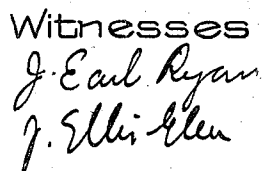


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UNITED STATES PATENT OFFICE.

OTTO WINKLER, OF CÖPENICK, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

CARBURETER.

1,060,053.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, OTTO WINKLER, a subject of the Emperor of Germany, residing at Cöpenick, Germany, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to internal combustion engines, and its object is to improve the action of the carbureter.

Many liquid fuels require to be subdivided into extremely fine particles in order to obtain good combustion. This result is most simply attained by atomizing or spraying them by means of a vigorous jet of air. In the ordinary operation of an internal combustion engine, the air current is due to the suction produced by the outstroke of the engine piston. In order to concentrate this air current and cause it to operate strongly and sharply upon the stream of fuel and thereby effect a complete atomizing of the same, I arrange a tapering funnel for the entrance of the air arranged adjacent to the fuel jet. A valve is placed between the mixing chamber and the cylinder and is kept closed until a certain vacuum has been produced in the cylinder, so that the rush of air through the funnel will be sudden and forcible. Another valve is arranged to open a large port into the mixing chamber to give a sufficient volume of air at the proper point in the stroke.

The accompanying drawing is a sectional diagrammatic view of an engine and carbureter embodying my improvements.

The piston 1 reciprocates in the cylinder 2 and revolves the crank 3 by means of the connecting rod 4. A mixing chamber 5 communicates with the upper end of the cylinder through a port 6 controlled by an admission valve 7, which is opened at the proper point in the stroke by means of a cam 8 on a rotating shaft 9. This valve is arranged near one end of the mixing chamber, and at the other end thereof is a nozzle 10 communicating with a suitable source of supply of liquid fuel, such as gasoline. Adjacent to said nozzle is a funnel 11 forming one end of the mixing chamber. The small end of said funnel stands close to the tip of the nozzle, the axes of these two elements being preferably at right angles to each other. The funnel is adapted to take

in a large amount of air through its wide mouth 12 and concentrate it in a small powerful jet across the tip of the nozzle. The liquid fuel is fed to the nozzle by any approved means suitable for the purpose. I prefer, however, to use means of a well known type which will maintain the fuel at such a level in the nozzle that the blast passing over the tip of said nozzle will draw up the fuel and atomize it. At some convenient point in the wall of the mixing chamber is an air-inlet port 13, controlled by a valve 14, which can be opened by a cam 15 on a rotating shaft 16. In actual practice the two shafts 9, 16 would be preferably one and the same.

The operation is as follows: The admission valve 7 remains closed until the crank 3 has made, say, one sixth of a revolution, starting from the upper dead center. The downward movement of the piston 1 creates a vacuum in the cylinder 2, so that when, at this instant, the cam 8 lifts the admission valve 7, there is a sudden and vigorous rush of air through the funnel 11. The jet issuing from the small end of the funnel exerts a powerful atomizer effect upon the liquid fuel in the nozzle 10, so that the mixing chamber is filled with spray. An instant later, the air-valve 14 is opened by the cam 15, and a considerable volume of air is admitted sufficient to form an explosive charge which enters the cylinder through the port 6.

The volume of air admitted through the neck of the funnel 11 is relatively small so that a reduced pressure due to the suction effect of the piston is maintained until the pressure is raised to atmospheric pressure by the opening of the valve 14. The equalization of the pressures at the opposite ends of the funnel due to the opening of the valve 14 causes the spraying action to cease.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. The combination with an engine cylinder and piston, of a mixing chamber having a small air-inlet opening through which a current of air is drawn by the suction action of the piston and a large air-inlet port, a fuel nozzle adjacent the small inlet opening with which nozzle the air current coöperates to supply a fuel charge to the cylinder, and means controlling the large port which opens it at a predetermined point in

the suction stroke of the piston to check said air current by equalizing the pressures at opposite ends of the small opening.

2. The combination with an engine cylinder and piston, of a mixing chamber, a fuel nozzle therein, a device having an opening communicating at one end with the atmosphere and terminating at its other end adjacent the nozzle, a valve controlling a port between the cylinder and the chamber, means for opening the valve after the piston on its suction stroke has created a certain degree of vacuum in the cylinder to cause said vacuum to draw a current of air through said device, a valve controlling communication between the atmosphere and said chamber, and means for operating the valve that opens it at a point in the suction stroke subsequent to the opening of the first valve.

3. The combination with an engine cylinder and piston, of a mixing chamber, a fuel nozzle therein, means cooperating with said cylinder and piston to concentrate a vigorous jet of air across said nozzle at a predetermined point in the suction stroke of the piston, a valve for admitting air to the chamber at a subsequent point in said stroke, and means for controlling the operation of the valve.

4. The combination with an engine cylinder and piston, of a mixing chamber, a fuel nozzle therein, means cooperating with the cylinder and piston for concentrating a vigorous jet of air across said nozzle at a predetermined point in the stroke, and means for admitting a considerable volume of air to the mixing chamber at a later point in the stroke.

5. The combination with an engine cylinder and piston, of a mixing chamber, a fuel nozzle therein, a tapering funnel having its large end opening to the atmosphere and

its small end arranged adjacent the nozzle to deliver a current of air which draws fuel from said nozzle and atomizes it, a valve controlling a port between the mixing chamber and the cylinder, a cam for operating the valve which opens it at a point in the suction stroke of the piston subsequent to the beginning of said stroke, the suction action of the piston causing a current of air to flow through the funnel and deliver a charge to the cylinder, a valve controlling a passage between the interior of the chamber and the atmosphere, and a cam for opening said valve at a predetermined interval after the first valve is opened to admit air to the chamber to equalize the pressures at opposite ends of the funnel and thereby check the flow through said funnel.

6. The combination with an engine cylinder and piston, of a vaporizing device through which a current of air is drawn from a suitable source by the suction stroke of the piston to form a charge of fuel, a valve for controlling the admission of the charge to the cylinder, means for opening said valve after the piston on its suction stroke has created a certain degree of vacuum in the cylinder to cause the vacuum to draw a current of air at high velocity through said device, and a valve that admits air at the pressure of said source to the delivery side of the device subsequently to the formation of said charge to equalize the pressures at the inlet and delivery sides of the device and thereby check the flow of air therethrough.

In witness whereof, I have hereunto set my hand this fifth day of October, 1907.

OTTO WINKLER.

Witnesses:

JULIUS RÖNNLAND,
KARL BIEKELEEN.