May 24, 1932. W. TOBLER 1,860,063

FUEL INJECTION DEVICE FOR INTERNAL COMBUSTION ENGINES

Filed May 28, 1931

Fig. 1.

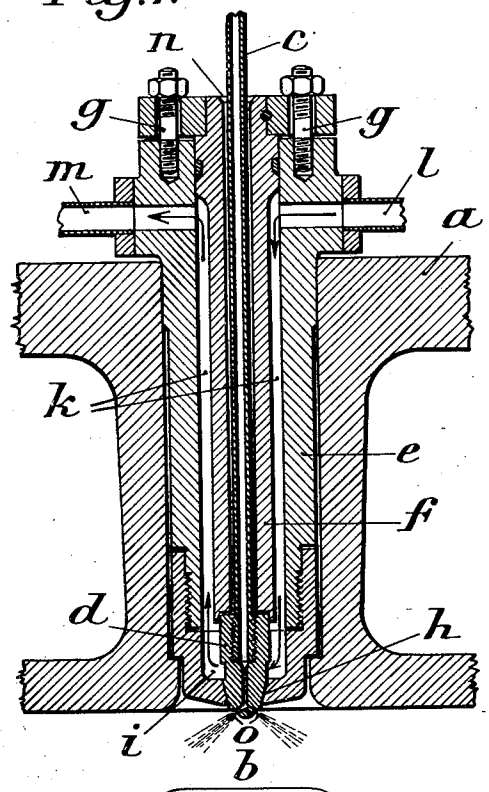
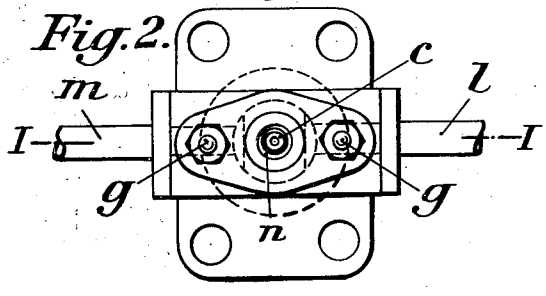


Fig. 2.



INVENTOR:
Werner Tobler
BY
Pennie, Davis, Marvin & Edmonds
ATTORNEYS

Patented May 24, 1932 1,860,063

UNITED STATES PATENT OFFICE

WERNER TOBLER, OF WINTERTHUR, SWITZERLAND, ASSIGNOR TO THE FIRM OF SULZER FRERES SOCIETE ANONYME, OF WINTERTHUR, SWITZERLAND

FUEL INJECTION DEVICE FOR INTERNAL COMBUSTION ENGINES

Application filed May 28, 1931, Serial No. 540,567, and in Switzerland September 25, 1930.

This invention relates to fuel injection devices for internal combustion engines.

In a fuel injection device according to this invention the fuel is delivered to the working chamber through a delivery pipe passing through the cylinder head and connected at its inner end as by screwing to an injection nozzle and this nozzle makes a liquid tight joint with the inner end of a jacket or wall surrounding the fuel delivery pipe so as to provide a clearance between the pipe and the jacket, whereby any fuel that may leak through the joint between the nozzle and the injection pipe can escape through the clearance space. Thus any fuel that may leak in this manner is prevented from escaping unnoticed, as for example by passing into cooling medium surrounding the nozzle, and is discharged in such a manner that it can be readily noticed and the leak rectified.

A construction according to the invention is illustrated by way of example in the accompanying drawings, in which

Figure 1 is a section on the line I—I of Figure 2, and

Figure 2 is a plan.

In the construction illustrated the cylinder head *a* of an internal combustion engine carries a valve casing *e* through which passes a delivery pipe *c* screwed at its lower end to a nozzle *d* having injection openings *o* for atomizing the fuel as this enters the combustion space *b*. The delivery pipe *c* is surrounded by a jacket *f* so that an annular clearance space is provided between the pipe and jacket, the lower end of which makes a tight joint with the nozzle *d* when the jacket *f* is screwed down by means of the bolts *g* so as to press the nozzle *d* on its seating *h* carried by the valve casing *e*. In order to protect the nozzle *d* from overheating it is surrounded by an annular cooling chamber *i* through which cooling water is circulated from an inlet pipe *l*, through conduits *k* formed in the jacket *f* and an outlet *m*. The nozzle seating *h* is formed in a screw cap which can be removed for the purpose of gaining access to the cooling chamber *i*.

It will be seen that any fuel which may leak through the screwthreaded joint between the delivery pipe *c* and the nozzle *d* can escape through the clearance space to the outlet *n* at the upper end of the valve casing where it can be observed, and that fuel leaking in this manner cannot pass into the cooling water and thus escape unnoticed.

Similarly if the joint between the nozzle *d* and the jacket *f* leaks, water will pass up through the clearance space to the outlet *n* where it can be observed.

I claim:

1. In a fuel injection device for internal combustion engines the combination with a fuel delivery pipe connected at its inner end to an injection nozzle, of a wall making a liquid tight joint with the nozzle and surrounding the delivery pipe with a clearance space between the pipe and wall, and of a connection between the clearance space and the room outside the fuel injection device, whereby any fuel leaking through the joint between the nozzle and the delivery pipe may escape.

2. In a fuel injection device for internal combustion engines the combination with a fuel delivery pipe connected at its inner end by screwing to an injection nozzle, of a sleeve making a liquid tight joint with the nozzle and surrounding the delivery pipe with a clearance space between the pipe and sleeve, said clearance space opening to the room outside the fuel injection device, whereby any fuel leaking through the joint between the nozzle and the delivery pipe may escape.

In testimony whereof I have affixed my signature.

WERNER TOBLER.