April 23, 1935. L. J. SCHEID 1,998,886

THROTTLE VALVE FOR INTERNAL COMBUSTION ENGINES

Filed Oct. 27, 1933 2 Sheets-Sheet 1

Fig. 1.

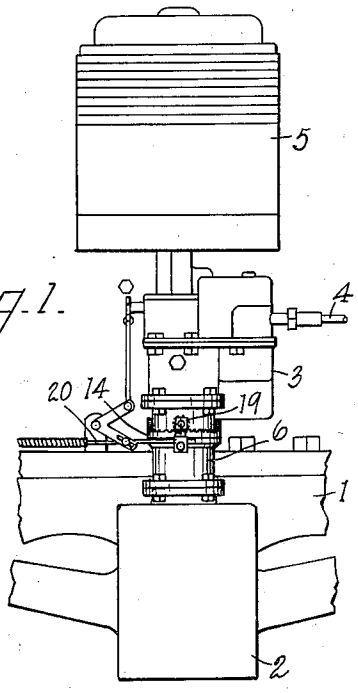


Fig. 2.

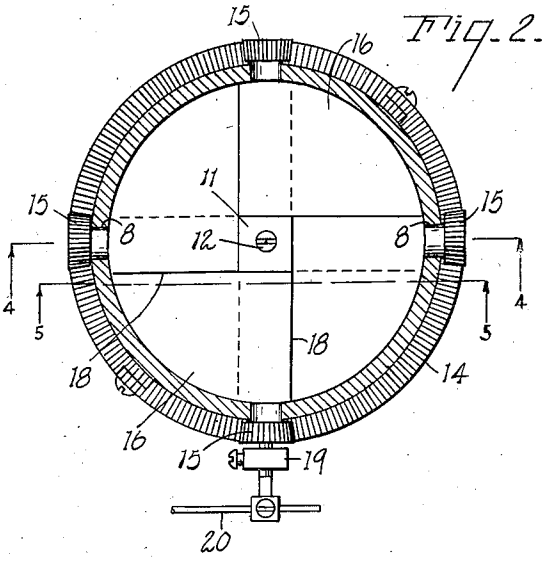
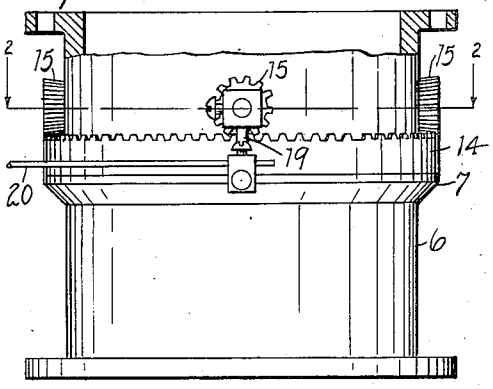


Fig. 3.



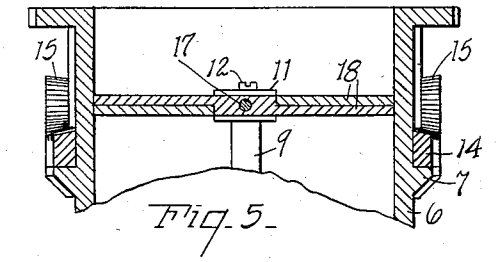


Fig. 5.

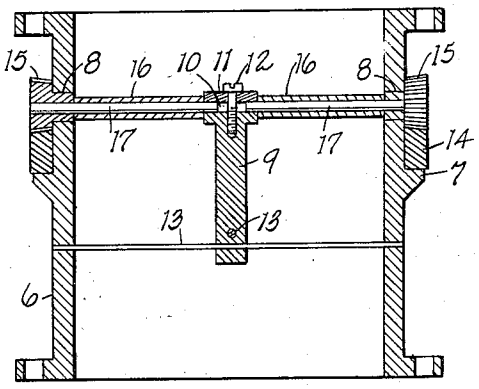


Fig. 4.

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THROTTLE VALVE FOR INTERNAL COMBUSTION ENGINES

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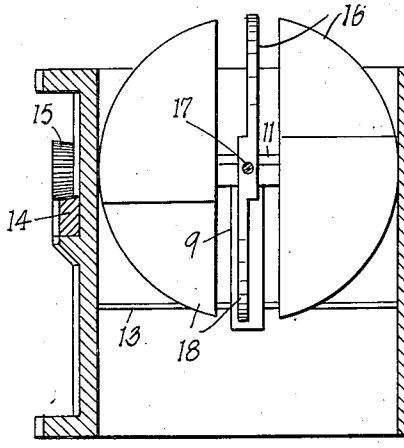


Fig. 6.

