June 28, 1932. R. MALIN 1,865,266

CARBURETOR

Filed Oct. 19, 1929

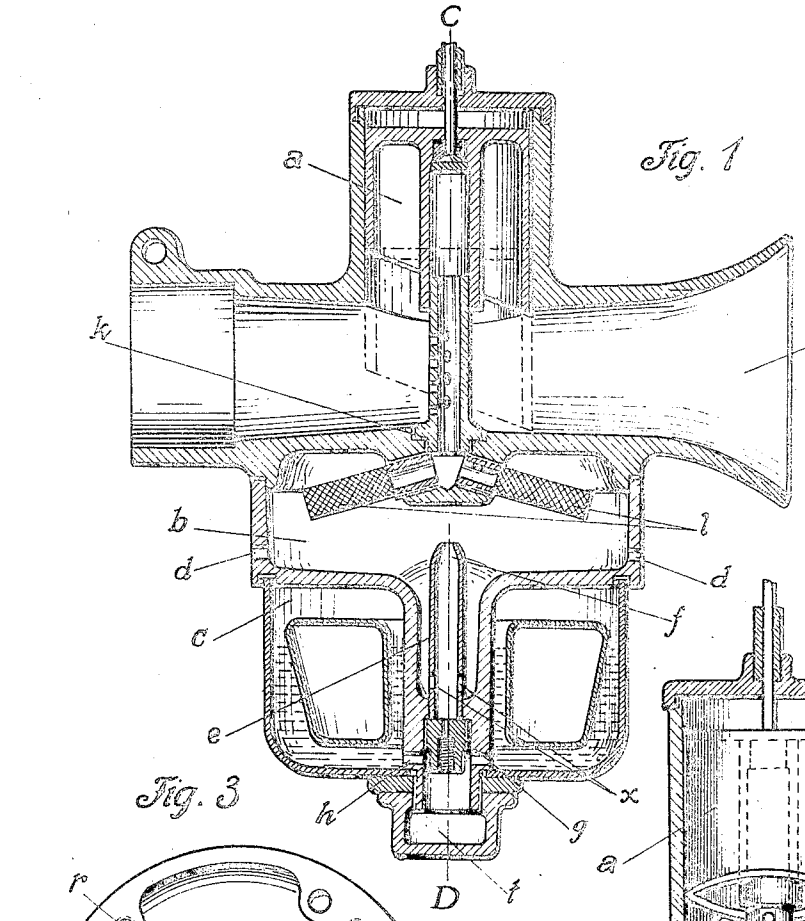

Fig. 1

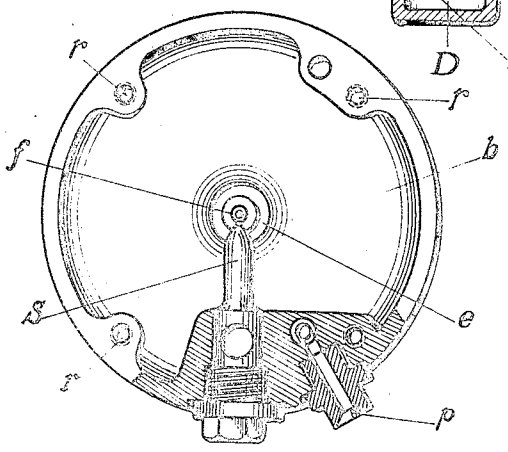

Fig. 3

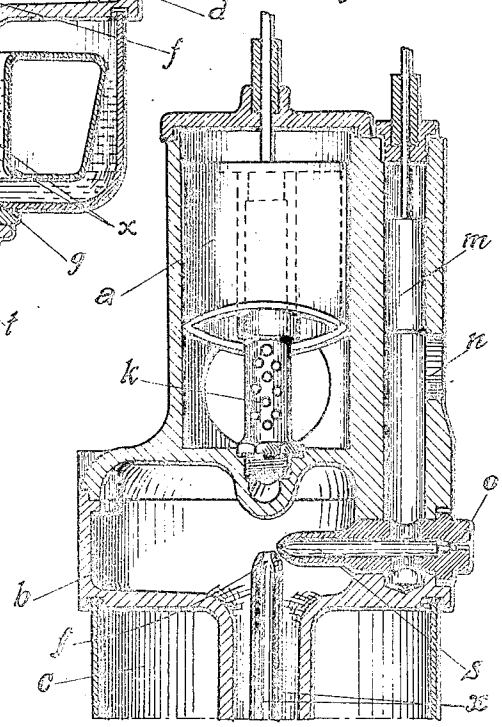

Fig. 2

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UNITED STATES PATENT OFFICE

RICHARD MALIN, OF CHEMNITZ, GERMANY, ASSIGNOR OF ONE-HALF TO FIRM THEODOR HAASE, OF CHEMNITZ, GERMANY

CARBURETOR

Application filed October 19, 1929, Serial No. 400,902, and in Germany September 7, 1929.

The object of the present invention is a carburetor wherein the novel feature is the provision of an atomizing chamber, separate from but connected to the induction channel only through a delivery pipe. The atomizing process proper takes place in this atomizing chamber, where the coarse particles of the fuel are precipitated and a complete mixture of gases or gas and vapour ready for use in the engine is continuously maintained therein. This ensures an immediate starting of the motor when cranked, and variations of load are equalized in such a manner, that they no longer make themselves felt to any appreciable extent, and thus a material saving in fuel is effected thereby.

