F. L. KINGSTON.

CARBURETER.

APPLICATION FILED JAN. 29, 1909.

974,076.

Patented Oct. 25, 1910.

Fig. 1.

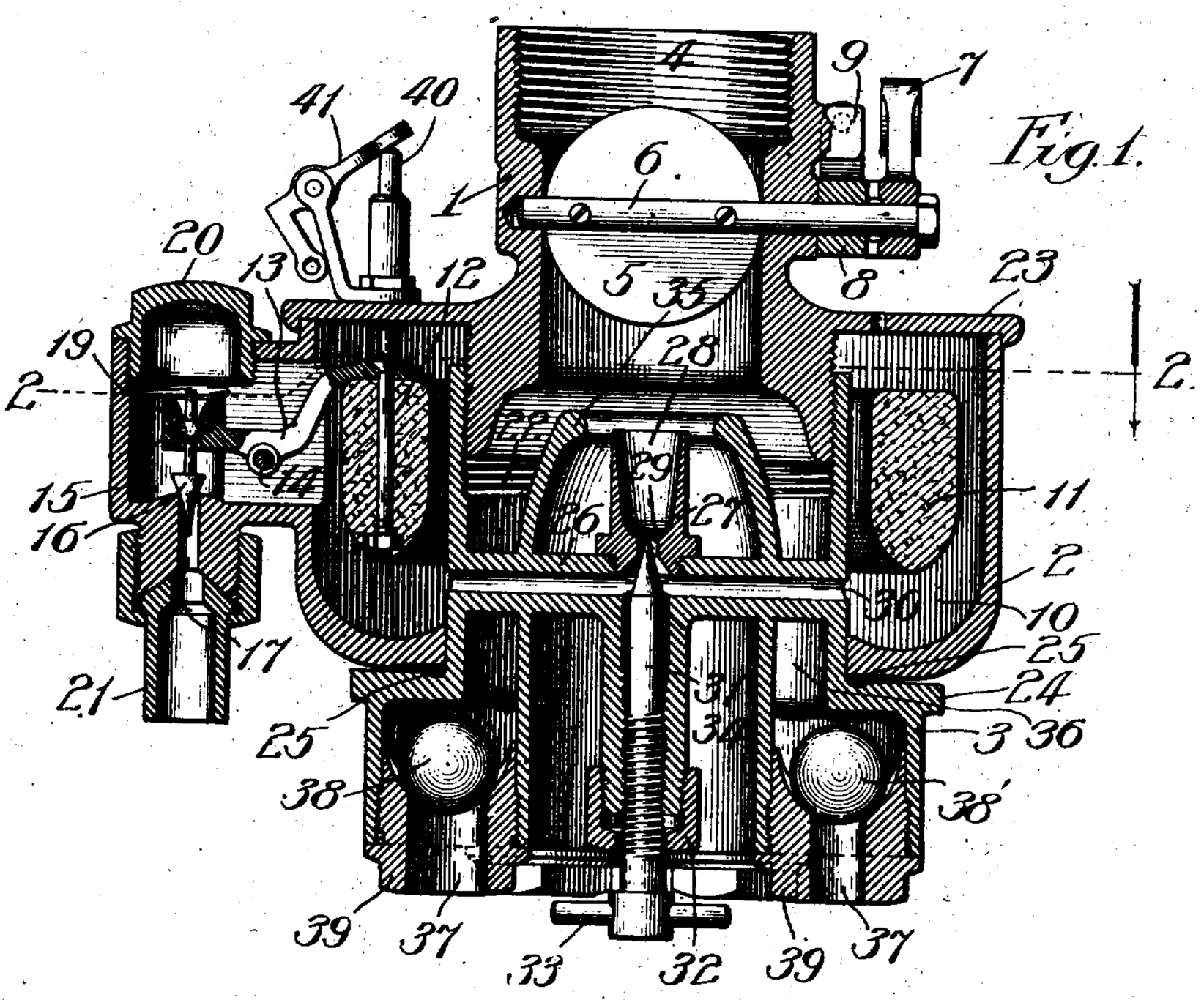
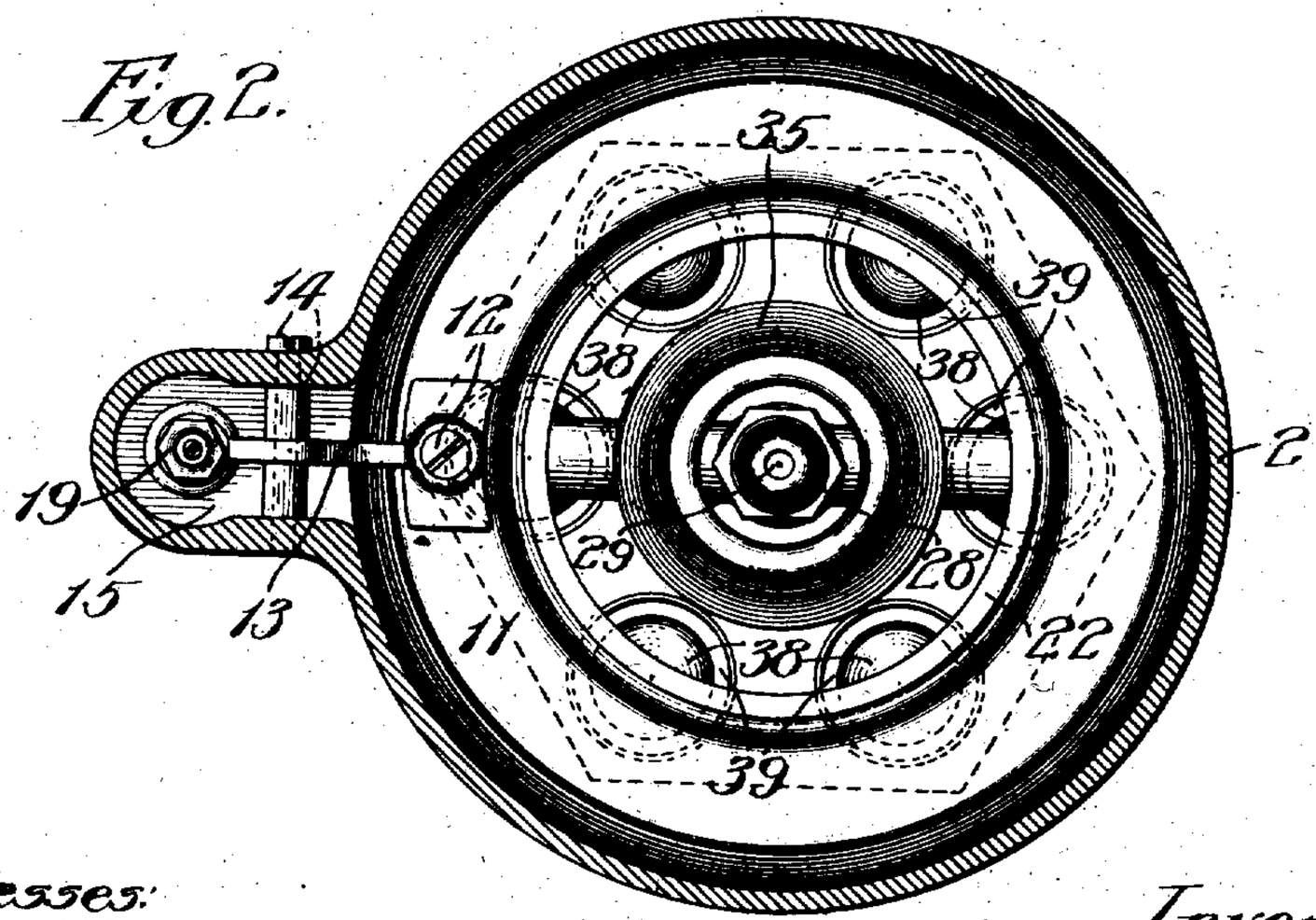


