

No. 660,292.

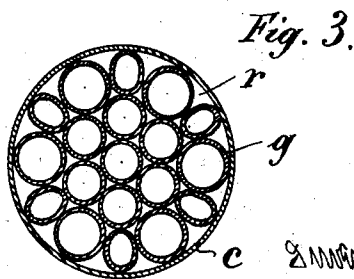
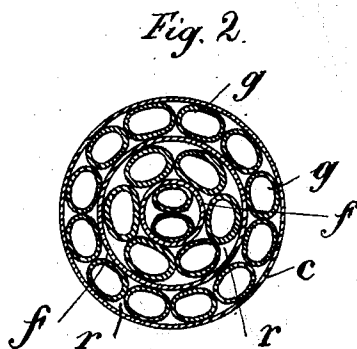
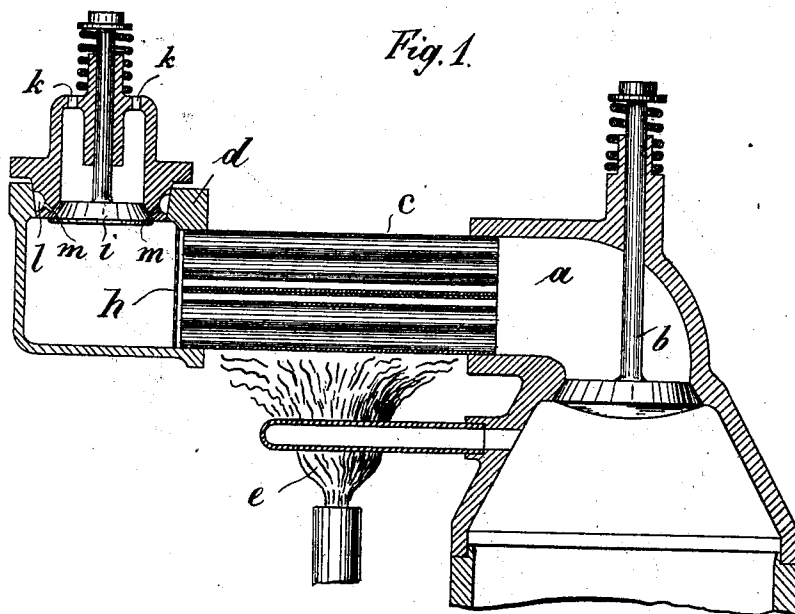
Patented Oct. 23, 1900.

F. DÜRR.

GASIFYING APPARATUS FOR EXPLOSIVE ENGINES.

(Application filed Apr. 17, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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GASIFYING APPARATUS FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 660,292, dated October 23, 1900.

Application filed April 17, 1900. Serial No. 13,221. (No model.)

To all whom it may concern:

Be it known that I, FRITZ DÜRR, engineer, a subject of the Emperor of Germany, and a resident of Alt-Moabit 97, Berlin, in the Kingdom of Prussia and Empire of Germany, have invented certain new and useful Improvements in Gasifying Apparatus for Carbonic-Hydrogen Engines, of which the following is a specification.

The subject of the present invention is a gasifying device for hydrocarbon-engines intended not only for gasifying the liquid combustible material, but also for obtaining an intimate mixing of the produced gas with the air.

The characteristics of this new gasifying apparatus are to be found in the fact that the combustible to be gasified during the period of mixing gases is compelled to pass over an extensive heating-surface provided by a number of small tubes inserted into the gas-channel in contact with the inner wall of the latter and with each other, so that heat is communicated from one to the other and channels are formed not only through the single tubes, but between them and both their inner and outer walls, which serve as heating-surfaces.

The subjoined drawings represent, by Figure 1, the upper part of such a gasifying device for hydrocarbon-engines in its longitudinal section, whereas Figs. 2 and 3 represent by cross-sectional views two different embodiments of the novel arrangement of tubes.

a is the admission-channel, connected with the upper end of the cylinder.

b is a spring suction-valve shutting off the admission-channel from the cylinder.

d is a casing containing the mixing-chamber for the air and inflammable liquid. Surrounding this casing is a valve-housing constructed with a circular channel *l*, with inclined channels *m*, leading from the circular channel through a valve-seat, and with air-channels *k*, leading to the chamber within the housing.

i is a spring suction-valve controlling the passage of inflammable liquid and air into the mixing-chamber.

