(No Model.) 2 Sheets—Sheet 1.

M. HONIGMANN.

ENGINE.

No. 477,367. Patented June 21, 1892.

Fig. 1.

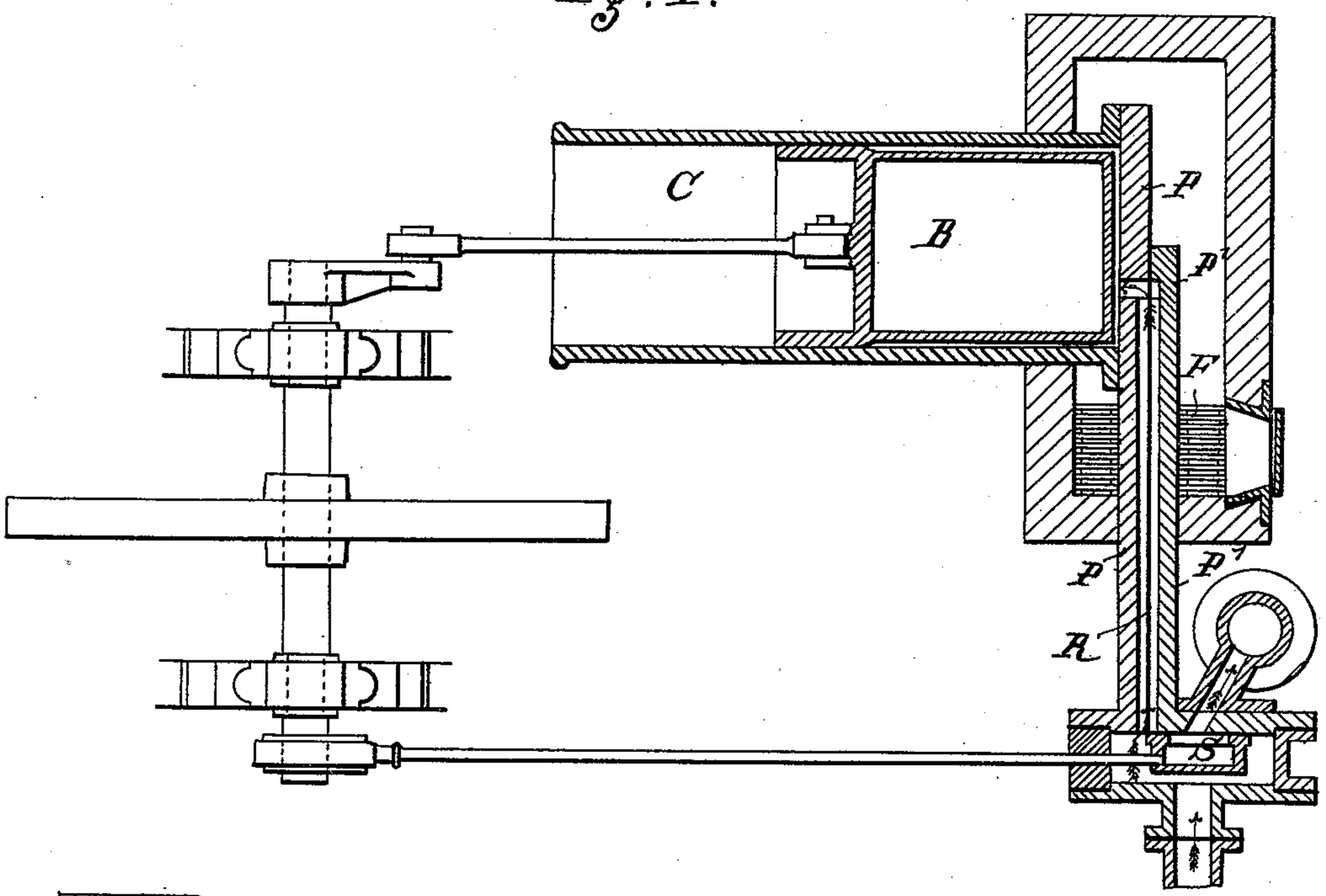
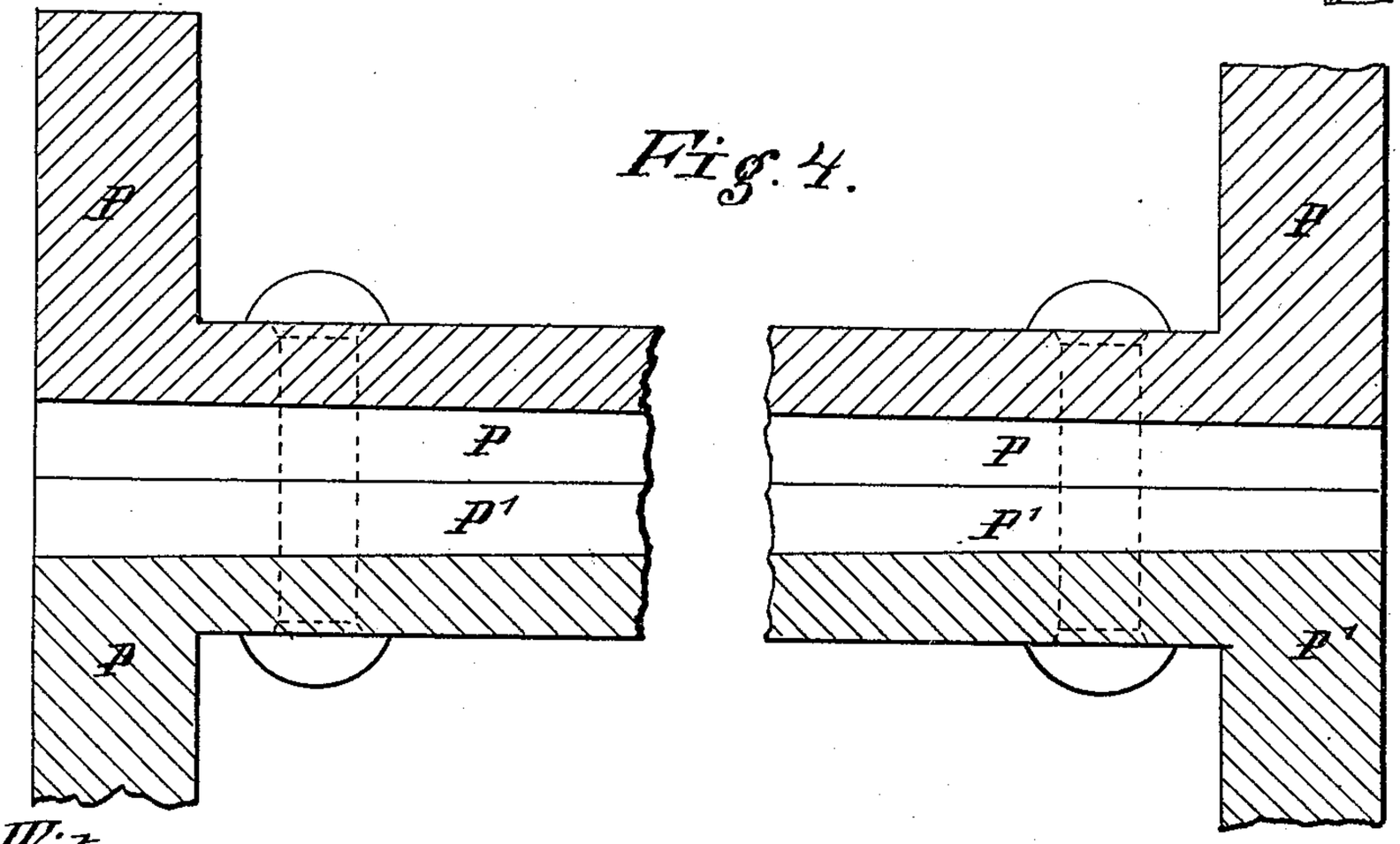


