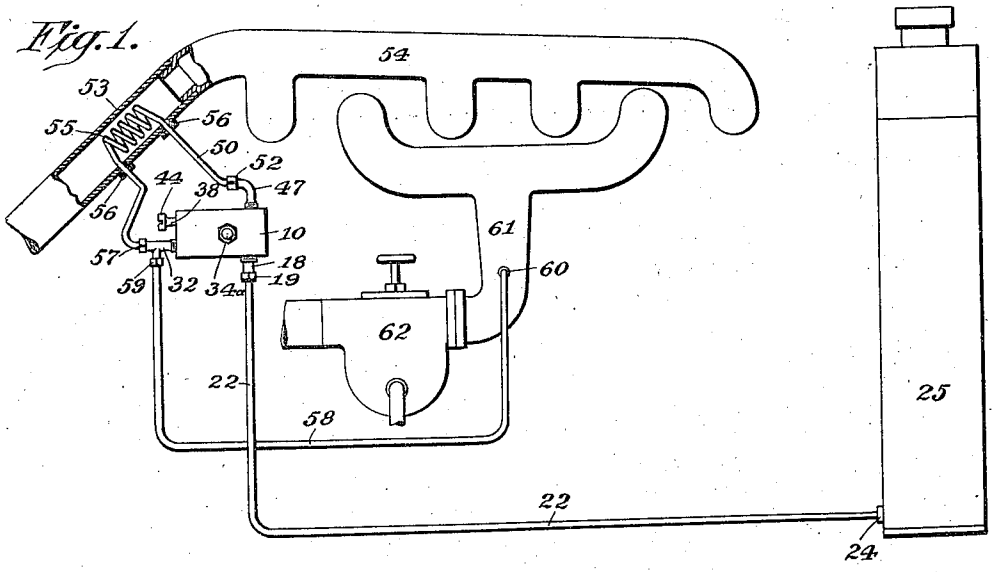
Nov. 11, 1924. 1,515,250

C. GEMINO ET AL

WATER VAPORIZING ATTACHMENT FOR INTERNAL COMBUSTION ENGINES

Filed Dec. 11, 1923

Fig. 1.



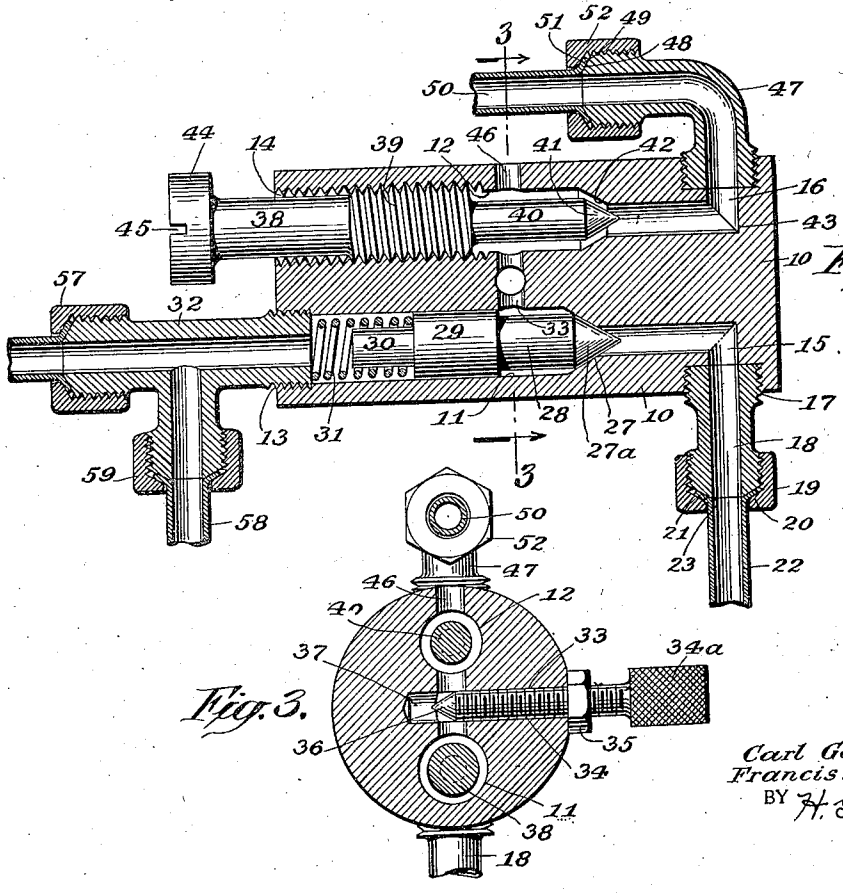


Fig. 2.