Another novel feature of this invention is the provision of a filter in front of the delivery pipe connecting the induction channel with the atomizing chamber, by means of which the heavy particles of the fuel are retained, which drop off and again join the fuel in an annular chamber surrounding the atomizing jet tube. The fact of arranging a filter in front of the inlet of the delivery pipe possesses a further important advantage in that it prevents the fuel in the carburetor being ignited by backfires, because of the fact that the filter prevents the flame occurring during the backfiring entering the atomizing chamber.

The drawing illustrates the subject matter of the invention in one of its constructional forms as an example and in it, Fig. 1 shows a longitudinal section thereof, and Fig. 2 shows a section taken on line C—D of Fig. 1, whilst Fig. 3 represents a section taken on line A—B of Fig. 1.

W is the induction channel, *b* denotes the separate atomizing chamber arranged between it and the float chamber *c*, the atomizing chamber being provided with a bottom depressed towards its center and also with orifices *d* communicating with the atmosphere. The atomizing jet tube *f* protrudes within the atomizing chamber *b*, and is surrounded by an annular chamber *e* which is contiguous to the atomizing chamber *b* and which communicates with the interior of the atomizing jet tube *f* by means of the orifices X. A calibrated plug *g* restricts the lower end of the atomizing jet tube *f*. The delivery pipe *k* leads from the atomizing chamber *b* into the induction channel *w* where it is provided with outlet orifices, and is surmounted by the throttle valve *a*. A filter *l* is provided on the inlet-end of the delivery pipe *k* within the atomizing chamber *b*.

An air opening is provided at *n* whereby air can be admitted from the atmosphere through the air nozzle pipe *s* to the interior of the atomizing chamber. This air opening is controlled by a slide-valve *m* and the air nozzle pipe *s* has a nozzle *o* which is in connection with the atmosphere also. The supply of fuel to the float chamber through nipple *p* is controlled by a float mechanism of any well known construction. R designates holes for the connecting screws.

The apparatus works as follows:—When the motor is at rest, air at atmospheric pressure enters the induction channel *w*, the atomizing chamber *b* (through the orifices *d* and the air opening *n* and the nozzle *o*) as well as the float chamber *c* (through openings in the same, not shown in the drawing). When the carburetor float is flooded the fuel is allowed to rise into the atomizing chamber, though not above the level of the orifices *d*, through which the fuel can escape to atmosphere. As the orifices *d* are at a lower level than the top of the atomizing jet tube, it is of course impossible to flood the atomizing chamber completely when starting the motor.

The fuel is therefore present in the float chamber *c* in the atomizing chamber *b* in the atomizing jet tube *f* and in the annular chamber *e* which are, as already mentioned, in communication with one another by means of holes X and the calibrated nozzle of plug *g*.

The calibrated nozzle of plug *g* restricts the lower end of the atomizing jet tube *f* and is arranged at a position far below the normal level of the fuel.

When the motor is started the suction produced is of course communicated to the atomizing chamber *b*. The air at that moment aspirated through *o* and *n* (see Fig. 2) passes over the top of the atomizing jet tube and draws the fuel from the tube to the atomizing

chamber. First of all the contents of the atomizing jet tube *f* and then that of the annular chamber *e* are evacuated, as the orifice of the atomizing jet tube is larger than the calibrated nozzle of plug *g*. If the full amount of mixture is admitted to the engine the calibrated nozzle of plug *g* discharges an appropriate quantity of fuel.

The atomized fuel is vaporized by reason of partial vacuum in the atomizing chamber *b* and the jet of air drawn in whirls around the atomizing chamber *b*, during which process the larger particles of fuel are caught upon the walls of the filter *l* and are thereafter precipitated and flow back into the annular chamber surrounding the atomizing jet tube *f*. The vaporized fuel formed in the atomizing chamber *b* is aspirated through the filter *l* and the holes of the delivery pipe *k* into the induction channel *w* whence it flows to the motor.

Whereas, hitherto even in the case of the best carburetor system, the fuel is vaporized or atomized directly in the induction channel, or in other words, is injected into the induction channel, the atomizing is effected in the case of the present invention within a special atomizing chamber arranged between the induction channel and the float chamber, and it is a fact that from this chamber only a very finely distributed and quite dry and filtered vapour is admitted to the induction channel and to the motor cylinder.

The fuel which collects in the annular chamber *e* then passes through the orifices X into the vaporizing tube, to be sucked up and vaporized again. If the fuel rises in the annular chamber *e* owing to throttling by means of the valve, then there is ample fuel present for the next acceleration.

By adjusting the air valve *m* in relation to the air inlet *n* the vaporization or atomization effect, and consequently the quantity of the vaporized fuel can be regulated, according to temperature and the like.

What I claim is:

In a carburetor the combination of a mixture delivery pipe provided with outlet orifices, an atomizing chamber into which protrude gauze filters which connect the atomizing chamber with the delivery pipe and thereby to the induction channel, a float chamber separated from the atomizing chamber by a calibrated plug, an atomizing jet tube adapted to receive fuel from the float chamber through said calibrated plug and discharging the fuel in said atomizing chamber, an air nozzle pipe in atomizing relationship to said atomizing jet tube, the amount of air flowing through said air nozzle pipe being controlled by a slide valve and the direction of the air stream being such that it does not strike said gauze filters, the bottom of said atomizing chamber being continued down into a cylindrical chamber through which the atomizing jet tube is carried which communicates with said cylindrical chamber by holes and at the lower end of which said calibrated plug is mounted.

RICHARD MALIN.