F. F. KOLARIK.

CARBURETER.

APPLICATION FILED JUNE 19, 1916.

1,247,548.

Patented Nov. 20, 1917.

2 SHEETS—SHEET 1.

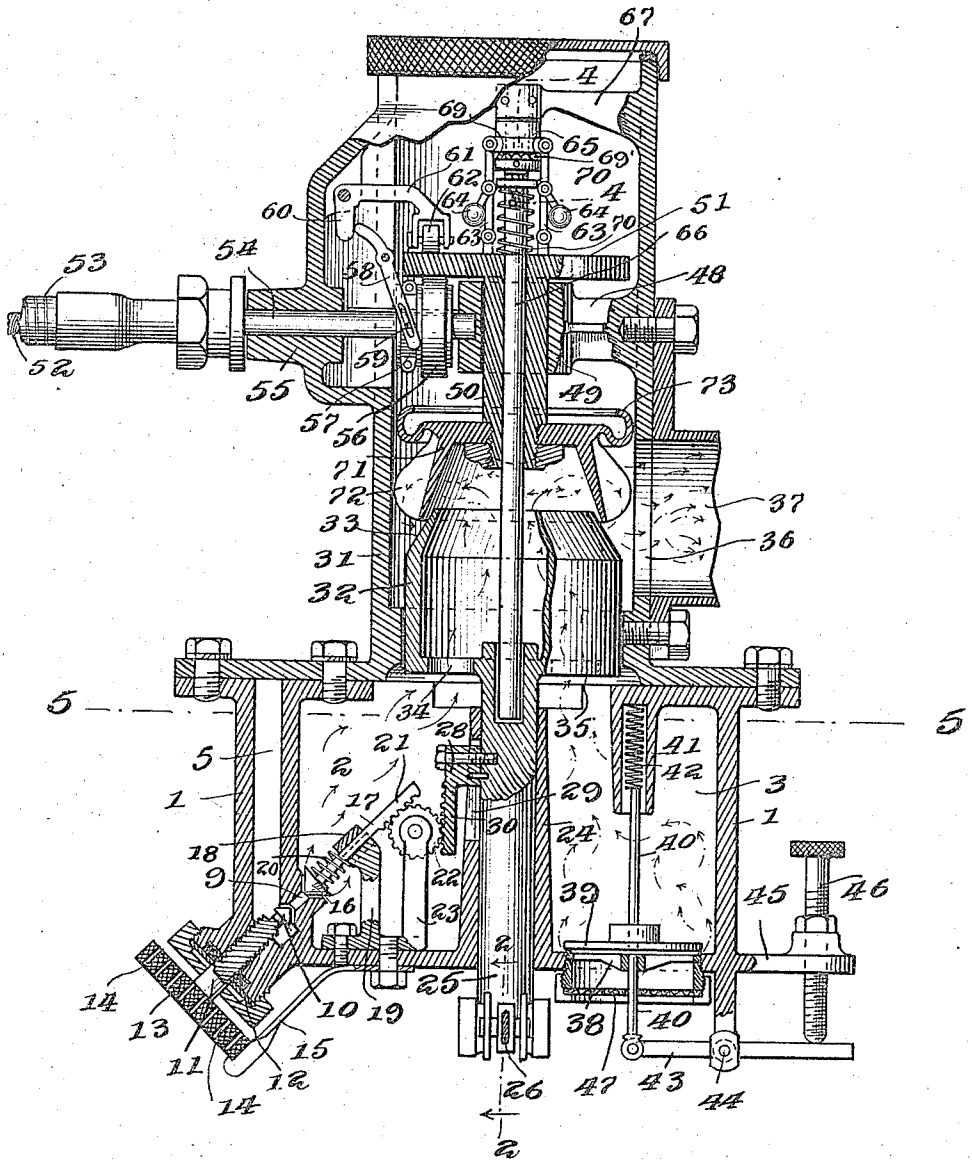


Fig. 1.

Witnesses

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2 SHEETS—SHEET 2.

