

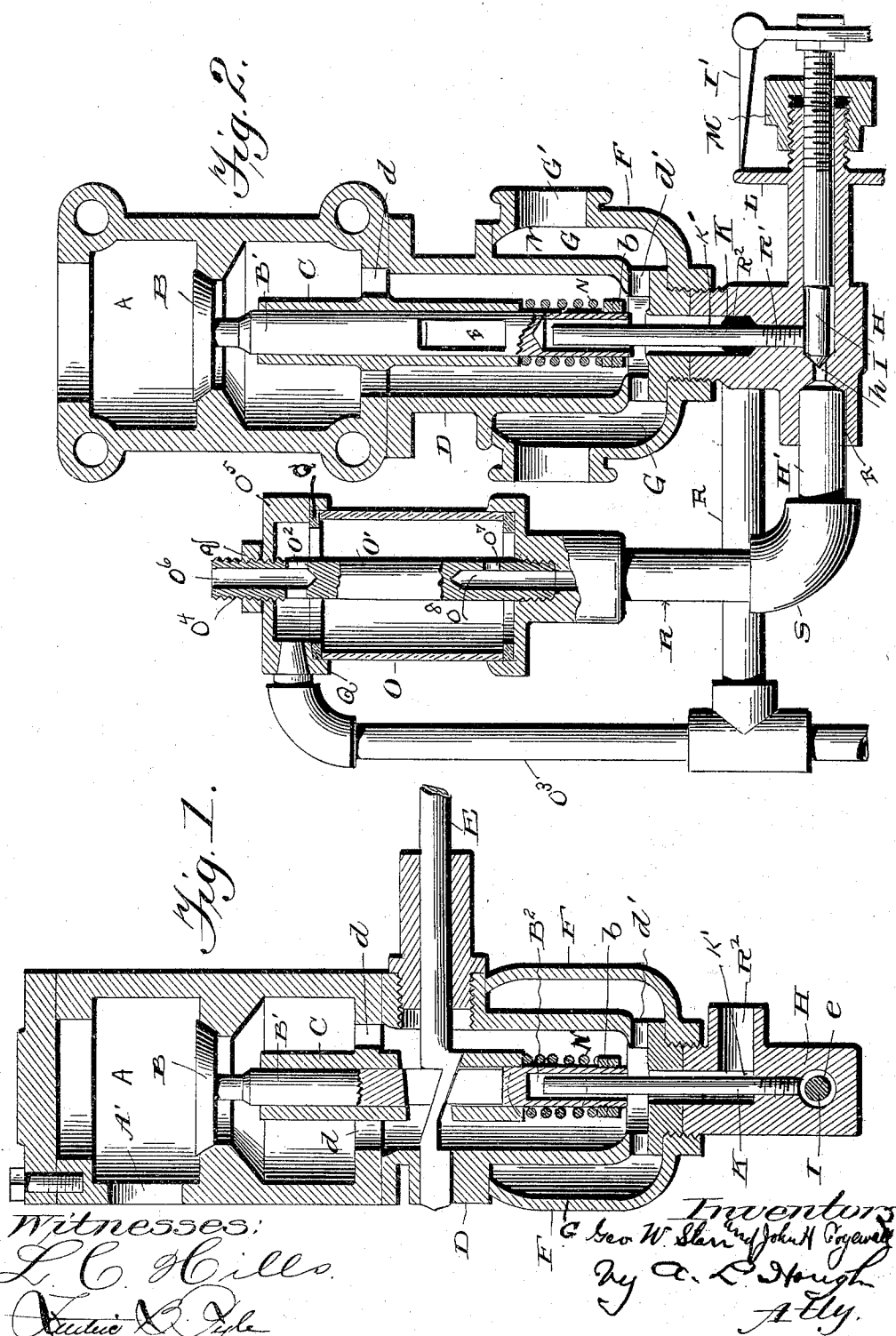
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Patented Sept. 27, 1898.

G. W. STARR & J. H. COGSWELL.
MIXER AND VAPORIZER FOR EXPLOSIVE ENGINES.

(Application filed Aug. 10, 1897.)

