CARBURETOR SECONDARY THROTTLE SHAFT CONSTRUCTION


Filed: Jan. 4, 1974

Appl. No.: 430,823

U.S. Cl. 261/23
Int. Cl. F02M 11/02
Field of Search 261/23 A; 137/601

References Cited
UNITED STATES PATENTS
1,096,482 5/1914 Winton
2,317,625 4/1943 Mallory
2,954,022 9/1960 Mick
3,013,778 10/1974 Carlson et al.
3,205,879 9/1965 Von Seggern et al.
3,528,008 6/1967 Gordon
3,523,680 8/1970 Bartholomew

Primary Examiner—Tim R. Miles
Attorney, Agent, or Firm—Robert E. McCollum; Keith L. Zerschling

ABSTRACT

A four-barrel (4V) carburetor has a primary throttle plate shaft mounting two primary bore throttle plates, and two secondary throttle plate shafts each mounting a secondary throttle plate, the two secondary shafts having a limited interconnection in one embodiment, and being completely independently mounted in a second embodiment, to assure secondary throttle plate seating repeatability minimizing leakage of air past the plates.

8 Claims, 4 Drawing Figures
CARBURETOR SECONDARY THROTTLE SHAFT CONSTRUCTION

This invention relates in general to a motor vehicle type carburetor. More particularly, it relates to a carburetor of the four barrel type having primary and secondary induction passages each with a pair of throttle plates.

All known 4V commercial carburetors contain primary and secondary throttle shafts each of which mount a pair of throttle plates. The two shafts usually each are one piece constructions, with the two throttle plates bolted or screwed to the shaft. In the case of the secondary throttle plates, the bores controlled by the throttle plates may be as large as two inches or larger in diameter, which means the throttle plate seats are approximately the same size. Since it is virtually impossible to manufacture both seats perfectly, it often occurs that the two seats are not identical. That is, the attitude of one may be very slightly off with respect to the other because of manufacturing tolerance stackups. Therefore, when one plate seats in the throttle bore to a closed throttle position, the other plate may be cracked open slightly.

Another problem with a metal shaft is flexing or torquing of the shaft. When the throttle plates are bolted to the shaft; they may not always be torqued down with the same force. This may flex or torque the shaft causing one plate to be at a slightly different angle than the other. Also, during operation, high manifold vacuum acting on the throttle plates tends to bow the shaft. The bowing may be cumulative to be more at one bore than another. This again may cause misalignment of the throttle plates with respect to each other. Accordingly, one of the plates may not seat properly when the throttle plates are returned to their closed positions. This leakage of air past the unseated plate causes changes in the idle speed and off idle speed mixtures and therefore deteriorates control of undesirable emissions.

It is an object of this invention to provide a carburetor secondary throttle shaft construction that provides good repeatability of seating function of a pair of secondary throttle plates and in so doing reduces leakage past the plates to improve operating efficiency.

It is another object of the invention to provide a 4V carburetor construction with a secondary throttle plate shaft that consists of a pair of shafts interconnected to provide a limited relative rotation between the two so that each of the secondary throttle plates will seat independently of the other to reduce leakage past the plates to a minimum.

It is a further object of the invention to provide a 4V carburetor with a pair of independently mounted secondary throttle plate shafts each mounting a secondary throttle plate for independent movement with respect to the other, to assure closure repeatability minimizing leakage of air past the throttle plates.

Other objects, features and advantages of the invention will become more apparent upon reference to the succeeding detailed description thereof, and to the drawings illustrating preferred embodiments thereof, wherein:

FIG. 1 is a plan view of a 4V carburetor throttle body;
Wound around the primary throttle shaft at its rightward end is a coiled spring 42 having opposite ends abutting opposite edges of a tang 48 projecting from a lever 50. Lever 50 is rotatably mounted on the primary throttle shaft and is connected by a link 52 to a lever 54. Lever 54 in turn is fixed on the rightward end of the secondary throttle shaft 38. Lever 54 is biased in a clockwise direction or closed by a further coiled spring 58 anchored at one end under a stationary portion 60 of the carburetor and its other end 62 engaging lever 54. This is repeated on the left side.