The inner arrangement of the gasifying apparatus is as follows: To the upper end of the

cylinder or to the admission-channel *a*, which is shut from the inner part of the cylinder by the valve *b*, a pipe *c* is connected, the left end of which communicates with the casing *d* of the mixing-valve. According to Fig. 2, several concentric pipes *f* are inserted into the pipe *c*, and the spaces between them are filled up by pipes *g* of small sectional area. These small pipes *g* are firmly squeezed into the spaces which they occupy for the purpose of bringing them into good contact both with one another and with the walls of the pipes *c* and *f*, and thus insuring the uniform transmission of heat throughout the group. If desired, the pipes *g* may be of such a sectional area as to be flattened, as shown, when squeezed into the intermediate space between the other pipes. The pipe *c* is heated exteriorly by the flame *e*, and the inner pipes, if used, and the filling of tubes which stand in contiguous and heat-conducting relation to the pipes and to one another are heated by conduction.

The arrangement shown in Fig. 2 may be substituted by the arrangement shown in Fig. 3 or by any equivalent arrangement. In the casing *d* before the mouth of the pipe *c* a wire-gauze *h* is provided for insuring a uniform distribution of the inflammable material and air for supporting combustion thereof.

The effect of the device which is to be applied to an explosive-engine is as follows: During the sucking period the two valves *b* and *i* are opened and the casing *d* is entered by air through the channels *k* and by inflammable liquid from the circular channel *l* through the channels *m*. Both the air and inflammable liquid drive against the sieve *h*, by which they are distributed, and enter through the several channels provided by the tubes *g* and the spaces between said tubes into the combustion-chamber of the cylinder, becoming rapidly heated by the passage through and around said pipes and thoroughly mingled. From the foregoing arrangement there not only results a perfect utilization both of the inner and the outer surfaces of the pipes, but also the formation of an extensive heating-surface for the mixed gases.

In order to obtain a good transmission of heat from one pipe to the other, the single pipes *g*, and, if desired, the pipes *c* and *f* too, are made of copper or a similar material of high conductivity of heat.

As to the further working of the hydrocarbon-engines it is performed in the usual way.

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

1. A vaporizer for hydrocarbon-machines consisting of a number of pipes and distinguished in that the pipes are arranged in groups or in any other desired manner in a main pipe and pressed or squeezed within the main pipe in such a manner that the pipes contact one with another as well as with the internal surface of the main pipe, in order that heat applied from without will be conducted from opposite sides, so that the outer surfaces, as well as the inner surfaces of the pipes, will serve as heating-surfaces for the mixture conducted through the vaporizer.

2. A gasifying apparatus comprising an inner pipe, an outer pipe and two concentric series of pipes located between and pressed or squeezed into the inner and outer pipes and having their surfaces in contact with each other and with the inner and outer pipes respectively; the inner and outer surfaces of the pipes combining to provide series of concentric channels or passages for the mixture interior and exterior of the pipes.

3. A gasifying apparatus comprising an inner cylindrical pipe, an outer cylindrical pipe, a concentric series of cylindrical pipes and a concentric series of alternating cylindrical and elliptical pipes located between the inner and outer cylindrical pipes and having their surfaces in contact with each other and with the inner and outer cylindrical pipes respectively; the concentric series of pipes being pressed or squeezed into position and the inner and outer surfaces of the pipes combining to provide series of concentric channels

or passages for the mixture interior and exterior of the pipes.

4. A gasifying apparatus comprising an inner pipe, an outer pipe, an intermediate pipe, pipes within the inner pipe having their surfaces in contact with each other and with the inner pipe, concentric series of pipes between the inner and intermediate pipes, having their surfaces in contact with each other and with the inner and intermediate pipes and concentric series of pipes between the intermediate and outer pipes, having their surfaces in contact with each other and with the intermediate and outer pipes; the concentric series of pipes being pressed or squeezed into position and the inner and outer surfaces of the pipes combining to provide series of concentric channels or passages for the mixture interior and exterior of the pipes.

5. A gasifying apparatus comprising an inner cylindrical pipe, an outer cylindrical pipe, an intermediate cylindrical pipe, elliptical pipes within the inner cylindrical pipe, having their surfaces in contact with each other and with the inner cylindrical pipe, concentric series of elliptical pipes between the inner and intermediate cylindrical pipes, having their surfaces in contact with each other and with the inner and intermediate cylindrical pipes, and concentric series of elliptical pipes between the intermediate and outer cylindrical pipes, having their surfaces in contact with each other and with the intermediate and outer cylindrical pipes; the concentric series of pipes being pressed or squeezed into position and the inner and outer surfaces of the pipes combining to provide series of concentric channels or passages for the mixture interior and exterior of the pipes.

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

FRITZ DÜRR.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.