Fig. 2.



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UNITED STATES PATENT OFFICE.

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CARBURETER.

Specification of Letters Patent. Patented Oct. 25, 1910.

974,076.

Application filed January 29, 1909. Serial No. 474,929.

To all whom it may concern:

Be it known that I, FRANK L. KINGSTON, a citizen of the United States of America, and a resident of Kokomo, county of Howard, and State of Indiana, have invented a new and useful Improvement in Carbureters, of which the following is a specification.

My invention has for its object the making of a carbureter for internal combustion engines, which will supply to the engine a proper mixture at all engine speeds, and which will at the same time be economical as to the use of gasolene, or other fuel, adapting itself automatically to the various running conditions of the engine, have a minimum number of manual adjustments, and those of a most simple character, and be of such simple construction as to make it easy to manufacture and take care of.

A further and more specific object is to provide for the automatic priming of the motor upon starting, and also the taking in of the air in such a manner that it will on its entrance be afforded an opportunity for mixing with the fuel.

On the sheet of drawings which accompanies this specification and forms a part thereof, Figure 1 is a vertical sectional view of my carbureter and Fig. 2 is a horizontal sectional view, the section being taken on the line 2—2, with the part 1 removed.

The parts 1—2—3 form the body of the main frame work of my carbureter. These parts are preferably of cast brass, although, of course, they may be made in any other suitable way.