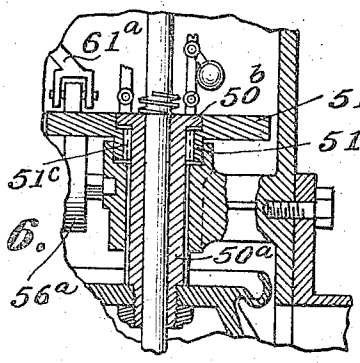


Fig. 6.

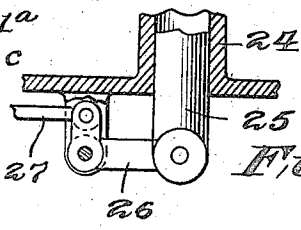


Fig. 2.

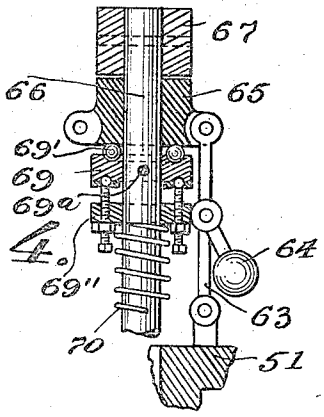
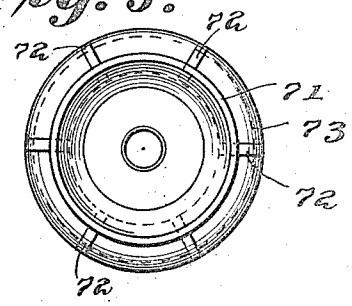


Fig. 4.

Fig. 3.



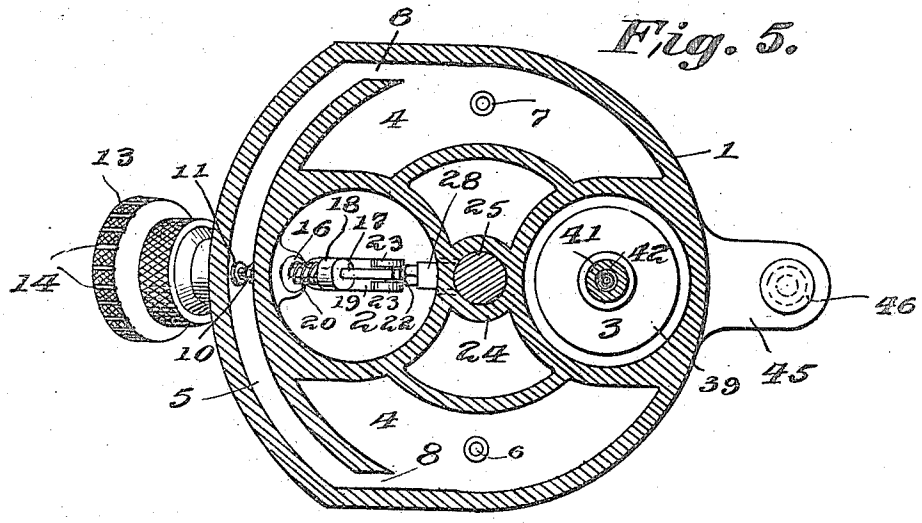


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,247,548. Specification of Letters Patent. Patented Nov. 20, 1917.

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To all whom it may concern:

Be it known that I, FRANK F. KOLARIK, a citizen of the United States, residing at Nunn, in the county of Weld and State of Colorado, have invented certain new and useful Improvements in Carbureters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in charge forming devices for internal combustion engines, and has for its primary object the control of both the speed of supply and the character of the charge proportional to the speed of the engine.

With this and further objects in view, the invention comprises certain novel constructions, combinations and arrangements of parts as hereinafter specified and claimed.

In the accompanying drawings,—

Figure 1 is a view partly in vertical central section and partly in elevation of a carbureter embodying the features of the present invention.

Fig. 2 is a detail vertical section taken on the plane indicated by line 2—2 of Fig. 1.

Fig. 3 is an inverted plan view of the valve cap detached.

Fig. 4 is an enlarged section taken on the plane indicated by line 4—4 of Fig. 1.

Fig. 5 is a cross section taken on the plane indicated by line 5—5 of Fig. 1 and looking downward.

Fig. 6 is a detail sectional elevation of a modified embodiment of the governor driving disk and coöperating parts.

