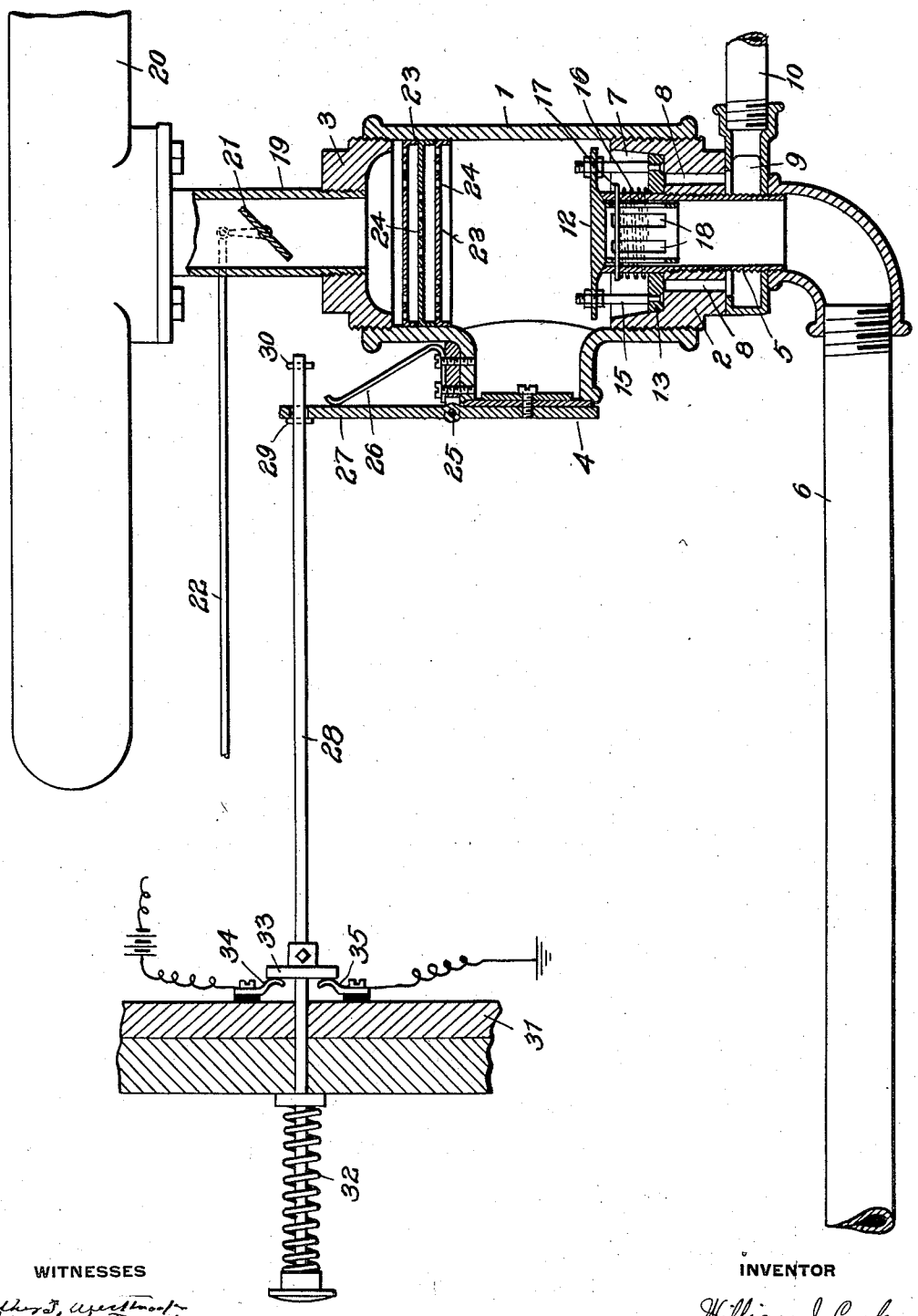
W. J. COOK.

MIXING VALVE.

APPLICATION FILED JAN. 21, 1914.

**1,138,628.** Patented May 11, 1915.




WITNESSES

Luther S. Upperman
William N. Watson.

INVENTOR

William J. Cook.
by Christy and Christy
ATT'Y'S

# UNITED STATES PATENT OFFICE.

WILLIAM J. COOK, OF ORANGE, GEORGIA, ASSIGNOR OF ONE-TENTH TO ADAM F. COOK, OF CHARLEROI, PENNSYLVANIA, AND ONE-TENTH TO THOMAS C. COOK, ONE-TENTH TO JAMES L. COOK, AND ONE-TENTH TO THOMAS F. DEAKIN AND ANNA S. J. DEAKIN, ALL OF PITTSBURGH, PENNSYLVANIA.

## MIXING-VALVE.

1,138,628. Specification of Letters Patent. Patented May 11, 1915.

Application filed January 21, 1914. Serial No. 813,472.

*To all whom it may concern:*

Be it known that I, WILLIAM J. COOK, residing at Orange, in the county of Cherokee and State of Georgia, a citizen of the United States, have invented or discovered certain new and useful Improvements in Mixing-Valves, of which improvements the following is a specification.

