N° 16,985 A.D. 1893

Date of Application, 9th Sept., 1893—Accepted, 14th Oct., 1893

COMPLETE SPECIFICATION.

Improvements in the Method of Igniting the Explosive Mixture of Hydrocarbon-engines.

I, WILHELM MAYBACH, of Cannstatt, in the Kingdom of Würtemberg, German Empire, Engineer, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

My invention relates to the method of igniting the explosive mixture in hydrocarbon-engines by a glowing ignition-tube or body, and my improvements in said method relate to the manner, in which said ignition-tube or its equivalent is kept in the state of glowing. Heretofore, a special outer flame has been used for that purpose, and this flame or its heat properly shall be replaced now by the heat of the escaping combustion-gases.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar letters denote similar parts, and in which :

Fig. 1 shows a horizontal section through the hind part of the cylinder of a hydrocarbon-engine, with inlet, outlet and ignition tube :

Fig. 2 is a modification in the arrangement of the ignition-tube ;

Fig. 2^A is a detail of Fig. 2,

Fig. 3 is a second modification, and

Fig. 4 shows a modification in the configuration of the ignition-body.

The explosive mixture is sucked through inlet-valve *a* into the cylinder *b* by the second up-stroke of piston *c* after the explosion, and the combustion-gases are driven out of the cylinder through channel *d* and outlet-valve *e* by the first down-stroke of the piston after the explosion. These combustion-gases, on their way from the cylinder to the outlet-valve, are compelled to flow through or around, or through and around, the ignition tube *f* or its equivalent, so as to give off their heat to said part *f*.

In the construction shown in Fig. 1, the pipe *f* is arranged axially within the rear part of channel *d* and is provided near its closed end f^1 with a number of holes f^2, so that the hot combustion-gases flow around the pipe as well as through it. In the first modification, shown in Figs. 2 and 2^A, the ignition-pipe is arranged normally within the enlarged middle part of channel *d*, whilst in the second modification, Fig. 3, the ignition-pipe forms directly a part of said channel.

In order to start the engine, it is, as a matter of course, necessary, to heat either pipe *f* itself, or an auxiliary equivalent, as for instance *g* in Fig. 1, artificially by an outer flame, until the ignition-tube proper is brought into the required state of glowing.

An important feature in my improved method consists in arranging the ignition-tube in such a way, that it remains surrounded by, or filled with, or surrounded by and filled with (according to the constructions shown in Figs. 2, 3 or 1) combustion-gases during the sucking-period, so that the fresh mixture entering the cylinder cannot come prematurely into contact with the glowing body.

If, afterwards, the fresh mixture contained in cylinder *b* is compressed, a like compression takes place within channel *d* with regard to the remainder of the combustion-gases, until finally, at the end of the compressing-period, the compressed mixture comes into contact with the glowing body.

I wish it to be understood, that the part *f* need not indispensably be made in the shape of a tube, but that any other suitable form, as for instance a solid rod or a bundle of small tubes or solid rods, as in Fig. 4, may be employed, provided, these equivalents are arranged in the way of, or passage for, the combustion-gases.

[*Price* 8*d*.]

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is :—

1. The method of igniting the explosive mixture of hydrocarbon-engines by a heat-collector, kept glowing by the combustion-gases, substantially as described.

2. The method of igniting the explosive mixture of hydrocarbon-engines by a heat-collector *f*, arranged between cylinder and outlet-valve, and kept glowing by the combustion gases, substantially as described.

3. The method of igniting the explosive mixture of hydrocarbon-engines by a heat-collector *f*, arranged within a connecting-channel *d* between cylinder *b* and outlet-valve *e*, and kept glowing by the combustion gases escaping through said channel, substantially as described.

4. The method of igniting the explosive mixture of hydrocarbon-engines by a heat-collector *f*, arranged within a connecting-channel *d* between cylinder *b* and outlet-valve *e*, and kept glowing by the combustion gases escaping through said channel, the latter remaining filled with such gases during the sucking period, substantially as described.

Dated this 9th day of September 1893.

WILHELM MAYBACH,

By Geo. Thos. Hyde,

4, Moorfields, Fore Street, London, E.C., Agent for the Applicant.

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MAYBACH'S Complete Specification.

SHEET 1.

Fig. 1.

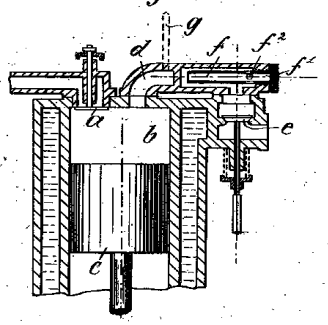


Fig. 2.