Referring to the drawings by numerals, 1 indicates a housing divided by various partitions into a gasolene chamber 2, an air intake chamber 3, and gasolene-containing chambers 4, 4 and 5. With one of the chambers 4 communicates the supply pipe 6 leading from the supply tank of gasolene or other fuel, while the other chamber 4 is provided with a removable plug or petcock 7 for enabling draining the fuel contents when desired. The chambers 4 communicate freely through passages 8, 8 with the chamber 5 at the opposite ends thereof, and the intermediate portion of the chamber 5 communicates through a port 9 with the chamber 2. The port 9 is provided with a valve seat at each end. A valve 10 is adapted to be seated on the valve seat at the outer end of port 9 and to be adjusted off of said seat through manipulation of the valve stem 11 which carries valve 10, said stem being threaded through a portion of the casing 1 and provided with a suitable packing gland 12 for preventing leakage. To the outer end of the stem 11 is fixed the usual thumb nut 13 for operating purposes, which is notched at 14, 14 to receive the edge of a spring 15 for locking the nut 13 in any given adjusted position. The spring 15 is bolted or otherwise appropriately fixed to the casing 1.

A valve 16 is adapted to coöperate with the seat at the inner end of port 9, and is provided with a stem 17 slidingly mounted in a sleeve 18 carried by a bracket 19 fixed to and upstanding from the floor of chamber 1. A spring 20 surrounds the stem 17 and is interposed between the sleeve 18 and valve 16 so as to exert pressure tending to maintain the valve on its seat. The rear portion of the stem 17 is formed into a rack 21 which meshes with a pinion 22 journaled in a bracket 23 also fixed to and upstanding from the floor of the chamber 2. A sleeve 24 extends upwardly in the casing 1 and forms part of the wall of the chamber 2, said sleeve being open at both ends and containing a reciprocably mounted rod 25, the lower end portion of which is engaged by one end of a bell crank lever 26, which lever is appropriately journaled and connected by rod 27 with the foot throttle lever or the hand throttle lever or both of an ordinary automobile, or other operating device, adapted to impart a longitudinal thrust to the rod 27 for shifting the rod 25 up and down. A stud 28 is bolted, or otherwise fixed to the rod 25, and extends through a slot 29 formed longitudinally in the sleeve 24. A rack 30 depends from the stud 28 and meshes with the gear 22 so that when the rod 25 is moved downward the gear 22 will be rotated in a direction causing the rack 21 to be drawn back and thus causing the valve 16 to be moved off its seat to a degree proportionate to the extent to which the rod 25 is moved downward.

Mounted upon and fixed to the casing 1 is a superimposed casing 31 which may be secured to casing 1 in any appropriate manner, as by bolts connecting integral flanges on respective casings. Within the lower

end portion of the casing 31 is arranged a tubular throttle valve 32 which is formed integral with, or appropriately fixed to, the upper end portion of the rod 25, the upper end of the tubular valve structure 32 being formed conical, as indicated at 33, and the bottom being closed with a web provided with an aperture 34 for the intaking of gas and a similar aperture 35 for the intaking of air. It will be apparent, of course, that there will be some intermixing of air and gas before the passage of the elements through the apertures 34 and 35, but said apertures are primarily intended to admit the respective elements named.

At one side of the tubular throttle valve 32, the casing 31 is provided with an aperture 36 with which communicates the intake pipe 37 of an internal combustion engine.

The air chamber 3 of casing 1 has its lower end practically open, being closed only by a spider 38 and being provided with an appropriate valve seat on which may rest the disk valve 39, which, when the parts are not operating, remains on its seat, but which is free to lift from its seat when air is drawn in and to remain lifted so long as the air pressure is sufficient. Valve 39 is fixed to a stem 40 which is slidingly mounted in a sleeve 41 depending from a portion of casing 1. Within the sleeve 41 is arranged a spring 42 which depresses the stem 40 and thus resists the lifting of the valve 29. Stem 40 extends downward through the spider 38 and is pivotally connected to the lever 43 which is journaled at 44 in a fulcrum formed integral with, or appropriately connected to casing 1. A bracket 45 outstands from said casing and an adjusting screw 46 engages the free end portion of lever 43 and enables adjustment thereof for controlling the extent to which the valve 29 may approach its seat. Any appropriate form of screen or other filter 47 may be provided for preventing entrance of foreign substances with the incoming air.