The object of my invention is to provide a mixing valve which may be employed for various purposes, but which is particularly adapted to be used for effecting a thorough mixture of air and fuel vapor or gas prior to its admission to the explosion chamber of an internal combustion engine.

In the accompanying drawing, which forms part of my specification, I have illustrated the preferred embodiment of my invention.

The figure is a sectional view of the valve attached at one side to intake pipes and on the other side to the manifold of an internal combustion engine, the intake pipes and manifold being shown in elevation.

In the practice of my invention I provide a single movable member for controlling both the air and fuel vapor inlets, such member being held yieldingly in closed valve position, but opening in response to the suction power of the engine and in proportion to the strength of such power. The valve is also constructed to effect an intimate mixture of the air and vapor as they pass through their respective ports.

Referring now to the embodiment of my invention illustrated in the drawing, the valve casing may be formed of a T pipe-connector 1 provided at its opposite alined openings with plugs 2 and 3, the side opening being provided with a movable gate valve 4 described more particularly hereinafter. The plug 2 is provided centrally with a tube 5 connected at its outer end to an intake pipe 6, preferably the fuel vapor pipe. At the inner end of this plug there is formed a concavity 7 having tapered sides, and, from the bottom of such concavity, a plurality of passageways 8 extend to an annular chamber 9 surrounding the tube 5 and connected to an air intake pipe 10, which extends to and has its outer end open at any convenient place for taking in air. The inner end of the tube 5 is closed by means of a circular valve 12, ground to fit a seat provided at the end of such tube; and the inner ends of the passageways 8 are closed by means of a disk 13, also ground to fit the lower portion of the plug concavity 7. In order to control, with relation to the suction power of the engine, the quantity as well as the relative proportion of air and fuel vapor or gas, these closures are connected into a single movable member by means of bolts 15, such member being held yieldingly in downward position by a spring 16, which bears at its opposite ends against the disk 13 and a cotter-pin 17 extending through the tube 5. The valve 12 is provided with a skeleton sleeve 18 extending loosely within the tube 5 and adapted to cause an accurate seating of both valve closures. By such construction it will be seen that the air will flow between the periphery of the disk 13 and the tapered wall of the concavity 7 in a sleeve-like stream, and that the fuel gas or vapor will, by the valve 12, be deflected laterally into such stream, thus effecting a good mixture.

Through the plug 3 a pipe 19 extends to the engine manifold 20, and is provided with a butterfly valve 21 adapted to be controlled by an operator through a rod 22. Near the outlet side of the valve casing there are a plurality of baffle plates 23, each being provided with holes 24 arranged opposite closed portions of adjacent plates, whereby a more intimate mixture of the air and fuel is effected.

The gate valve 4, which closes the side outlet of the T-fitting 1, is pivoted adjacent to said outlet, as at 25, and is held yieldingly in closed position by means of a spring 26 bearing on a stem 27 secured to the valve. A rod 28 extends loosely through the outer end of said stem, and is provided with cotter pins 29 and 30 on opposite sides thereof as shown. The rod extends to a convenient position for an operator, as for example the foot or dashboard 3 of an automobile, and is held yieldingly in closed valve position by means of a spring 32. A contact collar 33 is secured to the stem 28, and in one position of the stem completes the electrical ignition circuit through contact springs 34 and 35.

As thus constructed the valve 4 and its

controlling mechanism afford several advantages in the operation of automobiles. In the first place, in case of back fire from the engine, the closure 4 will fly open against the pressure of the spring 26, and thus afford an escape for the gases under pressure. When thus opened it will be observed that the outer end of the stem 27 will move to the pin 30 of rod 28 without moving such rod. In the second place, when an automobile is descending an incline, the rod 28 may be moved to open the valve 4 and to break the electrical circuit, the engine still being coupled with the driven wheels, under which conditions the engine will be cooled by the fresh air taken into and discharged from it, and the advance of the automobile will, on account of the resistance offered to the engine, be materially retarded. Back fire from the engine will also close the valve 12.

I claim as my invention:

1. In a mixing valve, the combination of a casing having openings therein, a plug in one of said openings provided with a central concavity having tapered sides, a tube extending through the center of said plug and extending above the bottom of the concavity, a plurality of passageways extending through said plug from the bottom of the concavity exterior of said tube, a closure plate for said tube extending laterally therefrom on all sides, an annular disk forming a closure for said passageways, means for connecting said closures into a single member, and means for holding such member yieldingly in closed valve position.

2. In a mixing valve, the combination of a casing having a tubular inlet port projecting within the casing and forming with the wall thereof an annular chamber, the outer wall of said chamber tapering outwardly from the bottom thereof, a plate valve closing the inner end of said port and having a projecting flange whereby gas issuing from the port is deflected laterally, a second inlet port entering said casing at the bottom of said annular chamber, a valve ring for closing the second port, means for connecting said two valve members to operate in unison, and means for holding them yieldingly in closed position.

In testimony whereof I have hereunto set my hand.

WILLIAM J. COOK.

Witnesses:

LUTHER F. WESTBROOK,

WILLIAM W. WATSON.