It will be clear that rotation of the primary throttle shaft from a closed position will not rotate the secondary throttle shafts until the tang portion 64 of lever 22 engages the extended end 46 of spring 42. At this time, continued opening of the primary throttle shafts will cause movement of lever 50 by the spring end 44 bearing against the tank 48 to thereby through linkage 52 and 54 open the secondary throttle shafts.

FIG. 4 shows a modified construction in which each of the secondary throttle shafts 38', 36' are completely independently mounted with no connection between the two. In this case, each shaft would have a suitable linkage 52' to the primary throttle shaft for concurrent actuation of the secondary shafts after a predetermined opening of the primary shafts, in a manner previously described.

From the foregoing, therefore, it will be seen that the invention provides a secondary throttle shaft construction for a 4V carburetor that provides good closing repeatability of the throttle plates to minimize secondary throttle plate leakage, to improve emissions and engine efficiency. The FIG. 2 embodiment permits a slight or limited independent rotation of each throttle plate shaft relative to the other, for seating purposes. However, a continued rotation of shaft 38 by the primary shaft accelerator linkage will interengage the tongue and groove parts of connection 40 to rotate shaft 36 with shaft 38 as a unit to assure essentially simultaneous opening of the secondary throttle plates. The FIG. 4 construction provides independent but concurrent rotation of each of the secondary shafts by the separate linkages.

While the invention has been shown and described in its preferred embodiments, it will be clear to those skilled in the arts to which it pertains, that many changes and modifications may be made thereto without departing from the scope of the invention.

We claim:

1. A carburetor having a pair of primary and a pair of secondary induction passages, a pair of primary and a pair of secondary throttle valves mounted for rotation in the respective passages, linkage means interconnecting the secondary throttle valves to the primary throttle valves for subsequent opening of the secondary throttle valves by the primary valves, and means mounting the secondary throttle valves on axially aligned shaft portions for an independent movement relative to each other to minimize leakage past the secondary throttle valves when closed.

2. A carburetor as in claim 1, including a single primary throttle valve shaft, means fixing the pair of primary throttle valves to the shaft, and means connecting the linkage to the shaft.

3. A carburetor as in claim 1, including a secondary throttle valve shaft to which are fixed the secondary throttle valves, the shaft having a pair of axially aligned portions each mounting a secondary throttle valve, and means providing a limited lost motion connection between the portions.

4. A carburetor as in claim 1, including a single primary throttle valve shaft, means fixing the primary throttle valves on the primary shaft, a pair of axially aligned secondary throttle valve shafts, means fixedly mounting a secondary throttle valve on each of the secondary shafts, the linkage means including means connecting each secondary shaft to the primary shaft.

5. A carburetor as in claim 2, including a secondary throttle valve shaft, means fixing the secondary throttle valves to the secondary shaft, the secondary shaft having a loose tongue and groove connection located between the secondary throttle valves to permit the independent movement.

6. A carburetor having a pair of primary induction passages, a primary throttle valve shaft rotatably mounted in the primary induction passage, a pair of primary throttle valves secured to the shaft for conjoint movement to open or close the passage, a pair of secondary induction passages, a pair of secondary throttle valves each mounted for rotation in the secondary passages to open and close the same, a secondary throttle valve shaft rotatably mounted in each secondary induction passage and fixed to one of the secondary throttle valves, the secondary throttle shafts being axially aligned, a linkage means interconnecting the primary shaft to the secondary shafts for movement in a sequential manner to open the secondary throttle valve subsequent to the primary valves, and means mounting the secondary shafts for an independent movement of the secondary throttle valves relative to each other for minimizing leakage of airflow past the valves when the secondary valves are maintained in a closed position during opening movement of the primary valves.

7. A carburetor as in claim 6, including means providing a limited interconnection between the secondary throttle valve shafts for a limited independent movement of one secondary throttle valve relative to the other secondary throttle valve shaft to provide good simultaneous seating of both secondary throttle valves.

8. A carburetor as in claim 6, the means mounting the secondary throttle valve shafts mounting each of the secondary shafts for separate independent rotation, the linkage means including a separate linkage between the primary shaft and each of the secondary shafts.