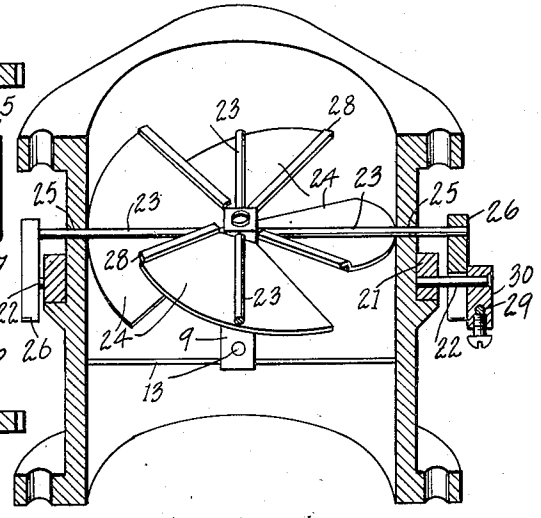


Fig. 8.

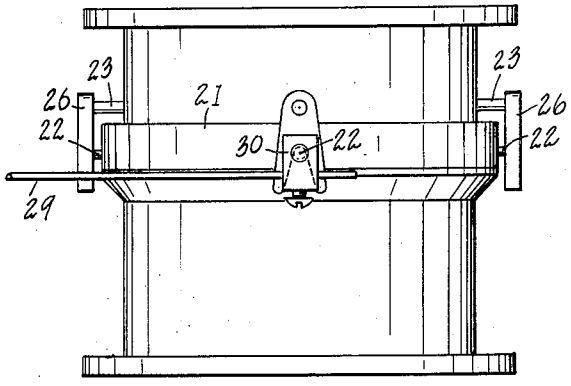


Fig. 7.

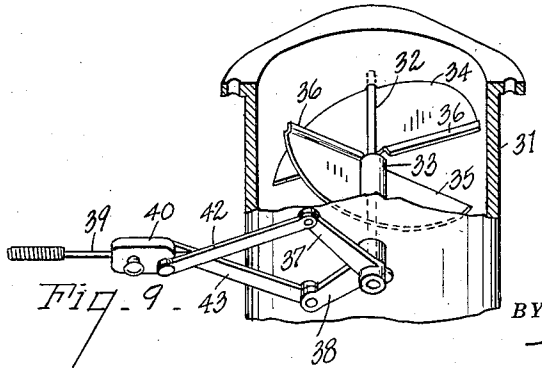


Fig. 9.

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THROTTLE VALVE FOR INTERNAL COMBUSTION ENGINES

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Application October 27, 1933, Serial No. 695,426

13 Claims. (Cl. 251—11)

The main objects of this invention are:

First, to provide a throttle valve for internal combustion engines which is not only effective as a throttle valve but is highly effective in mixing the air and carbureting fuel passing the valve, and even distribution of the gas.

Second, to provide a throttle valve comprising a plurality of leaves operatively connected for simultaneous actuation so that when partially opened, they present a propeller disposition of leaves whereby a swirling motion is imparted to the fluid, the pitch of the blades being varied in proportion to the opening and closing of the valve, and the parts being arranged so that when fully open, a minimum of obstruction is presented.

Third, to provide a throttle valve having the above desirable features and characteristics which is simple and durable in its parts and highly efficient in operation.

Objects relating to details and economies of my invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a fragmentary side elevation of parts of an internal combustion engine showing my improved throttle valve in operative relation thereto, the various parts being shown mainly in conventional form.

Fig. 2 is an enlarged transverse section on line 2—2 of Fig. 3, the parts being shown in full lines for convenience in illustration.

Fig. 3 is a side elevation with a portion of the casing broken away and in longitudinal section.

Fig. 4 is a view mainly in longitudinal section on line 4—4 of Fig. 2.

Fig. 5 is a fragmentary view sectioned on line 5—5 of Fig. 2.

Fig. 6 is a view partially in longitudinal section with the valve open.

Fig. 7 is a side elevation of a modified form or embodiment of my invention.

Fig. 8 is a perspective view mainly in longitudinal section of the modification shown in Fig. 7.

Fig. 9 is a perspective view partially in longitudinal section of another embodiment or adaptation of my invention.

Referring to the embodiment illustrated in Figs. 1 to 6 inclusive of the drawings, 1 indicates parts of an internal combustion engine, 2 a manifold, 3 a carburetor having an intake indicated at 4, and 5 an air filter. These parts are all conventionally illustrated, the carburetion being of the so-called "down-draft" type.

