H. M. REICHENBACH.

CARBURETING DEVICE.

APPLICATION FILED SEPT. 18, 1914.

1,147,644. Patented July 20, 1915.

3 SHEETS—SHEET 1.

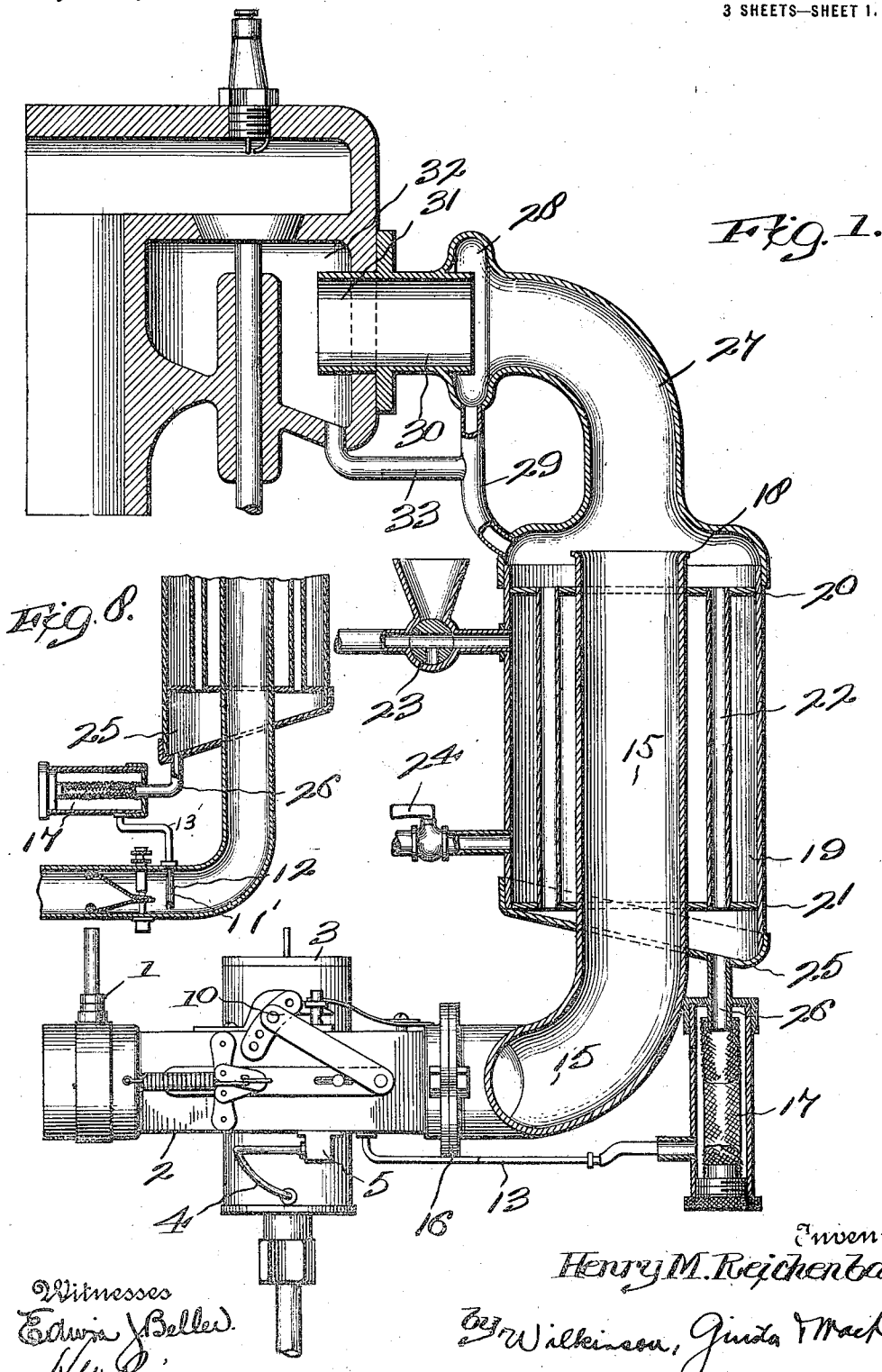


Fig. 1.

Fig. 8.

