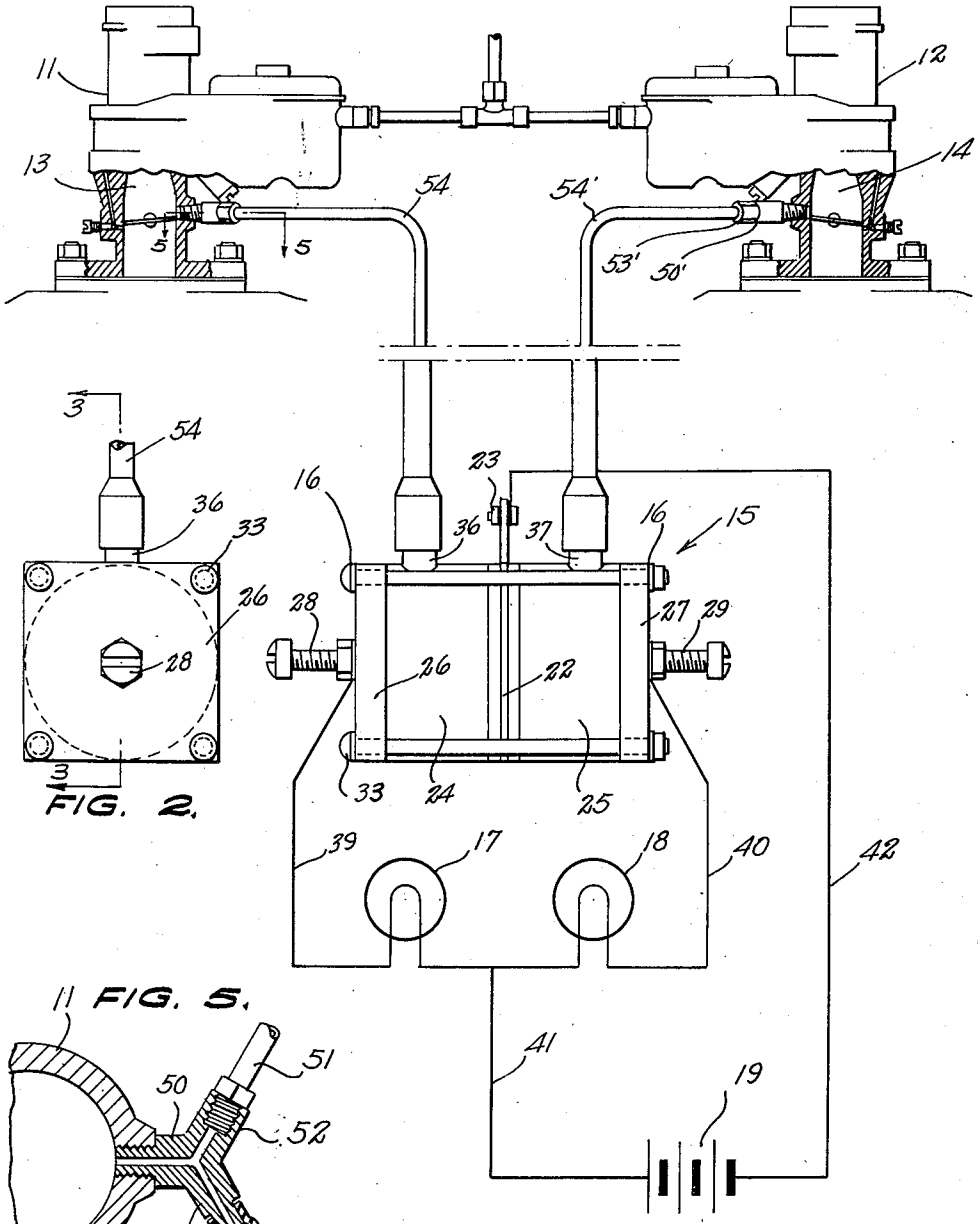


FIG. 2.

11 FIG. 5.

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FIG. 3.