My improved throttle valve comprises a tubular casing 6 which is designed to be interposed between the carburetor and the manifold. The device is preferably cylindrical, as illustrated, and provided with an annular shoulder 7 and with wall bores 8 constituting bearings and located above the shoulder. These bearings 8 are disposed in the same transverse or horizontal plane and are spaced 90° apart. A support 9 is disposed centrally or in line with the longitudinal axis of the casing and is provided with bearings 10 aligned with the wall bearings 8. To facilitate assembly, the support is provided with a bearing cap 11 held in place by the screw 12. Cross pieces 13 are provided, these supporting the member 9 from the wall of the casing. A gear ring 14 is mounted on the shoulder for rotative movement about the casing. Pinion gears 15 are journaled in the wall bearings 8 in meshing relation with the annular gear 14.

The complementary segmental valve plates or leaves 16 are provided with spindles 17 journaled in the bearings of the central support and connected to the pinion gears for rotation therewith. The spindles are disposed in the approximate longitudinal centers of the valve leaves and the valve leaves are provided with overlapping portions 18, the valve leaves being shouldered, as best shown in Fig. 5, so that when the leaves are closed, one end of each leaf overlies one end of the coacting leaves whose axes are at an angle thereto and underlie the other. When the valve is opened or partially opened, these valve leaves assume an inclined position, much like the blades of a propeller and act to impart a swirling and effective mixing motion to the air and fuel passing from the carburetor to the manifold, this resulting in a very thorough agitation and carburetion of the air and effectively preventing the collection of fuel and drops on the valve.

One of the pinion gears is provided with an arm 19 to which the end of the throttle control 20 is connected so that by manipulation of the throttle, the ring gear is rotated and all of the valve leaves are actuated in unison to the same extent. When the valve is fully opened, a minimum of obstruction is presented to the passage of fluid thereto.

Throttle valves of the commonly used type, the so-called butterfly type, serve, when the engine is operated at low speeds and especially in starting, to collect or baffle the gasoline so that it does not effectively mix with the air and drips from the valve. This butterfly type of valve also

results in an uneven distribution to the cylinders. This disadvantage is effectively overcome in my improved valve because the arrangement of the leaves is such that a very thorough agitation results and a wiping swirling action of air is set up across the valve blades or leaves, this being violent at low speeds and varying with the speed commonly resulting with the degree of opening of the throttle.

Referring to Figs. 7 and 8 of the drawings, there is illustrated a modification of my throttle valve wherein the control ring 21 is provided with radial pins 22 spaced 90° apart. The spindles 23 of the valve leaves 24 are journaled to the wall bores 25 and have levers 26 at their outer ends provided with slots receiving the pins 22 so that when the control ring is rotated the valve leaves are turned in unison and to the same angular extent.

In the modification, the leaves are provided with offset flanges 28 which are adapted to overlap the edges of the adjacent leaves when they are in closed position. The control ring 21 is adapted to be rotated by the throttle wire 29 which is connected to one of the pins 22 by means of the coupling member 30. Otherwise, the valve of the modification is substantially similar in construction and operation to the preferred embodiment of my invention.

In the modification illustrated by Fig. 9, the case 31 is provided with diametrically opposed bores in which are journaled the outer end of shaft 32 and the sleeve 33, the shaft extending through the sleeve for rotary movement therein. The shaft and sleeve are provided with semi-circular vanes or leaves 34 and 35 which are adapted to be turned in opposite directions as indicated, the leaves being provided with offset flanges 36, 36 for overlapping the corresponding edge of the other leaf when they are in closed position. The leaves are operated by means of levers 37 and 38 which are connected respectively to the shaft and sleeve, the free ends of the levers being connected to the control member 39 by the knuckle 40 and links 42 and 43. The arrangement is such that when the control member 39 is reciprocated the valve leaves 34 and 35 are turned in opposite directions to open and close the valve and when partially open impart a spiral or swirling motion to the fluid traversing the case 31.

I have illustrated and described my improvements in embodiments which I have found very practical. I have not attempted to illustrate or describe other embodiments or adaptations, as it is believed this disclosure will enable those skilled in the art to embody or adapt my improvements as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A throttle valve for internal combustion engines comprising a tubular casing adapted to be interposed between the carburetor and manifold of the engine, a plurality of coacting segmental valve leaves provided with supporting spindles journaled in said casing and disposed radially and at 90° angular relation to each other and in the same transverse plane, the spindles being disposed substantially at the radial centers of the valve leaves so that when the valve leaves are closed their ends are in overlapping relation, the end portions of the valve leaves being offset relative to their pivots and shouldered to receive the lapping portions of the coacting valve leaves. and means for simultaneously rotating the spindles to open and close the valve leaves.

2. A throttle valve for internal combustion engines comprising a tubular casing adapted to be interposed between the carburetor and manifold of the engine, a plurality of coacting segmental valve leaves provided with supporting spindles journaled in said casing and disposed radially and at 90° angular relation to each other and in the same transverse plane, the spindles being disposed substantially at the radial centers of the valve leaves so that when the valve leaves are closed their ends are in overlapping relation, and means for simultaneously rotating the spindles to open and close the valve leaves.