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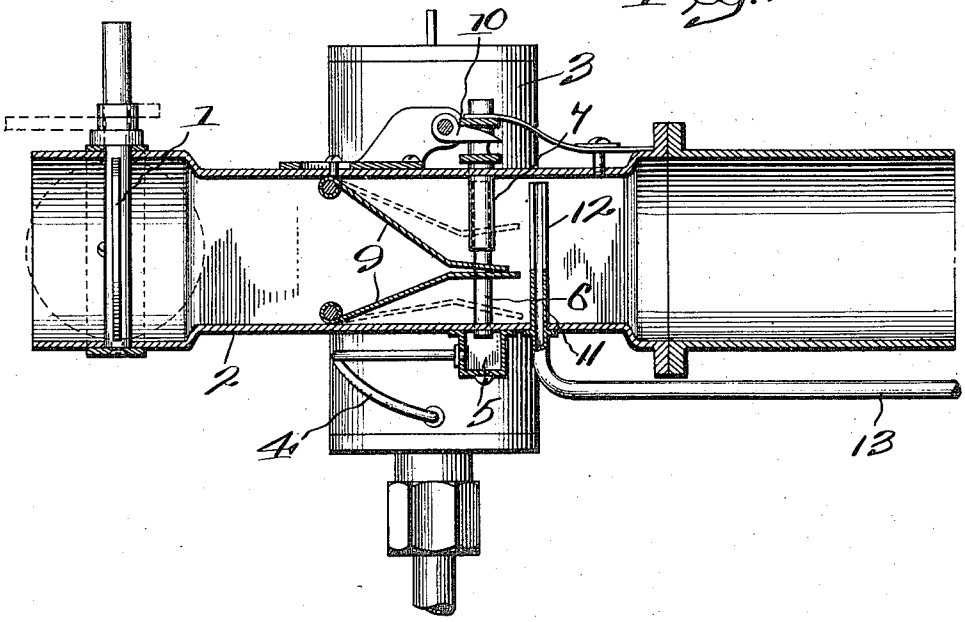
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3 SHEETS—SHEET 2.

Fig. 2.



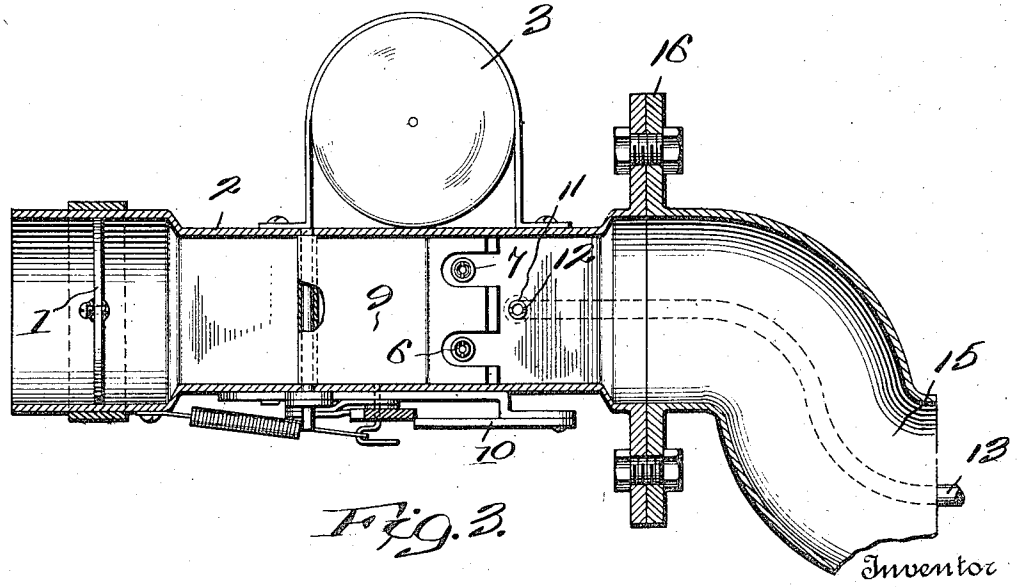


Fig. 3.

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3 SHEETS—SHEET 3.

