No. 811,744. PATENTED FEB. 6, 1906.

F. REICHENBACH.

COMBUSTION ENGINE.

APPLICATION FILED MAR. 9, 1905.

Fig. 1

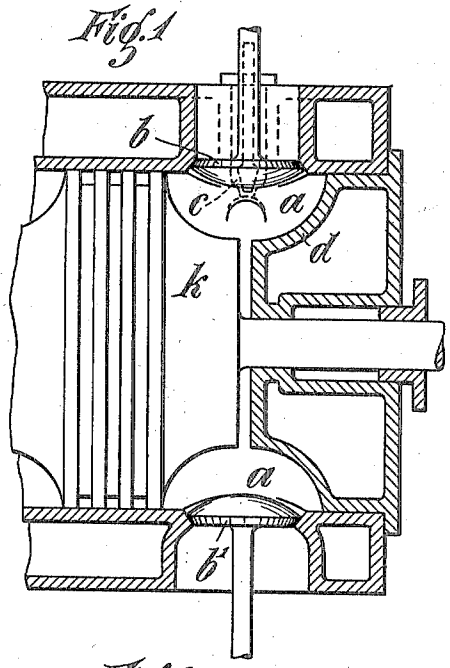
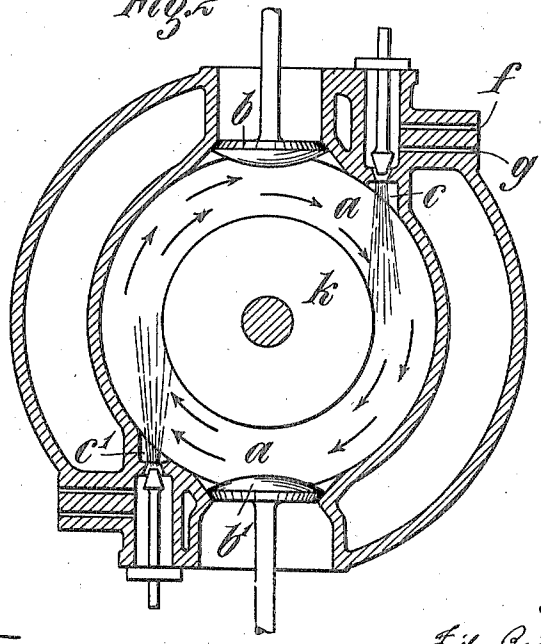



Fig. 2




Witnesses:

Carl Jett

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# UNITED STATES PATENT OFFICE.

FRITZ REICHENBACH, OF CHARLOTTENBURG, GERMANY.

## COMBUSTION-ENGINE.

No. 811,744. Specification of Letters Patent. Patented Feb. 6, 1906.

Application filed March 9, 1905. Serial No. 249,203.

*To all whom it may concern:*

Be it known that I, FRITZ REICHENBACH, a subject of the German Emperor, residing at 14 Bismarckstrasse, Charlottenburg, near Berlin, Germany, have invented new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

The present invention relates especially to combustion-engines of the four-cycle type. The four periods are as follows: first, the sucking in of the air; second, the compression of the air; third, the blowing in of combustibles, ignition, and expansion, and, fourth, the blowing out of the combustion residuum, the four periods corresponding to a double rotation of the crank and each of the periods requiring one piston-stroke.

This invention has special reference to that class of engines in which the combustibles are injected into the combustion-chamber while the air therein is under compression. In these engines an equal distribution of the combustibles is difficult, because when the fuel is injected the air in the cylinder is already compressed, and this pressure opposes directly the distribution of the injected fuel.

In order to obtain a complete mixture of the fuel with the already-compressed air notwithstanding the above difficulties, I give to the compression-chamber an annular form and arrange the fuel-injectors tangentially thereto, whereby even though the air in the compression-chamber be compressed to a high degree and be at rest when the fuel is injected the mixture will be carried around and around until the fuel is perfectly mixed with the air, this perfect mixture being obtained before the piston begins its return stroke. This highly-desirable result is augmented in proportion to the number of injectors employed.

The present invention is illustrated, by way of example, in the accompanying drawings, in which—

Figure 1 is a longitudinal section, and Fig. 2 a cross-section, of a portion of a double-acting engine.

Referring to the drawings by reference characters, *a* is an annular combustion-chamber which is formed by the piston *k* and the cylinder-head *d*. *b* is a suction-valve for air, and *b'* is the exhaust-valve. The injection of the combustibles, which enter through the channel *g* by means of air under pressure entering by channel *f*, takes place through one of several injectors *c c'* in a direction approximately tangential to the annular combustion-chamber.

By the tangential injection of the combustibles in the annular combustion-chamber there is obtained their best distribution throughout the body of compressed air, the air being thereby caused to rotate, as indicated by the arrows. In cylinders of larger diameter it is advantageous to arrange several injectors, as shown, these injectors being arranged at different points circumferentially.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an internal-combustion engine, the combination of a cylinder having a head, a piston, the piston and head forming when in juxtaposition an annular combustion-chamber, inlet and exhaust valves, and a fuel-injector arranged tangentially to said annular chamber, for the purpose set forth.

2. In a double-acting internal-combustion engine, the combination of a cylinder having a head, a piston carried by a rod working through said head, the adjacent faces of the piston and head being so shaped as to form an annular chamber when they are in juxtaposition, inlet and exhaust valves, and a fuel-injector arranged tangentially to said annular chamber, for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRITZ REICHENBACH.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.