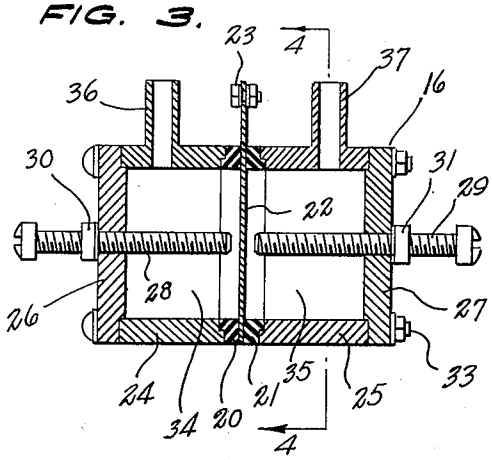


FIG. 4.

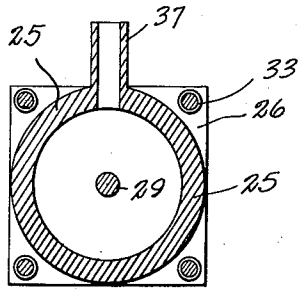


FIG. 6.

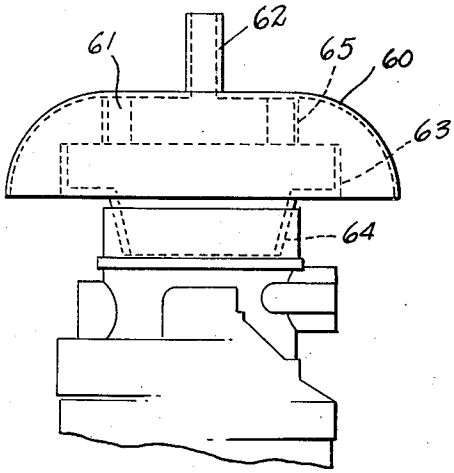
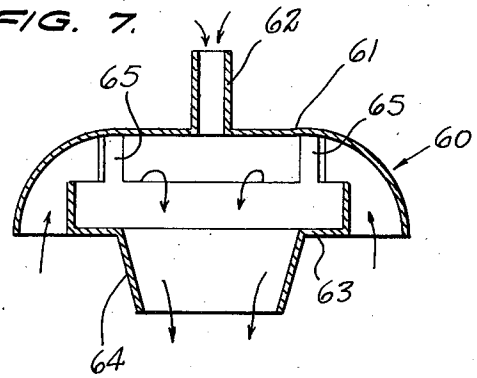


FIG. 7.



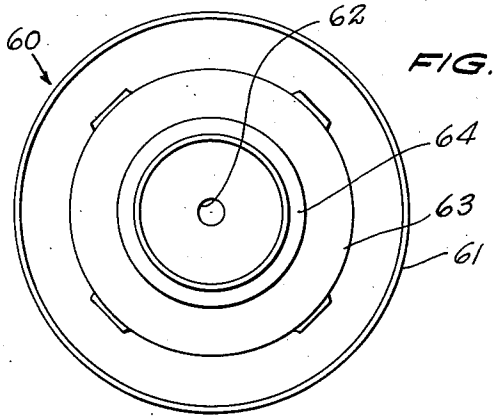


FIG. 8.

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MULTI-CARBURETOR SYNCHRONIZER

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Application December 9, 1955, Serial No. 552,197

3 Claims. (Cl. 340—236)

This invention relates to carburetor adjusting devices, and more particularly to a device for synchronizing the air flow on internal combustion engine multi-carburation installations.

The main object of the invention is to provide a novel and improved air flow synchronizing device for use in adjusting the air flow in two carburetors employed in an internal combustion engine so that the air flow through the carburetors may be synchronized, the device being simple in construction, being easy to attach to the carburetors to be adjusted, and providing an accurate indication of the relative pressure conditions in the air flow passages of the carburetors.

A further object of the invention is to provide an improved means for indicating pressure differentials existing in the air flow chambers of the dual carburetors of an internal combustion engine, the improved device having high sensitivity, being durable in construction, being relatively compact in size, being inexpensive to manufacture, and being substantially free from vibration, whereby the accuracy of the device will remain high under various conditions of adjustment thereof.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a schematic diagram showing the manner in which an improved carburetor synchronizing device of the present invention is connected to the dual carburetors of an internal combustion engine to be synchronized.