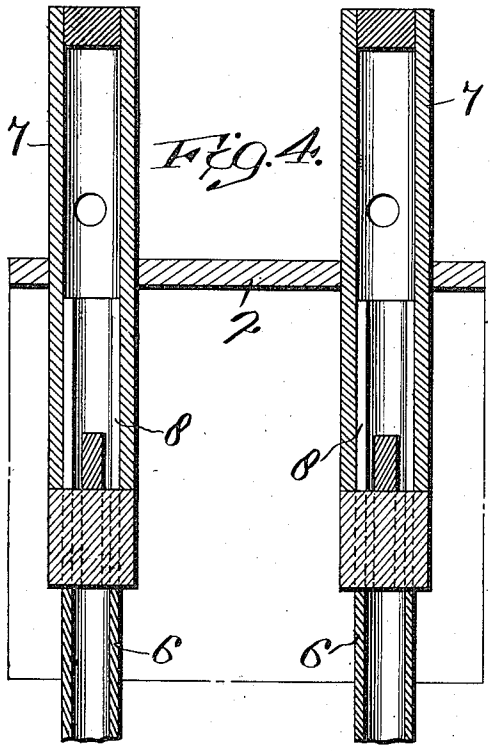


Fig. 4.

Fig. 5.

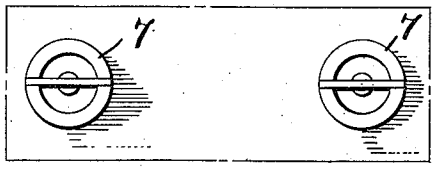
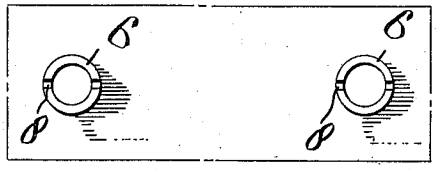


Fig. 6.



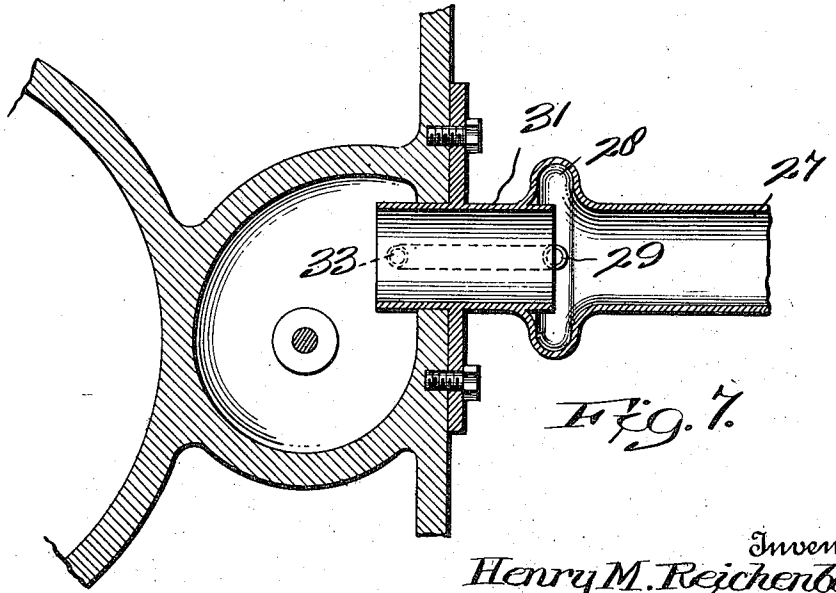


Fig. 7.

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UNITED STATES PATENT OFFICE.

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CARBURETING DEVICE.

1,147,644. Specification of Letters Patent. Patented July 20, 1915.

Application filed September 13, 1914. Serial No. 862,343.

To all whom it may concern:

Be it known that I, HENRY M. REICHENBACH, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Carbureting Devices; and I do hereby 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.

My invention relates to carbureting devices for use in connection with internal combustion engines, and particularly to atomizing devices arranged in an atomizer conduit so as to be in responsive relation to the draft of the intake.

In general my apparatus is an improvement over that shown in my former application, Serial No. 771,567, filed June 3, 1913, for carbureters.

In the device shown in the application referred to, I have shown my atomizer arranged so as to deliver fuel to an automizing draft in response to the suction pull of the engine. I, in the present case, improve the apparatus disclosed in my prior application referred to by arranging near the primary atomizer and in the same atomizer conduit, that is, in substantially its vicinity of operation, a secondary atomizer, connected to drip pockets arranged in the conduit channel or in connection with the conduit.

