

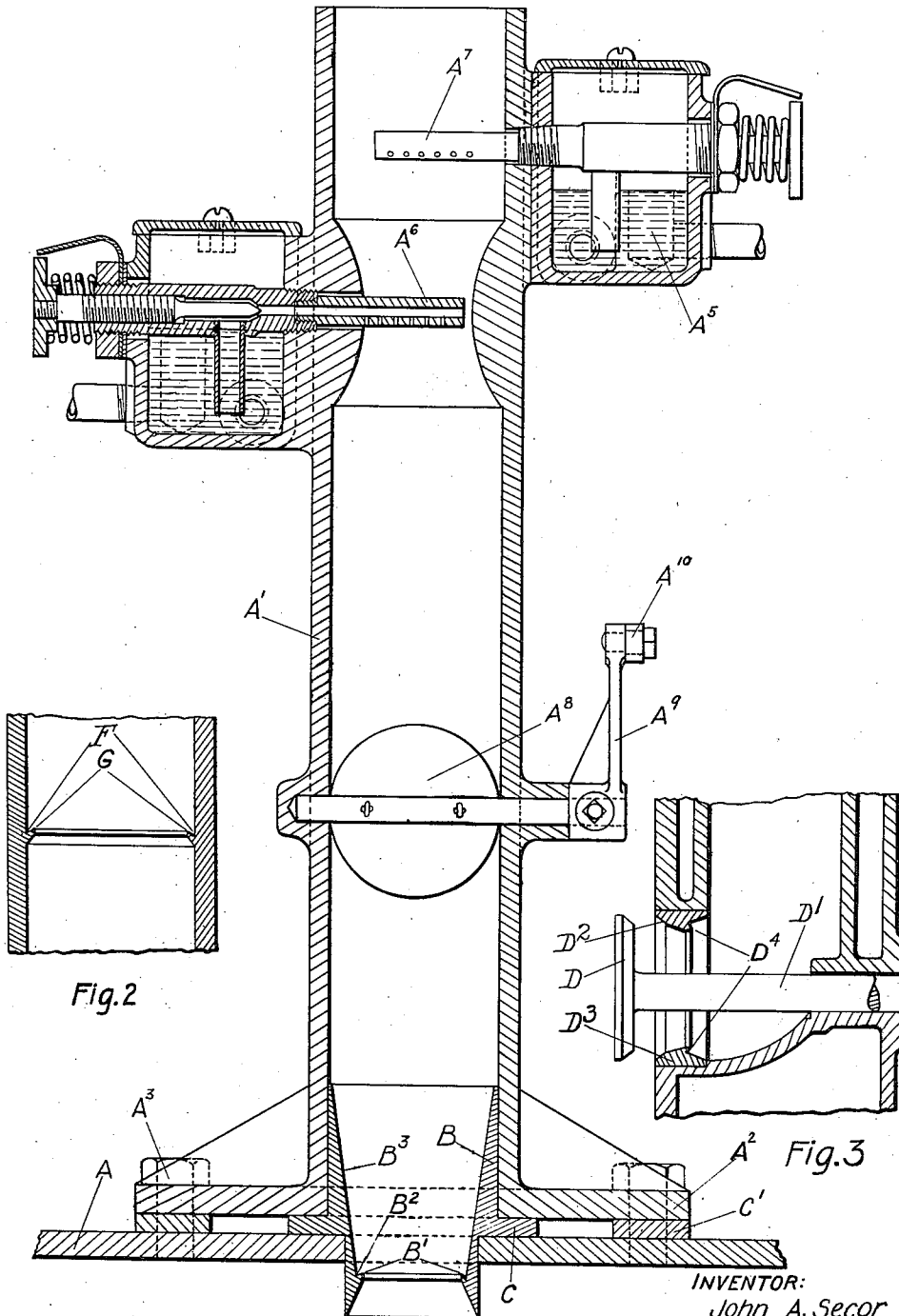
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J. A. SECOR

REATOMIZER

Filed June 30, 1919



Witness:
H. P. Ireland

Fig. 1

INVENTOR:
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UNITED STATES PATENT OFFICE.

JOHN A. SECOR, OF LAPORTE, INDIANA, ASSIGNOR TO ADVANCE-RUMELY COMPANY,
OF LAPORTE, INDIANA, A CORPORATION OF INDIANA.

REATOMIZER.

Application filed June 30, 1919. Serial No. 307,682.

To all whom it may concern:

Be it known that I, JOHN A. SECOR, a citizen of the United States, residing at Laporte, in the county of Laporte and State of Indiana, have invented a certain new and useful Improvement in Reatomizers, of which the following is a specification.

My invention relates to improvements in carburetors, and particularly has reference to re-atomizing devices therefor.

It is, of course, well-known that when liquid fuel is aspirated by a rapidly moving current of air, the sudden change in velocity of the liquid and the sudden change in the pressure to which it is subjected among other forces, results in more or less comminuting or atomizing the liquid so that it readily mixes with the air to form a combustible fluid.

Experience shows, however, that particularly with heavier fuels, such as kerosene and the heavier fractions or distillates, you are likely to have difficulty in that the fuel which is caught up by the air may be re-deposited along the walls and passages through which it travels and particularly is this the case after the combustible mixture has passed by a throttle valve, the throttle valve tending to change the direction of flow, and to separate out the fuel so that you may even get an actual stream of liquid running down the walls of the passage, which stream of liquid has been taken out of a satisfactory mixture by the mere presence of the partially closed throttle valve.