3. A throttle valve for internal combustion engines comprising a tubular casing adapted to be interposed between the carburetor and manifold of the engine, more than two coacting segmental valve leaves provided with radially disposed supporting spindles, the spindles being disposed in substantially the radial centers of the valve leaves so that when the valve leaves are closed their ends are in overlapping relation, and means for simultaneously rotating the spindles to open and close the valve leaves.

4. A throttle valve for internal combustion engines comprising a tubular casing adapted to be interposed between the carburetor and manifold of the engine, coacting segmental valve leaves provided with supporting spindles journaled in said casing and disposed radially and at 90° angular relation to each other and in the same transverse plane, the spindles being disposed in substantially the radial centers of the valve leaves so that when the valve leaves are closed their ends are in overlapping relation, the end portions of the valve leaves being offset to receive the lapping portions of the coacting valve leaves, and means for simultaneously rotating the spindles to open and close the valve leaves.

5. A throttle valve for internal combustion engines comprising a tubular casing adapted to be interposed between the carburetor and manifold of the engine, coacting segmental valve leaves provided with supporting spindles journaled in said casing and disposed radially and at 90° angular relation to each other and in the same transverse plane, the spindles being disposed in substantially the radial centers of the valve leaves so that when the valve leaves are closed their ends are in overlapping relation, and means for simultaneously rotating the spindles to open and close the valve leaves.

6. A throttle valve for internal combustion engines comprising a tubular casing adapted to be interposed between the carburetor and manifold of the engine, coacting segmental valve leaves provided with radial supporting spindles arranged so that when the valve leaves are closed their ends are in overlapping relation, and means for simultaneously rotating the spindles in the same angular direction to open and close the valve leaves.

7. A throttle valve comprising a cylindrical casing, more than two complementary valve leaves, supporting spindles for said leaves disposed centrally of the leaf and radially of the casing, each leaf having a part underlapping a portion of a coacting leaf when the valve is closed and extending downwardly from its spindle when the valve is opened, and means for simultaneously rotating the spindles for opening and closing the valve.

8. A throttle valve comprising a cylindrical casing, more than two coacting valve leaves

mounted in said casing and journaled so that each leaf underlaps a portion of a coacting leaf when the valve is closed and extends downwardly from its axis when the valve is opened, and means for simultaneously actuating the leaves for opening and closing the valve.

9. A throttle valve comprising a cylindrical tubular casing having an external annular shoulder and wall bearings arranged in the same transverse plane and spaced 90°, a central support having bearings aligned with said wall bearings, cross pieces connecting said support to the wall of the casing, an annular gear rotatable on said shoulder, pinion gears journaled in said wall bearings and meshing with said annular gear, valve leaves having spindles journaled at their inner ends in said bearings in said central support and connected at their outer ends to said pinion gears for rotation therewith, the valve leaves being provided with offset portions overlapping when the valve is closed, and operating means connected to one of said pinion gears.

10. A throttle valve comprising a cylindrical tubular casing having an external annular shoulder, a central support, an annular gear rotatable on said shoulder, pinion gears journaled in said casing and meshing with said annular gear, valve leaves having spindles journaled at their inner ends in said central support and connected at their outer ends to said pinion gears for rotation therewith, the valve leaves being provided with offset portions overlapping when the valve is closed, and operating means connected to one of said pinion gears.

11. A throttle valve comprising a cylindrical tubular casing having an external annular shoulder and wall bearings arranged in the same transverse plane and spaced 90°, a central support, an annular gear rotatable on said shoulder, pinion gears journaled in said wall bearings and meshing with said annular gear, valve leaves having spindles journaled at their inner ends in said central support and connected at their outer ends to said pinion gears for rotation therewith, and operating means connected to one of said pinion gears.

12. A valve comprising a casing, a central support in said casing, a control ring mounted for rotation about said casing, valve leaves having supporting spindles journaled to said central support and said casing, and means at the ends of said spindles and coacting with said control ring so that when the ring is rotated the valve leaves are turned in unison in the same angular direction and to the same angular extent.

13. A throttle valve comprising a cylindrical case having an external annular shoulder and wall bores arranged in the same transverse plane and equally spaced apart, a central support in line with the longitudinal axis of said case and having bores alined witb said wall bores, cross bars connecting said support to the wall of said case, a ring seated on said shoulder for rotation about said case, valve leaves having supporting spindles journaled at their inner ends to the bores in said central support and connected at their outer ends to said ring for rotation thereby, the valve leaves being provided with offset overlapping portions whereby the valve leaves form a disk-like transverse partition when in their closed position, and means connected to one of said spindles for rotating said ring gear to turn said leaves in unison and to the same angular extent whereby a mixing and swirling screw motion is imparted to the fluid traversing said case when the leaves are in partially open position.

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