Figure 2 is an end elevational view of the signal switch chamber of the carburetor synchronizing device shown in Figure 1.

Figure 3 is a longitudinal vertical cross sectional view taken through the signal switch chamber on the line 3—3 of Figure 2.

Figure 4 is a transverse vertical cross sectional view taken through the signal switch chamber on the line 4—4 of Figure 3.

Figure 5 is an enlarged cross sectional detail view taken on the line 5—5 of Figure 1.

Figure 6 is a fragmentary elevational view of the upper portion of a carburetor on which is mounted a cap device for determining the air pressure in the flow passage through the carburetor, in accordance with the present invention.

Figure 7 is a vertical cross sectional view taken through the test cap device of Figure 6.

Figure 8 is a bottom view of the test cap device of Figures 6 and 7.

Referring to the drawings, 11 and 12 respectively designate the dual carburetors of a conventional internal combustion engine of the multi-carburetor type, said carburetors having the usual passages 13 and 14 therethrough through which the respective fuel mixtures provided in the carburetors flow. In adjusting the carburetors it is usually desirable to synchronize the flow of the mixtures

through the passages 13 and 14, so that substantially equal pressures exist in said passages.

In accordance with the present invention, a pressure differential-responsive switch device designated generally at 15 is provided, said switch device comprising a signal switch chamber 16, a pair of indicator lamps 17 and 18 and a battery 19. The signal switch chamber 16 comprises a housing of suitable shape, for example, of rectangular shape, said housing being formed of conductive material and being insulated at its intermediate portion by a peripheral bushing structure comprising the bushing frame elements 20 and 21 between which is clamped a diaphragm 22 of conductive material, said diaphragm being relatively flexible and having an externally projecting portion provided with a terminal 23. The chamber 16 comprises the respective cylindrical housing segments 24 and 25 having the respective square end walls 26 and 27, said end walls being provided with the respective terminal screws 28 and 29 extending centrally therethrough and being in threaded engagement therewith, as shown in Figure 3, the screws being locked in adjusted positions by suitable lock nuts 30 and 31, as shown, said lock nuts engaging against the external surfaces of the respective end walls 26 and 27. The chamber is secured in assembled condition by a plurality of fastening bolts 33 extending longitudinally through the corner portions thereof, said bolts being suitably insulated from the respective chamber elements, as by suitable bushings, so that the adjustable electrode bolts 28 and 29 are electrically insulated from each other, as well as from the diaphragm 22, under normal conditions.

The structure above described thus defines respective compartments 34 and 35 in the signal switch chamber 16 on opposite sides of the flexible diaphragm 22. The chamber segment 24 is formed with a conduit element 36, and the chamber segment 25 is formed with a similar conduit element 37. The conduits 36 and 37 are connected to the respective carburetor air passages, for synchronizing the flow through said passages, in a manner presently to be described.

One terminal of the signal lamp 17 is connected by a wire 39 to the terminal screw 28, and one terminal of the signal lamp 18 is connected by a wire 40 to the terminal screw 29. The remaining terminals of the signal lamps 17 and 18 are connected to a common wire 41, which is in turn, connected to one pole of the battery 19. The remaining pole of the battery is connected by a wire 42 to the diaphragm terminal 23.

As will be readily apparent, when there is an unbalance of pressures in the compartments 34 and 35, the diaphragm 22 will flex, the flexure thereof being toward the chamber having the smaller pressure, whereby said diaphragm will engage the end of the electrode screw 28 or 29 in the chamber having the smaller pressure, thus energizing the corresponding signal lamp 17 or 18. The sensitivity of the device can be increased by diminishing the normal spacing between the ends of the electrode screws 28, 29 and the diaphragm 22.

