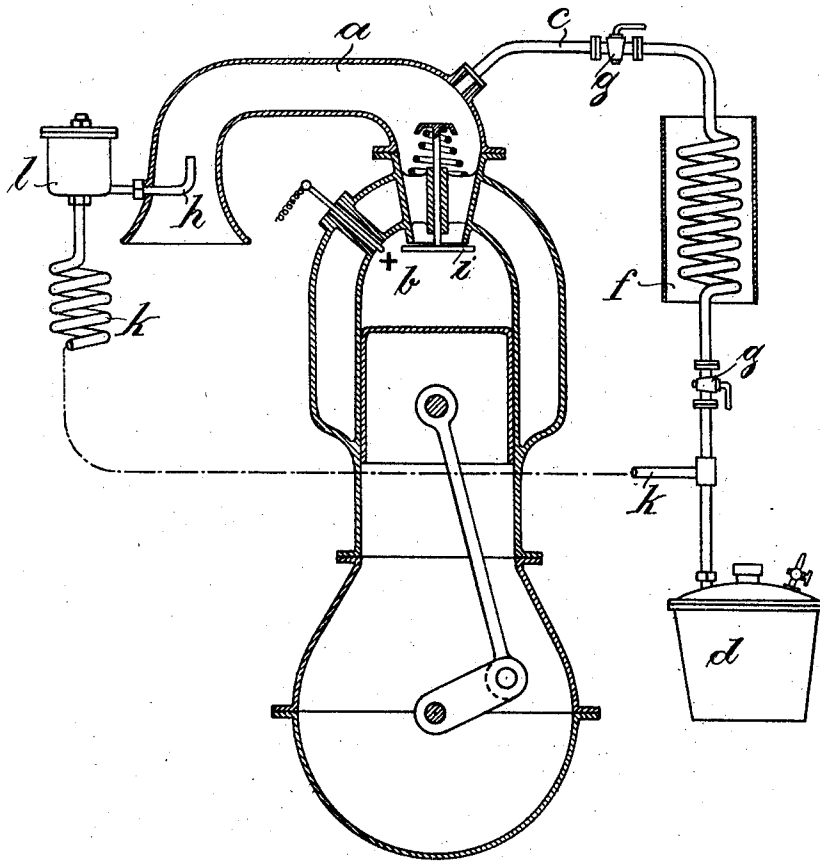


P. DAIMLER.
HYDROCARBON MOTOR.
APPLICATION FILED MAY 29, 1909.

1,046,988.

Patented Dec. 10, 1912.



Witnesses:
Eloa Greenwald
Alfred Lyons

Inventor:
Paul Daimler.
by L. K. Schmitt,
Attorney.

UNITED STATES PATENT OFFICE.

PAUL DAIMLER, OF STUTTGART, GERMANY, ASSIGNOR TO DAIMLER MOTORENGESELLSCHAFT, OF UNTERTÜRKHEIM-STUTTGART, GERMANY.

HYDROCARBON-MOTOR.

1,046,988.

Specification of Letters Patent.

Patented Dec. 10, 1912.

Application filed May 29, 1909. Serial No. 499,249.

To all whom it may concern:

Be it known that I, PAUL DAIMLER, a subject of the King of Württemberg, and resident of Untertürkheim-Stuttgart, in the Kingdom of Württemberg, German Empire, have invented certain new and useful Improvements in Hydrocarbon-Motors, of which the following is a specification.

This invention relates to hydrocarbon motors of the type in which a liquid hydrocarbon is sprayed into the air passing to the combustion chamber of the engine. In such engines in order to insure ignition of the mixture a preliminary heating of the parts is required. In torpedo boats having hydrocarbon motors it is desirable to avoid the use of ignition tubes or an open flame, and in submarine boats the use of ignition tubes or an open flame is absolutely impossible owing to the danger which would arise in view of the surrounding conditions.

The object of the present invention is to provide improved means for effecting this preliminary heating while avoiding the use of either an ignition tube or an open flame.

The invention will be more readily understood from the following description of the accompanying drawing which is a diagrammatic sectional view of an engine provided with means for warming up the engine previously to starting according to the present invention.

In the form illustrated a hydrocarbon supply pipe *c* opens into the induction pipe *a* leading to the inlet valve *i* in the working cylinder *b* and this hydrocarbon supply pipe is adapted to take the fuel from the main fuel holder *d*. In the pipe *c* there is arranged a vaporizer *f* through which the liquid fuel must pass on its way to the induction pipe *a*. On both sides of this vaporizer *f* there are provided cocks *g* in the pipe *c*.

Starting is effected as follows:—The supply of fuel through the pipe *k* having been cut off the motor is first turned a few times so as to fill the induction pipe *a* between the ordinary spraying nozzle *h* and the induction valve *i* with air as well as the cylinder *b*. The vaporizer then supplies petroleum or other hydrocarbon vapor through the pipe *c* by opening the cock *g* which is arranged between the induction pipe *a* and the vapor-

izer *f*. The cock *g*, arranged between the vaporizer *f* and the holder *d* is in the meantime closed so as to prevent any return of the vaporized oil into the holder *d*. After the combustion of the vaporized hydrocarbon has effected heating of the parts as described, the hydrocarbon is led through the pipe *k* and past the control device *l* to the nozzle *h* which opens into the induction pipe *a*. The oil sprayed in fine particles through the nozzle *h* mixes with the air in the induction pipe *a* and owing to the heat of the parts in the cylinder *b* the ignition of the mixture by the igniting device *p* is assured. Of course as soon as the motor is properly started the cocks *g* are both closed.

When applying a starting device of the kind described to multi-cylinder engines the pipe leading from the vaporizer *f* is branched off to the various cylinders.

I claim:—

In combination with an internal combustion engine having a main hydrocarbon fuel supply to the mixing chamber of the engine; means for starting the engine and for maintaining a heated branch fuel supply under pressure capable of being supplied to the mixing chamber by its own pressure whenever required to restart the engine comprising a branch pipe from said main fuel supply, means for heating said branch pipe so as to heat the fuel therein out of contact with air, valve means whereby said pipe may be absolutely and simultaneously disconnected from said mixing chamber and main fuel supply so that fuel may be first vaporized under pressure and exclusion of air in said branch pipe and whereby said branch pipe may be connected with said mixing chamber so that the vaporized fuel therein may be thereafter discharged under its own pressure in the form of a spray into said mixing chamber where it may mix with air therein, and means for igniting said mixture in the engine cylinder so as to heat up the engine before admitting fuel thereto by way of the main fuel supply.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

PAUL DAIMLER.

Witnesses:

ROBERT UHLAND,
FRIDA KLAIBER.