Fig. 3.

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Patented Nov. 11, 1924. 1,515,250

UNITED STATES PATENT OFFICE.

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WATER-VAPORIZING ATTACHMENT FOR INTERNAL-COMBUSTION ENGINES.

Application filed December 11, 1923. Serial No. 680,048.

To all whom it may concern:

Be it known that we, CARL GEMINO and FRANCIS B. DIANA, citizens of the United States, and residents of Waterbury, county of New Haven, and State of Connecticut, have invented certain new and useful Improvements in Water-Vaporizing Attachments for Internal-Combustion Engines, of which the following is a specification.

This invention relates to internal combustion engines, and more particularly to an attachment for introducing superheated water vapor into the combustion mixture for the purpose of reducing the carbon deposit and increasing the power of the engine.

One object of this invention is to provide an automatically controlled attachment for continuously withdrawing liquid water from the cooling system, vaporizing it, and then injecting the vapor into the intake manifold of the engine.

A further object is to provide an attachment of the above nature which will automatically shut off the supply of water when the engine stops.

A further object is to provide a device of the above nature which will be simple, cheap to manufacture, easy to install, compact in size, and very efficient and durable in use.

With these and other objects in view, there has been illustrated on the accompanying drawing one form in which the invention may be conveniently embodied in practice.

Fig. 1 represents a diagrammatic side view, partly in section, of the water injecting attachment as it appears when installed upon an internal combustion engine.

Fig. 2 is a longitudinal sectional view of the attachment, shown on a considerably enlarged scale.

Fig. 3 is a transverse sectional view of the attachment, taken along the line 3—3 of Fig. 2, looking in the direction of the arrows.

Referring now to the drawing in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates a body member substantially cylindrical in shape, and preferably formed by casting from brass, bronze, or other suitable non-rusting metal. The body member 10 is provided with a pair of parallel longitudinal channels 11 and 12, both of said channels being open at one end as shown at 13 and 14 respectively. The other ends of the channels 11 and 12 are reduced in diameter and are connected respectively to the enlarged inlet and outlet ports 15 and 16. The inlet port 15 on the channel 11 is threaded at 17 to receive a pipe section 18, provided with screw threads on both ends, as shown. The lower threaded end of the pipe section 18 is adapted to be engaged by a collar 19, said collar having an inwardly turned flange 20. The flange 20 of the collar 19 holds a flared end 21 of a metal tube 22, preferably formed of copper, in tight contact with a conical end 23 of the pipe section 18. The pipe 22 leads downwardly and forwardly to the front of the engine where it is connected at 24 to the lower part of the radiator 25.

The reduced section of the lower channel 11 is joined to the remainder of the channel by a conical tapered portion 27, which forms a seat for the conical end 27^a of a valve plug 28, slidable in said channel 11. The middle section of the valve plug 28 is enlarged in diameter at 29 to loosely fit the bore of the rear of the channel 11. The member 28 is provided with a rear section 30, of considerably reduced diameter, upon which a spiral spring 31 is adapted to seat. The other end of the spring 31 engages a T-member 32 screwed into the open end 13 of the channel 11.

In order to establish communication between the channels 11 and 12, a transverse passageway 33 is provided, said passageway having a valve member 34 of larger diameter than the passageway 33, extending through it at right angles. The valve member 34 is threaded throughout its length, and is adapted to screw into a threaded hole in the body member 10. The outer end of the valve member 34 is provided with a knurled hand knob 34^a, by means of which said valve member may be manipulated. The valve member 34 is held in any desired adjusted position by means of a nut 35 screwed upon the member 34, and adapted to engage the outside of the body member 10. The inner end of the valve member 34 has a conical point 36 adapted to seat in a recess 37, as clearly shown in Fig. 3.

By means of this construction, it will be evident that when the valve member 34 is moved up from its seat, communication will be established between the channels 11 and 12. When it is desired to permanently shut off the supply of water, it will merely be necessary to turn the knob 34^a in a direction

to move the valve member 33 inwardly until it engages the seat 37.

The upper channel 11 is threaded at its open end to receive an adjustable needle valve 38 which has a screw-threaded section 39 intermediate its ends The inner end of the needle valve 38 is reduced in diameter at 40 and has a conical point 41, adapted to seat upon the conical aperture 42 which connects the large rear part of the channel 12 with the reduced forward part thereof. The needle valve 38 extends out through the open end of the channel 12 and is provided with an enlarged head 44 having a slot 45 for engagement by a screw driver or other adjusting tool, whereby the needle valve 38 may be readily moved to any desired adjusted position in the channel 12.