(No Model.)



UNITED STATES PATENT OFFICE.

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MIXER AND VAPORIZER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 611,341, dated September 27, 1898.

Application filed August 10, 1897. Serial No. 647,730. (No model.)

To all whom it may concern:

Be it known that we, GEORGE WATSON STARR and JOHN HENRY COGSWELL, citizens of the United States, residing at Havana, in the county of Mason and State of Illinois, have invented certain new and useful Improvements in Mixers and Vaporizers for Explosive-Gas Engines; and we do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in attachments for gasoline-engines, and especially to a vaporizer or mixer whereby the gasoline may become suitably mixed with air and vaporized before entering the combustion-chamber of the engine, suitable means being provided for regulating the supply of air and gasoline in proportion to the variation of the load or work of the engine.

A further part of the invention resides in the provision of means whereby the surplus gasoline which is not taken up by the inrushing air, coming in contact with the gasoline which is fed through overflowing pipes, may be conveyed back to a storage-reservoir, and in the mechanism shown, in which the stem of the induction-valve telescopes over the outlet of the supply-pipe from the gasoline-tank.

To these ends and to such others as the invention may pertain the same consists, further, in the novel construction, combination, and adaptation of the parts, as will be hereinafter more fully described and then specifically defined in the appended claims.

Our invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which drawings similar letters of reference indicate like parts throughout the several views, in which—

Figure 1 is a central vertical sectional view through our improved mixer. Fig. 2 is a central vertical section through our improved

mixer and gasoline-supply cup, the view being in a plane at right angles to that of Fig. 1.

Reference now being had to the details of the drawings by letter, A designates the valve-chamber, in which is a port A', leading to the main cylinder of the engine, to which the valve-chamber is secured.

B is the main suction-valve, having a stem B', and C is a guide for the said stem and is a part of the casing of the valve-chamber.

D is a shell which is suitably secured to the valve-chamber, and between the inner walls of which and the guide for the said piston-stem is formed an air-chamber in which the air and gasoline are mixed before passing through the ports d and on through the suction-valve to the combustion-chamber of the engine, which is not shown. The upper end of said shell D is apertured to form a support for the sliding stem E, which is actuated by a governor mechanism to regulate the throw of the suction-valve, which construction of governing mechanism is not illustrated, as it is not claimed as a part of the present invention, as we have been granted Letters Patent No. 585,127 for such construction.

A suitable shell F surrounds the shell D, forming an air-chamber G, into which the outside air is drawn through the apertures G', thence through apertures G² at each stroke of the piston to supply the mixed air and gas to the combustion-chamber. This air-chamber G also prevents any gasoline from spraying out by reason of the backlash between the strokes of the engine.

Secured to the lower end of the shell F, having preferably screw-threaded connection therewith, is the member H, which has lateral projections to receive the gasoline-supply valve I and the supply-pipe H', leading from the gasoline-cup. This supply-valve I is mounted in the hollow extension of the member H, having screw-threaded connections therewith, whereby the valve may be worked back and forth to regulate the supply of gasoline which passes from the supply-pipe H' through the contracted passage-way h, regulated by the tapering end of the valve I, which gasoline, after entering through said

passage-way, passes up through the feed-tube K, which has its lower end held in a duct in the casting H. The outer end of the valve I has secured to its end an indicating-pointer I', and L is a dial on which may be arranged numerals. A suitable packing-nut M, through which the stem of the valve I passes, is screwed over one end of the extension of the casting.

The lower end of the valve-stem B' is hollowed out, as seen at B², to receive the upper end of the feed-pipe K, which telescopes therein. On or about the lower end of the said valve-stem B' are the jam-nuts b, against the upper of which bears one end of the coiled spring N, while the upper end of the spring bears against the lower end of the guide C. The spring is provided for the purpose of seating the valve B after the latter has been raised by suction caused by the partial vacuum in the engine-cylinder.