In the arrangement shown in Figure 1, a Y fitting 50 is employed in place of the usual conduit fitting connected to the automatic spark adjusting conduit 51 of the internal combustion engine, the conduit 51 being connected to one branch 52 of the wire fitting 50. Connected to the other branch 53 of the Y fitting 50 is a conduit 54 whose opposite end is connected with the conduit element 36 of the signal switch chamber 16. As shown, the Y fitting 50 is employed with the carburetor 11. A similar Y fitting 50' is employed with the carburetor 12, in the same manner as above described, and a conduit 54' connects the branch 53' of Y fitting 50' to the conduit element 37 of the signal switch chamber

16. Thus, the respective compartments 34 and 35 of the signal switch chamber 16 will be under the same respective pressures as the carburetor passages 13 and 14, and the differential in these pressures will cause the diaphragm 22 to flex, as above described, to provide a corresponding signal indication. Thus, if the pressure in the chamber compartment 35 is less than the pressure in the chamber compartment 34, the diaphragm 22 will flex to engage the electrode screw 29, causing the signal lamp 18 to be energized. This notifies the operator that the pressure in the passage 14 is less than the pressure in the carburetor passage 13, whereby suitable adjustments may be made to the carburetors to equalize the pressures in their flow passages. Similarly, if the pressure in the compartment 34 is less than the pressure in the compartment 35, diaphragm 22 will engage the electrode screw 28, causing the lamp 17 to be energized, notifying the operator of the unbalance of pressures in the carburetor passages 13 and 14.

Where the carburetors are not provided with conduit fittings for automatic spark control, or the like, air flow test caps, as illustrated in Figures 6 to 8, may be employed, one of said caps being illustrated at 60 and comprising a circular dome-like top wall 61 formed centrally with the upstanding conduit portion 62. Designated at 63 is an annular inner shell member provided with a downwardly tapering depending spout portion 64 engageable in the top of a carburetor, as shown in Figure 6. The rim of the annular shell member 63 is formed with spaced upstanding lug elements 65 rigidly connected to the underside of the dome-like top wall 61, whereby said top wall 61 is rigidly secured to the annular shell member 63 in spaced relation therewith so that air may flow upwardly and inwardly into the dome member and thence downwardly through the shell member 63 into the top of the carburetor.

A cap member 60 is mounted on each carburetor, as above described, and as illustrated in Figure 6, and the respective conduits 54 and 54' are connected to the respective upstanding conduit elements 62 of the cap member 60, whereby the respective compartments 34 and 35 of the signal switch chamber 16 are exposed to the respective air pressures existing at the intake portions of the carburetors being synchronized. As described in connection with the arrangement of Figure 1, an unbalance in air pressures will indicate lack of synchronization of the carburetors, such unbalance being shown by the illumination of one or the other of the signal lamps 17 and 18. This enables the operator to make the required adjustments to equalize the air flow through the carburetors.

While certain specific embodiments of an improved multicarburetor synchronizing device for internal combustion engines have been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In combination with an internal combustion engine having dual carburetors, a signal switch chamber, a flexible diaphragm having a conductive portion mounted in the intermediate portion of said chamber, defining respective compartments on opposite sides thereof, respective conduit means connecting the respective compartments to the respective dual carburetors, and respective electrodes in said compartments respectively engageable by said conductive portion of said diaphragm responsive to an unbalance of pressure in said compartments.

2. In combination with an internal combustion engine having dual carburetors, a signal switch chamber, a flexible diaphragm having a conductive portion mounted in the intermediate portion of said chamber, defining respective compartments on opposite sides thereof, respective conduit means connecting the respective compartments to the respective dual carburetors, respective electrodes in said compartments respectively engageable by said conductive portion of said diaphragm responsive to an unbalance of pressure in said compartments, a first terminal on said switch chamber electrically connected to said conductive portion, and respective signal terminals electrically connected to said electrodes.

3. In combination with an internal combustion engine having dual carburetors, a signal switch chamber, a flexible diaphragm having a conductive portion mounted in the intermediate portion of said chamber defining respective compartments on opposite sides thereof, respective conduit means connecting to connect the respective compartments to the respective dual carburetors, respective electrodes in said compartments respectively engageable by said conductive portion of said diaphragm responsive to an unbalance of pressure in said compartments, a first terminal on said switch chamber electrically connected to said conductive portion, respective signal terminals electrically connected to said electrodes, a battery, means electrically connecting one pole of said battery to said first terminal, and respective signal devices connected between the remaining pole of said battery and said signal terminals.

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