In order to permit air to enter the channel 12, an air inlet aperture 46 is provided, said aperature 46 being preferably in alinement with the passageway 33 connecting the channels 11 and 12.

An elbow member 47 is adapted to be screwed into the outlet port 16, previously mentioned, and the opposite end of the elbow member 47 has a conical extremity 48. The flared end 49 of a copper pipe 50 is adapted to be held against the conical extremity 48 by means of a flange 51 on a collar member 52, screwed on the end of the elbow member 47. The pipe 50 passes rearwardly and upwardly into an exhaust pipe 53 which is connected to the exhaust manifold 54 of the internal-combustion engine.

In order to provide a large heating surface for superheating the water vapor as it is drawn through the pipe 50, said pipe is coiled at 55 within the exhaust pipe 53, as clearly shown in Fig. 1. The pipe 50, which is held in place by a pair of flanged bushings 56, is connected at its lower end to the T-member 32 by means of a flanged collar 57, similar in all respects to the collars 19 and 52 respectively. The lower leg of the T-member 52 is connected to a copper pipe 58 by means of a collar member 59. The pipe 58 extends downwardly, forwardly, and upwardly, and is connected at 60 in any suitable manner, to the intake manifold 61 of the internal combustion engine, preferably at a point between the intake port of the engine and the carburetor 62.

In operation, when the engine is started, the strong suction produced by the pistons in the cylinders will be transmitted through the intake manifold 61 to the pipe 58 and into the T-member 32. The suction in the forward branch of the T-member 32 will cause the valve plug 23 to move to the left in the channel 11 against the tension of the spring 31, thereby opening up communication between the channel 11 and the pipe 22, and permitting a small amount of water to flow from the lower part of the radiator 25.

The suction from the engine is also transmitted from the rear branch of the T-member 32 through the pipe 50 into the upper channel 12 of the body member 10. The suction at this point will cause air to be drawn in through the inlet aperture 46 at a velocity determined by the adjustment of the needle valve 38. At the same time, water will be slowly drawn through the passageway 33 at a rate dependent on the adjustment of the valve member 34. The water coming into the channel 12 from the passageway 33 will be aspirated and caused to break up into fine particles by the rapidly flowing stream of air entering from the inlet 46. The commingled air and water spray will then be drawn into the pipe 50 and will be vaporized and superheated by the heat of the exhaust gases surrounding the coil 55. The superheated mixture will next pass through the T-member 32 and the pipe 58 into the intake manifold 61 at the point 60.

One advantage of this invention is that carbon deposits in the head of the cylinder will be eliminated, thereby reducing the "knocking" of the engine.

A further advantage is that the flow of liquid water to the attachment may be varied at will, thus making it possible to install it upon any size and type of engine.

A still further advantage is that the vaporizing coil 55 is in direct contact with the exhaust gases from the engine. The water spray is thus vaporized and superheated almost instantaneously.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

1. In a water vaporizing injecting attachment for an internal combustion engine, a casing having a pair of longitudinally extending communicating passages, the first of said passages being connected to a source of water supply, the second of said passages being connected to a source of vacuum, needle valves located in each of said passages for controlling the openings thereinto, the first passage being also connected to said source of vacuum, a spring pressing against the needle valve in said first passage for closing said needle valve when the engine is not running, but permitting said needle valve to automatically open when the engine is started, means for permitting

the entry of air from the atmosphere into the second passage, said air being mixed in said second passage with the water coming from the first passage, and means for heating said air and water mixture to completely vaporize it.

2. In a water vaporizing injecting attachment for an internal combustion engine, a body member having a pair of parallel passages, the first passage leading to the water portion of the water cooling system and the second passage leading to a source of vacuum, the second passage having an opening to the outer atmosphere, an adjustable needle valve threaded into said second passage and adapted to control the flow through said passage, a spring-pressed needle valve in the first passage, said first passage being connected at the end opposite from the point of the spring-pressed needle valve to a source of vacuum, and means for connecting said passages, the spring-pressed needle valve being adapted to shut off the supply of water when the engine is not running but being adapted to open said supply under the suction from the engine when the latter is started.

In testimony whereof, we have affixed our signatures to this specification.

CARL GEMINO.
FRANCIS B. DIANA.