Part 1 is provided with an internal screw thread opening 4, for facilitating its attachment to the intake pipe of the engine. Within the neck, or tube, leading from the intake pipe of the engine there is a throttle valve 5, which I preferably make in the general form of a stove pipe damper. This damper plate is secured to a shaft 6 within the part 1, and carries at its outer end a lever 7 for the attachment of the throttle valve rod, by which the throttle is manually controlled by the operator of the engine. Mounted also upon the shaft 6 there is a lever 8 which turns with the shaft. This lever 8 is L-shaped and its two outer ends serve to engage the lug 9 projecting from the part 1 in such manner as to limit the movement of the shaft, and its valve plate, to approximately a 90 degree movement. By changing the angular position of the operating lever 7 with respect to the stop lever 8 on the shaft 6, the lever 7 is readily adapted to receive its operating push or pull from any direction at right angles with the shaft 6.

The part 2 forms the float chamber of the carbureter, and it engages the part 1 by the screw threads, as clearly indicated. The float chamber 10 is annular in form and within it is mounted the float 11, which may be of cork, wood or hollow metal, or any other suitable substance of smaller specific gravity than the liquid fuel to be used. This float is mounted by a bolt 12, or bolts, upon a lever 13, which lever is pivoted on a transverse rod 14 extending across a fuel intake chamber 15, which is offset from the float chamber 10. On the outer end of the lever 13 there is carried a cone valve 16, which serves to close or open the passage 17 through which the liquid fuel is supplied. The valve 16 is mounted on a light vertical rod of brass provided with a spherical enlargement, which engages loosely within a seat on the lever 13, and is held in place by a hollow nut 19, as shown. By this construction there is provided a flexible mounting for the valve 16, allowing it to seat itself naturally when depressed. A slot in the upper end of the valve rod is provided to enable the turning of the valve in its seat in case it is necessary to clean or re-seat it. Access to this valve is provided for by means of the screw cap 20, which closes the upper part of the fuel intake chamber.

Gasolene, or other fuel, is supplied to the carbureter through the passage 17, suitable pipes terminating in the coupling 21 leading to the fuel tank or reservoir. As soon as the gasolene within the float chamber reaches a predetermined level the float 11 is raised, which depresses the cone valve 16, thus closing off the supply of more fuel. The withdrawal of the fuel from the float chamber allows the cone valve to open slightly, thus admitting more fuel. In this way the level of the gasolene within the float chamber is maintained at an approximately fixed position.

The part 3 is provided with an internal

screw thread flange 22, the screw thread on which engages an external screw thread portion of the part 1. As the float chamber—part 2—lies between the lateral flange 23 projecting from the part 1, and the lateral flange 24 projecting from the part 3, the float chamber part is securely clamped in place between these two flanges when the screw thread portion 22 of the part 3 is screwed home on the part 1. In order to prevent a fuel leakage a gasket 25, preferably of tubular copper, is provided between the flange 24 and the lower part of the float chamber. Carried upon a tubular transverse member 26 of the part 3 is a cup-shaped spray nozzle 27. This engages the transverse tube 26 by means of a screw thread, as shown, and is therefore, readily removable for cleaning or renewal. This spray nozzle has an enlarged opening—cup 28—at its upper end which opening communicates through the needle valve passage 29 with the passage 30 of the transverse member 26. There is thus afforded a free passage for the fuel from the float chamber 10 to the cup 28 of the spray nozzle, and the gasolene will therefore rise in this cup to the same level as in the float chamber. The passage 29 may be closed to a greater or less extent by the needle valve 31, which is screw threaded, as shown, and provided with a stuffing gland 32, which may be packed to prevent the leakage of fuel. A suitable thumb screw 33 provides ready means for adjusting the needle valve within the passage, and thus regulating the normal flow of fuel through the spray nozzle.

Surrounding the stem of the needle valve 31 there is an annular passage 34 which forms the normal air intake; air is thus taken in from the bottom of the carbureter and leads up through the passage 34 around the spray nozzle 27. The passage 34 is constricted so as to form a strangling nozzle 35 just on a level with the upper edge of the spray nozzle. By this means the air as it is drawn in through the carbureter rushes by the spray nozzle with maximum velocity and mixes perfectly with the fuel vapor that is being drawn up through that nozzle.

Surrounding the passage 34 there is a passage 36, through which air may be admitted from below the carbureter through the auxiliary passages 37. These auxiliary passages are normally closed by means of ball valves 38 resting against the seats 39, being held therein by gravity. The ball seats 39 are brass or bronze, and are screw threaded to the opening on the lower part of the casting 3, as indicated. I preferably make the balls 38 of bronze, and make them all of the same size and weight, and make the passages 37 of different diameters, so that the balls will be operated successively as the engine speed increases. By this means the auxiliary, or high speed air passages, will be brought into operation, one at a time, as the engine speed increases, thus adjusting the supply of air automatically to the engine speed at all times.