It is well known that in using fuel in an internal combustion engine, the fuel is sometimes not all volatilized or burned, and is burned subsequent to explosion, within the cylinder, or is burned in the flame of exhaust gases, or is not burned at all, and is discharged with the exhaust gases. Any of these constitutes a waste with loss of power and diminished efficiency in the engine. If the burning is not complete, deposit of carbon is likely to occur over the interior of the cylinder or passages. Moreover, the discharged gases may be impregnated with evil smelling and injurious admixtures. The portions so remaining unburned are in the form of guttules or drops larger than the mist-like spray or nebula of ungasified hydrocarbons which is usually found in the charge of an internal combustion engine. These guttules or drops are, for the most part, composed of hydrocarbons heavier, and less easily volatilized than the less refractory constituents of the oil. They, therefore, do not nebulize as readily as the lighter hydrocarbons, and are apt to occur as comparatively large drops in the cylinder charge or to be spread over the interior of the cylinders or passages.

I aim in the present application, to collect these more resistant hydrocarbons into one channel and to discharge them through an atomizer, *i. e.* through a secondary atomizer arranged in the atomizer conduit in close proximity to the locus of action of the primary atomizer, and therefore as near as possible to the point of highest velocity of the intake current and before it expands into the larger passage engine-ward of the atomizer. There is, possibly, also some lifting effect due to suction.

In the drawing: Figure 1 is a side view largely in section, showing the arrangement of my invention in connection with the intake or receiving chamber of an engine. Fig. 2 is a side view, in section, of the atomizer channel. Fig. 3 is a top view in section of the same. Fig. 4 shows a section crosswise of the conduit, of the form of atomizer which I prefer to use. Fig. 5 is a top view of the sleeve arranged to control the openings in the primary atomizer. Fig. 6 is a view of the jets as shown in Fig. 3, looking downward from the top. Fig. 7 is a view of the discharge into the engine intake chamber; and Fig. 8 is a view, on a reduced scale, of a somewhat modified form.

1 represents the throttle valve, 2 the rectangular atomizer channel, 3 the fuel tank, 4 the pipe leading from the fuel tank to the primary atomizer, 5 the fuel channel for such atomizer, 6 the atomizer pipes, 7 the shields controlling the extent of opening of such pipes, 8 the openings or slots in said pipes, shown in Fig. 4 as fully closed by the shields 7, 9 the deflecting plates controlling the width of the cross section of the blast, 10 a cam provided with a differential curve controlling the play of the caps in response to the play of the valves or gates 9 by mechanism 10, not necessary here to discuss in detail. Directly in front of, that is engine-ward of such primary atomizer, I arrange a secondary atomizer 11, with the slots 12 as shown, in fixed position, and as near as practicable to the working plane of the primary atomizer. This is connected by the pipe 13 to the lower part of upright filter 17. The intake conduit 15 is clamped at 16 to the atomizer conduit but out of line with it, as

shown in Fig. 3. The pipe 16 terminates in a flared end 18. It is surrounded by the drum 19, and this drum is closed at the top and bottom by the partitions or heads 20 and 21. These heads are pierced, and tubes 22 form open communications between them. The interior of the drum may be heated, and the fuel and air arising may be heated by fluids of any kind introduced at 23 and allowed to leave at valve 24. The drum is provided with an inclined bottom 25, a pipe 26 leading to the upper part of a filter 17. As the filter becomes filled, the hydrostatic pressure will raise the collected drip to the level of the slotted openings in the secondary atomizer. Engine suction may possibly aid this somewhat too. Any drip from the flared mouth 18 is caught on the upper plate 20 and brought to the filter. Above this flared mouth I arrange a top which extends into and merges with a tube 27 bent to ninety degrees. On the horizontal portion of this tube I arrange a bead or drip collecting annular chamber 28, which, by means of a pipe 29, communicates with the head of the drum. Protruding into this annular chamber or bead is a straight pipe 30, the other end 31 of which protrudes into the intake 32 of the engine. The said intake is provided with an inclined bottom which, by means of a pipe 33, communicates with pipe 29 and with the head of the drum. By these constructions, I am able to form several pockets in the conduit in which drops condensed out of the fuel current may be permitted to gather and collect finally into the filter 17. The connection between the atomizer conduit and the intake conduit is, as I have shown in Fig. 3, not in line, so that a current of air and gas coming from the square atomizer conduit into the round intake conduit is given a swirling or gyratory motion. This motion of the current serves two purposes, one is to pick up and carry along with it any drops which might have a tendency to adhere to the walls of the channel; another is that the drops so carried along may be more readily collected at the points of collection that I have indicated. This gyratory motion serves to spread any fuel not atomized and not gasified, over the heated surface, in a spiral path, allowing it a longer time in its ascent, thereby increasing the heating and exposure to the air currents for evaporation. It also provides an easier lift (under less velocity upward) in this heating tube.