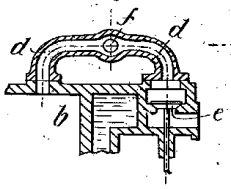


Fig. 2a.

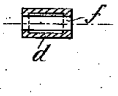
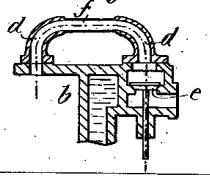


Fig. 3.



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SHEET 2.

Fig. 4.

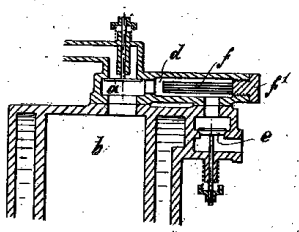

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Fig. 1.

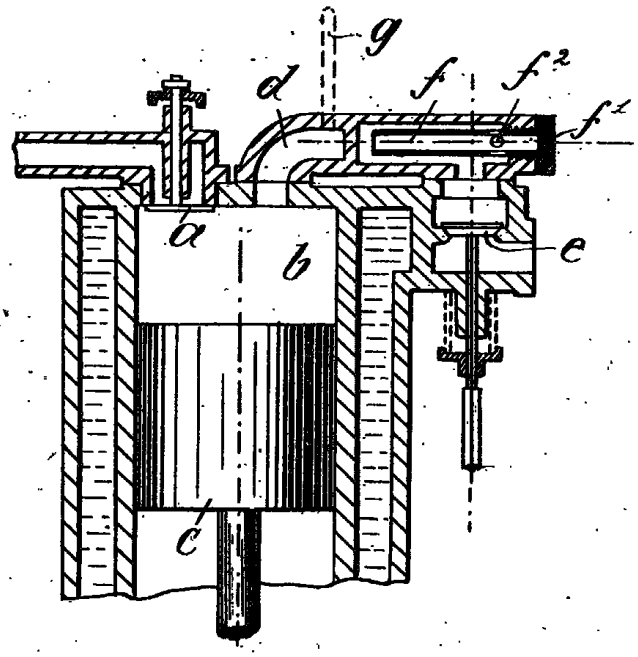

Fig. 2.

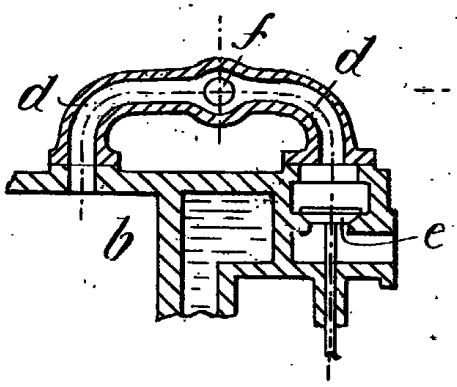

Fig. 2a

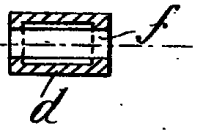

Fig. 3.

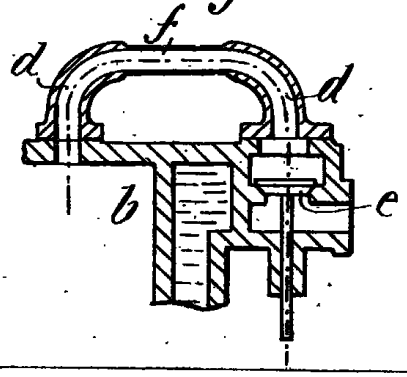

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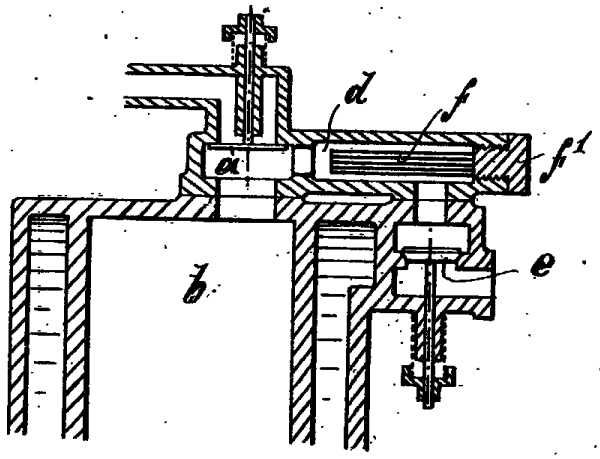
Fig. 4.



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