The passage 36, like the passage 34, entirely surrounds the fuel nozzle, and is constricted at a point just above the fuel nozzle so that the air coming in through the auxiliary passages will unite more completely with the vapor, or spray, emerging from the spray nozzle. The cup 28 just above the needle valve affords a reservoir for a small amount of gasolene during the period of idleness of the engine, and the first suction stroke of the engine on cranking throws the accumulated gasolene out of this priming cup and allows it to mix freely with the incoming air, thus giving an initial charge of sufficient richness to cause the first explosion with certainty; the effect produced being practically the same as though when the motor is primed by some external means.

At 40 I show a plunger which may be depressed by the lever 41 so as to push the float 11 down and thus raise the cone valve 16. By this operation gasolene is allowed to enter the float chamber above its usual level, and thus flood the carbureter when it is desired to do so.

In the construction above shown, all difficult manufacturing operations are avoided, and each part of the carbureter is accessible for inspection, cleaning or repairs.

The feature of bringing both the normal air supply and the auxiliary air supply through passages that surround the spray nozzle, and of providing a strangling nozzle for each of these air supplies at the point where the air meets the fuel vapor secures a most complete mixing of the air and vapor in the most direct possible manner and with the least complication. The directness with which this result is secured is made possible by the placing of both the normal and the auxiliary air intakes at the bottom of the carbureter.

By employing balls of uniform size, regardless of the areas of the openings which they cover, and by employing valve seats that are bodily and individually removable, I attain several distinct advantages of construction and operation. The uniformity in ball sizes allows corresponding uniformity in the curvature of all the ball seats. This tends toward economy in construction, since the same tools which form and grind the ball valve seats may be employed for all seats, regardless of the size of the cylindrical opening which is covered by the ball. The ball seats may therefore all be made exactly alike and the opening through them altered as desired by the very simple process of

drilling. The uniformity in the size of the balls is also of advantage in the assembly of the carbureter in the factory, and also in the case of repairs on the road, particularly the latter, since the motorist need carry but a single size of balls in his repair kit rather than a graded size of balls as is the case where balls of variant sizes are employed.

By the concentric form of the normal and high speed air passages, the rich mixture of carbureted air through the normal air passage retains to a considerable extent its cylindrical form and is surrounded by a concentric envelop of unmixed air from the high speed air passage as it passes upward through the opening 4. An advantage of the arrangement of parts securing this condition is that the gasolene vapor does not condense upon the inner surfaces of the walls of the pipe leaving the carbureter, because the vapor itself is held insulated in the center of the pipe and does not touch the walls until after it has proceeded so far as to find the walls warmed by the engine and therefore not producing condensation. An advantage of the cylindrical form of part 3, and of the positioning of all the air intake openings and passages 34—37—37 within the cylindrical space of that part and upon the circular space forming the lower end of that part is found in the convenience of attachment to the cylindrical part 3 of an air intake tube which may be carried to a suitable source of air for feeding the carbureter. In automobile work the carbureter is located in a rather dusty position, and this intake tube may be carried under the seat or higher in the car if desired, to be above the dust of the road. In stationary engines the advantage of the intake pipe supplying thus both the normal and high speed air passages and being attached to the carbureter in so simple a manner is easily understood.

It is obvious that certain changes may be made in the details of my carbureter without departing from the spirit of my invention; but

What I claim as new and desire to secure by United States Letters Patent is:

1. In a carbureter, a spray nozzle, a passage surrounding said spray nozzle for the normal admission of air, a passage surrounding said normal air passage for the admission of air at high engine speeds, a series of valves for admitting air into said high speed passage, each of said valves consisting of an individually removable valve seat having an opening therethrough, and a ball for normally closing said opening, substantially as described.

2. In a carbureter, a spray nozzle, a passage surrounding said spray nozzle for the normal admission of air, a passage surrounding said normal air passage for the admission of air at high engine speeds, a series of valves for admitting air into said high speed passage, each of said valves consisting of an individually removable valve seat having an opening therefor, and a ball for normally closing said opening, the balls of all of said valves being uniform in size and weight.

3. In a carbureter, an auxiliary passage for the admission of air at high engine speeds, a series of valves for the admission of air into said auxiliary passage, said valves being provided with individually removable seats having openings therethrough for the admission or air and with balls for normally closing said openings.

Signed by me at Chicago county of Cook and State of Illinois, in the presence of two witnesses.

FRANK L. KINGSTON.

Witnesses:
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WM. E. KEMP.