A bracket 48 is formed integral with, or appropriately fixed to, the wall of the chamber 3, and extends inwardly therefrom, and at its inner end is formed with a sleeve 49 in which is journaled and through which extends the hollow shaft 50. The upper end of the shaft 50 carries a disk 51. A flexible shaft 52 is driven from the crank shaft of the engine (not shown) and is mounted in the usual casing 53. The shaft 52 terminates in a rod 54 journaled in a bearing 55 formed integral with the casing 31, the rod extending inward and finding bearing at its inner end in the wall of sleeve 49. Keyed to and slidingly mounted on the sleeve is a shive 56, which preferably has its periphery covered with leather. A collar 57 is journaled in a boss outstanding from the shive 56 so as to enable shifting of the shive by axial shifting of the collar without rotation of the collar. To effect shifting of shive 56 radially of disk 51, a lever 58 is journaled in a portion of the casing 31 and is provided with a slotted end portion engaging a pin 59 carried by the sleeve 57. The opposite arm of the lever 58 contacts with the short arm 60 of an elbow lever having a pivoted connection with casing 31, the other arm 61 of said elbow lever being bent downward in position to overhang the disk 51 and being bifurcated and carrying a roller 62 riding on the upper face of the disk 51. It will be obvious that upward movement of disk 51 will cause a swinging of arm 61, which swings the arm 60 in a direction for moving the lever 58 and proportionally shifting the shive 56 outward. Thus the larger diameters of disk 51 over which shive 56 must travel when shifted radially cause transmission of less movement and a resulting reduction of speed of disk 51, and the speed of the governor hereinafter mentioned is reduced.

Pivotally connected to the upper face of disk 51 are toggles 63 of an ordinary governor whose weights 64 are connected at the toggle joints in the usual fashion, the upper ends of the toggles being pivotally connected to a sleeve 65 journaled on the upper portion of a vertical shaft 66, the said shaft being fixed to a bracket 67 formed integral or suitably connected to the wall of the casing 31 and extending inwardly therefrom. The sleeve 65 is, of course, journaled in a manner to prevent movement of the sleeve longitudinally of shaft 66, and by preference ball or other antifriction bearings 69′ support sleeve 65. Bearings 69′ are carried in a race-way formed in a collar 69 fixed by pin 69^a to shaft 66. A collar 69″ surrounds shaft 66, below collar 69, and rests upon the upper end of a spring 70 which surrounds the shaft 66 and extends down to and rests on the upper face of the disk 51. The spring 70 thus resists the action of the governor in lifting the disk 51, and the tension of the spring may be varied by adjustment of the screws 68 which are threaded through collar 69″ and have swiveled engagements with collar 69. The shaft 66 extends down through the bore of the hollow shaft 50 and axially through the valve 32, and has its lower end extending into an axial bore in the upper end portion of the shaft 55.

The shaft 50 extends below the sleeve 49 and at its lower end fixedly carries a valve cap 71, the cap being preferably detachably connected by being held between an annular shoulder on the shaft 50 and a nut threaded onto the reduced portion beyond the shoulder. The cap 71 is provided with stirring blades or wings 72 outstanding radially and extending longitudinally of the cap in position for agitating the fuel products

rising out of the valve 32. The upper portion of the cap 71 is formed into an annular container 73 positioned and adapted for receiving foreign substances, such as lubricant, falling from the machinery above. The interior of the cap 71 is tapered or conically bored to correspond with the taper 33 of valve 32 so that when the disk 51 is in its lowest position, and the valve 32 is in its highest position, the throttle will be closed, and fuel will not be able to escape in appreciable quantities through the intake 37.