This difficulty is also present when you are using water as a part of the combustible mixture, and it is, of course, quite undesirable that this liquid fuel or liquid water be allowed to get into the cylinder in anything but a gaseous or finely divided condition, both because either the liquid fuel or liquid water hinders combustion and because liquid ingredients in the cylinder R likely to cause dilution of the lubricant in the crank case.

My invention therefore takes the form of a device or devices which have for their purposes, to reatomize the combustible liquid, or water and mix or assist in the mixing of it with the air.

My invention is more or less diagrammatically shown in the accompanying drawings

which show a longitudinal section through a carburetor embodying my device, wherein—

Figure 1 is a cross section through the carburetor with a first atomizing device;

Figure 2 is a detail cross section of the passage pipe with a modified form of atomizing device;

Figure 3 is a detail of an extension of the passageway and showing a re-atomizer at the intake valve.

Like parts are designated by like characters throughout.

A is a part of the engine cylinder, or housing containing the cylinder. A¹ is the carburetor casting which merely consists in an elongated tube flanged at A² so that the bolts A³ may attach it to the engine and provided with a water reservoir A⁴, fuel reservoir A⁵ and water nozzle A⁶ and fuel nozzle A⁷ discharging into the passage. A⁸ is a butterfly throttle valve between the fuel and water nozzles and the engine, adapted to be controlled by means of the lever A⁹ and link A¹⁰.

B is an atomizing or re-atomizing sleeve inserted in the passage immediately below the butterfly. This sleeve takes the form of a modified Venturi tube from the throat of which a ridge projects, a slight gutter being left between the ridge and the wall of the tube so as to provide a sharp annular knife edge B¹ with a downwardly and outwardly extending curved channel or reservoir or gutter B², the wall of the Venturi tube being sloped upwardly from the bottom of the reservoir as at B³.

The reatomizing venturi is held in position by clamping the flange C therein between the carburetor flange and the engine. To obviate possibility of breaking the carburetor flange, washers C' of the same thickness as the reatomizing flange C are used to contact the pressure of the bolts and thus to prevent breaking or distortion of the carburetor flange.

D is the engine intake valve carried on the valve stem D¹, controlled by means not here shown. It operates against a valve seat D² and this seat is made removable in the engine and carries, extending up toward the carburetor, the Venturi tube D³ grooved or distorted at D⁴ in the same manner as the

distortion of the member B. This arrangement gives a final atomization and mixing just as the mixture enters the engine.

Thus I have disposed two Venturi tube
5 atomizers between the throttle valve and the intake.

Referring to the device of Figure 2, the passageway A¹ is provided with an interior trough F which is arranged about the side
10 of the passageway and is provided with the edge G. Under certain conditions such a device might be operated more or less effectively to atomize the liquid by collecting it as it flows down the side and then exposing
15 it to the outer knife like edge of the trough which lies in the path of the moving current of air or mixture. This is only done to suggest the different forms of atomizer which might be employed.

20 The use and operation of my invention are as follows:

If the throttle valve is wide open and if the air velocities are high, there will be little change in the mixture, but as it passes
25 through the Venturi tube, it will be re-atomized and re-mixed to some certain extent.

If, however, the throttle is more or less closed it will provide an obstruction against which the fuel will impinge and, being
30 heavier than the air, it will be separated out by inertia and the air will go on carrying probably a lean and unsatisfactory mixture and the liquid will run down the walls
35 of the tube. This liquid will be caught by the ledge in the venturi and the little annular reservoir formed by that ledge will be filled up with liquid, and as more liquid comes down, it will overflow the sharp knife edge. One possible explanation of
40 the action of my device is that as the liquid overflows, it comes into the direct path of the air and it will be suddenly torn apart and atomized by such air.

Experience shows that the diameter of
45 this modified Venturi tube for the lower re-atomizer must be a little larger to get the same capacity, than the diameter of a normal venturi. This is probably caused by the fact that the effective diameter of the
50 venturi is decreased by the thin film of oil overflowing the ledge all the way around, before this thin film of oil has time to be broken up and carried away as part of the atomizing mixture.

I claim:—

1. In combination with a down-draft carbureter, a reatomizer located in the mixture passage leading from the carbureter to the engine, said reatomizer comprising an annular channel opening only into said pas-
55 sage and facing in the direction of the incoming fuel current, and provided about its inner sides with a sharp edge, said channel adapted to receive and collect liquid fuel and to permit the same to overflow its inner
60 edge and to be reatomized thereby into the current.

2. An atomizer and mixer comprising a Venturi tube located in the mixture passage leading from the carbureter to the engine
70 and having an annular channel in the interior wall thereof, said channel being open only to the interior of said mixture passage, and opening toward the incoming mixture.

3. An atomizer and mixer comprising a
75 Venturi tube adapted to be inserted in the mixture passage of an internal combustion engine, having an annular channel in the interior wall thereof, said channel being closed at its bottom and being situated at
80 the smallest diameter of the venturi, and opening towards the incoming mixture.

4. An atomizer and mixer comprising a Venturi tube adapted to be inserted in the mixture passage of an internal combustion
85 engine, having an annular channel in the interior wall thereof, said channel being closed at its bottom and being situated at the smallest diameter of the venturi, and opening towards the incoming mixture, the
90 channel being bounded on its exposed side by a sharp edge.

5. An atomizer and mixer comprising a Venturi tube formed within the mixture
95 passage of an internal combustion engine, having an annular channel in the interior wall thereof, said channel being closed at its bottom and being situated at the smallest diameter of the venturi, and opening towards the incoming mixture.

In testimony whereof, I affix my signature in the presence of two witnesses this 24th
100 day of June, 1919.

JOHN A. SECOR.

Witnesses:

MINNIE M. LINDENAN,
MILDRED H. MACKIE.