It will be noted by reference to Fig. 7, that the straight pipe 31 discharges from the bent pipe 27 tangentially into the more or less circular intake chamber. This tangential discharge continues the gyratory flow of the gas and air currents, and also tends to keep clean the walls of the intake from any precipitated drip. It also allows any drip that may form to collect upon the inclined bottom of said chamber.

Gyratory motion in the motor intake chamber serves also to keep up a circular movement, and this prevents precipitation of entrained fuel during the interval of valve closure. It may be noted that material mechanically suspended in a moving medium tends to precipitate if the movement ceases; the size of the particles which may be suspended being in proportion to the velocity and density of the current of the medium.

It may be here stated that I regard as the intake conduit, all of the (inclosed) passages between the fuel emission jets and the intake valves of the engine, and that I regard as the intake, the current of air and fuel flowing to the engine cylinders or intake valves.

I have shown in Fig. 8 a modification which may in some instances be preferred. In this modified form I collect in the bottom 25, any liquid trickling from above and lead it to the filter 17, through pipe 26, and thence by pipe 13′ to the secondary atomizer 11′ by gravity. The lower end of the atomizer is closed, as shown, so that all escape of collected fluid is sidewise through the slots 12, to the blast. In this form it will be noted the collected drip is led downward throughout its course.

The secondary atomizer arranged as I have shown it, with its slots 12 directly across the path of the current of air, gives up its fuel in direct accordance with the force of the blast, modified by the temperature and consistency of the fuel. The primary atomizer will take care of any irregularities caused by the secondary atomizer. By arranging my secondary atomizer in this close proximity to the primary atomizer I am able to effect a complete admixture and commingling of the heavier oils delivered to the said secondary atomizer with the fuel current.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a device for conducting mixed air and fuel to the intake of an explosion engine, the combination with the fuel discharge pipe of an atomizer, of a second fuel discharge pipe associated with said atomizer pipe and arranged to conduct to the vicinity of the discharge of said atomizer pipe, fuel condensed or precipitated from the charge.

2. In combination, a primary atomizer for liquid fuel, a conduit in which said atomizer is located, an intake conduit connected to and continuing said atomizer conduit to the engine intake conduit, drip collecting places arranged in connection with said intake conduit, a pipe connection between said devices and the vicinity of the atomizer, and an

atomizer at the end of said pipe adapted to discharge said collected drip in an atomized condition near said primary atomizer.

3. In combination, an atomizer conduit, a primary atomizer arranged in said conduit, in responsive relation to the engine suction, and in communication with the fuel tank, a secondary atomizer, an intake conduit, drip catching pockets in connection with such intake conduit, means conducting drip so caught from said pockets to said secondary atomizer, said secondary atomizer being also arranged in responsive relation to the engine suction.

4. In combination, an atomizer conduit, a primary atomizer therein, means controlling discharge of fuel from said atomizer in response to the suction of the engine, an intake conduit, a secondary atomizer, arranged to discharge drip fuel collected from the intake conduit, said secondary atomizer being arranged in direct responsive relation to suction pressure.

5. In combination, an atomizer conduit, a primary atomizer therein, means in said conduit arranged to control in response to engine suction the effective width of the channel, and at the same time control fuel discharge in proportion to said width, an intake conduit connected to said atomizer conduit, drip collectors in said conduits, a secondary atomizer arranged in said atomizer conduit in close proximity to the primary atomizer and connected to the drip collecting pockets, said secondary atomizer being located in the vicinity of the primary atomizer.

6. In combination, an atomizer conduit, a primary atomizer therein, means controlling discharge of fuel from said primary atomizer, in response to the suction of the engine, an intake conduit, a temperature changing drum arranged in relation to said conduit, drip tubes passing away from said drums away from the engine, means for changing the temperature of the drip passing through said tubes, a secondary atomizer arranged to discharge drip fuel collected from the intake conduit, said secondary atomizer being arranged close to the primary atomizer.

In testimony whereof, I affix my signature, in presence of two witnesses.

HENRY M. REICHENBACH.

Witnesses:
E. A. WALLING,
JNO. J. HAY.