The operation of the structure should be obvious, and may be briefly stated to consist in the shifting of the shaft 25 by the operator to a lower position as he requires greater speed or power and to a higher position for a converse purpose. As the valve 32 descends the valve 16 leaves its seat and admits fuel in a quantity proportional to the descent of the valve 32. With the increase in the supply of fuel and a resultant increase in the speed of the engine, the governor slightly lifts the disk 51 and proportionally lifts the cap 71, which increases the area of discharge between the cap 71 and valve 32. Obviously disk 51 can not be sufficiently elevated to leave contact with shive 56 for any appreciable period of time, as the movement of the governor begins to slow down as a result of such lifting and thus reëstablishes operating contact with shive 56. As the operator wishes to decrease his power, he moves the shaft 25 upward and the resultant decrease in fuel and lowering of the speed of the engine effects a proportional lowering of the governor and a resultant descent of the disk 51 and of the cap 71.

It will be noted that the driving disk 51 and levers actuated thereby for shifting the pulley 36 are especially adapted for insuring smoothness and flexibility in the action of the governor. The structure is susceptible of a wide range of modification, one variation being illustrated in Fig. 6 in which the sleeve 50^a corresponds in, structure and function to the sleeve 50 above described, but it is varied therefrom in detail in being provided with an annular flange 50^b at its upper end and with a key slot 50^c extending longitudinally of the sleeve in the outer surface thereof. The governor actuating disk 51^a is not formed integral with the sleeve 50^a but is formed with a circular recess adapted to accommodate the flange 50^b and with a depending collar 51^b offset beneath the flange 50^b and provided with a key 51^c sliding in the groove 50^c. The shive 56^a engages the underface of the disk 51^a and is shiftable radially thereof and adapted to be shifted by coöperating levers, similar to those above described, the final one 61^a of which carries an anti-friction roller resting on the upper surface of the disk 51^a. By this arrangement the under face of the disk 51^a may be formed perfectly flat since the disk 51^a is permitted to remain resting down upon the shive 56^a when the sleeve 50 is moved upward. The balance of the details of the structure seen in Fig. 6 are the same as those above described.

What I claim is:

1. In a charge forming device for internal combustion engines, the combination of a tubular throttle valve, a cap therefor, means for shifting the throttle valve relative to the cap, and means for automatically shifting the cap proportionally to the shifting of the valve.

2. In a charge forming device for internal combustion engines, the combination of a tubular throttle valve, a cap therefor, a governor for actuating the cap connected to move the cap away from the valve with increase in the speed of the governor, and means for shifting the valve relative to the cap.

3. In a charge forming device for internal combustion engines, the combination of a tubular throttle valve, a cap therefor, means for rotating the cap, and agitator blades extending from the cap.

4. In a charge forming device for internal combustion engines, the combination of a tubular throttle valve, a cap therefor, means above the cap for moving the same relative to the valve, and a receptacle carried by the cap in position for receiving foreign substances falling from the cap moving means.

5. In a charge forming device for internal combustion engines, the combination of a tubular throttle valve having a tapering end portion, a cap conically bored to receive said tapered end, and means for moving the valve relative to the cap.

6. In a charge forming device for internal combustion engines, the combination of a tubular throttle valve, a cap therefor, a governor for actuating the cap, a disk for operating the governor, a shive for actuating the disk, a shaft connected to operate in timed relation to the engine being supplied, the said shive being keyed on said shaft in engagement with said disk, the disk having that face engaged by the shive concaved and the shive being proportionally tapered, and means for shifting the shive radially of the disk proportional to variations in speed and resultant actuation of the governor.

7. In a charge forming device for internal combustion engines, the combination with charge controlling means, of a shiftably mounted sleeve for actuating said means, a disk engaging the sleeve, engine driven means for rotating the disk and thereby rotating the sleeve, and a governor for shifting the sleeve and proportionally varying the charge controlling means.

8. In a charge forming device for internal combustion engines, the combination with charge controlling means, of a shiftably mounted sleeve for actuating said means, a disk engaging the sleeve, engine driven means for rotating the disk and thereby rotating the sleeve, and a governor for shifting the sleeve and proportionally varying the charge controlling means, the disk being keyed to the sleeve to move longitudinally thereof, and means actuated by the disk for varying the speed of delivery of motion from the engine driven means.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK F. KOLARIK.

Witnesses:
BERT M. ALLEN,
MARIE E. ENTWISTLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."