O is a gasolene-supply cup mounted on the pipe R, which through the union S is connected to the pipe H'. Mounted in the said cup is the pipe O', which is solid a portion of its length, and to the upper threaded end of said pipe is adapted to be connected a pipe which conveys the gasolene from a pump (not shown) to the bore O⁶, from which it enters the said cup through the lateral apertures O². The upper end of the cup has fitted thereto a cap Q, which is held securely against the packing Q', interposed between the upper edge of the cylindrical portion of the cup and the cap, by means of the nut q. The lower portion of the said pipe O' has an aperture O⁷, leading into the bore O⁸, whereby the gasolene is allowed to flow from the cup into pipe R and thence to and through the pipe K. The object in having the pipe O' constructed as illustrated and described is to cause a steady flow of gasolene to the vaporizer, as the momentum of the gasolene as it comes from the pump is broken in coming in contact with the bottom of the bore O⁶, after which the gasolene is deflected laterally and through the apertures O² and runs down in the cup and through the aperture O⁷. It is obvious that if the gasolene entered directly into the body of the gasolene-cup it would be in a more or less state of agitation and the pressure at the feeding-valve would not be constant, which would cause a pulsating flow of gasolene down the feeding-tube K.

Leading away from the upper end of the cup is the pipe O³, which is provided to carry away the surplus gasolene and convey it to a supply-tank, from which it may be again pumped to the cup O. A pipe R' communicates between the space K' about the tube K and the pipe O³, whereby the surplus gasolene which runs down on the outside of the pipe K may return to the tank.

In operation the gasolene enters the cup

through the apertures O². The valve I is slightly opened, which allows the gasolene to flow up in the tube K and overflow at its upper end and run down on its outer surface. When a partial vacuum is formed in the engine-cylinder, to which our apparatus is attached, the suction will cause the valve B to rise up, and with it the stem B', which is hollowed out at its lower end and telescopes over the tube K. As the stem rises more or less of the surface of the pipe down which the gasolene is flowing will be exposed to the in-rushing air, which enters through the apertures G' and G², and the gasolene will be carried with the inflowing air up through the apertures d' and, becoming thoroughly mixed, enter the cylinder of the engine through the aperture or port A', where the supply of mixed gasolene and atmosphere is in readiness to be compressed by a return movement of the plunger and then exploded. On the return stroke of the piston of the engine the valve B will be seated, being aided by the tension of the spring N, which is under tension, as the stem B' rises.

From the foregoing, taken in connection with the drawings, it will be understood that the higher the stem B' is allowed to work, the limit of its movement being regulated by the governor mechanism, the more of the pipe K which is covered with gasolene will be exposed to the in-rushing air and taken to the engine-cylinder.

Having thus described our invention, what we claim to be new, and desire to secure by Letters Patent, is—

1. In a mixer or vaporizer for explosive-gas engines, the combination with the valve-chamber, valve and stem therein, the lower end of the said valve-stem hollowed out, of the gasolene-feed pipe, over which the lower end of the said stem telescopes, as and for the purpose set forth.

2. In a mixer or vaporizer for explosive-gas engines, the valve-chamber, valve and seat therefor, the valve-stem with its lower end hollowed out, the guide C, in which said stem works, the jam-nuts on the hollow end of the stem, and the spring interposed between the same and the lower end of the guide C, combined with the gasolene-feed pipe, over which the lower end of the stem works for the purpose set forth.

3. In a mixer or vaporizer for explosive-gas engines, the combination with the valve and chamber, the valve and stem with hollow end, of the shell D and member H, of the gasolene-feed tube mounted in the latter, and communicating with a valve-regulated duct, of the shell F, having screw-threaded connection with the said member, and casing D, as shown and described.

4. In combination with the vaporizing apparatus described, the gasolene-supply cup,

the tube mounted therein, which tube has a bore at each end with lateral openings into the said bores, the bore at the upper end adapted to communicate with a supply-pipe, and its lower end communicating with a pipe leading to the mixing-chamber, as shown and for the purpose set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE WATSON STARR.

JOHN HENRY COGSWELL.

Witnesses:

E. ROBESON,

DOUGLAS WRIGHT.