Fig. 4.



Witnesses:-
George Barry.
C. L. Sundgren

Inventor:-
Moritz Honigmann
by attorneys
Brown & Seward

(No Model.) 2 Sheets—Sheet 2.

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ENGINE.

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Fig. 2.

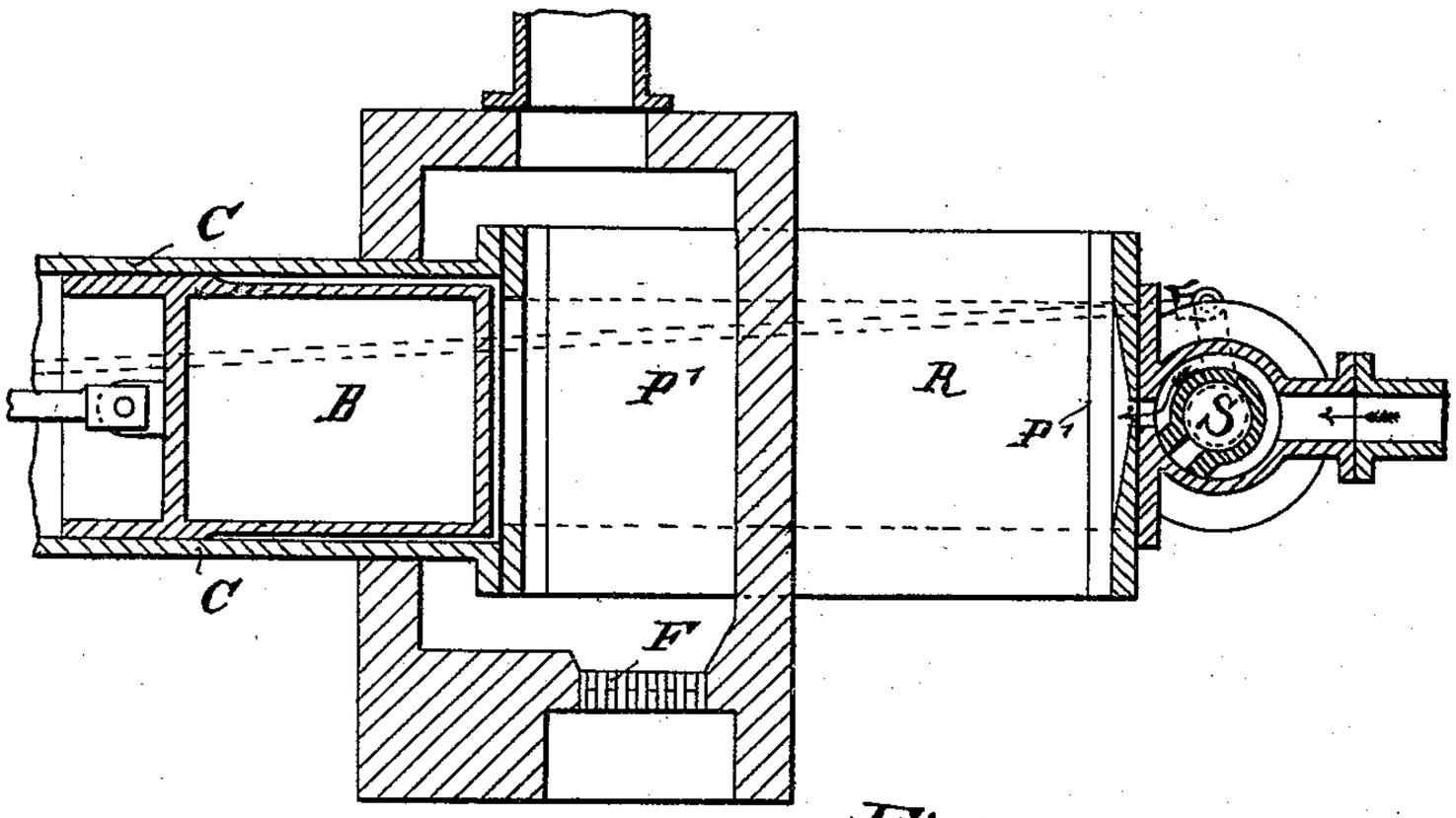


Fig. 3.

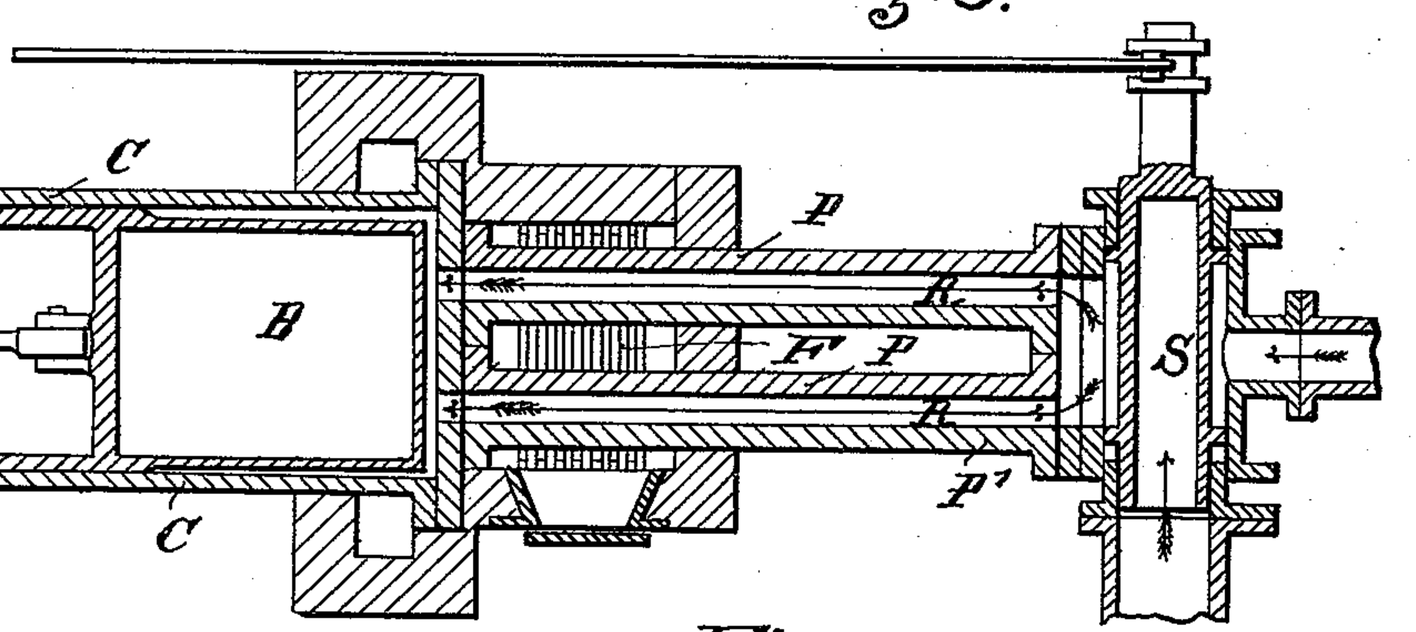
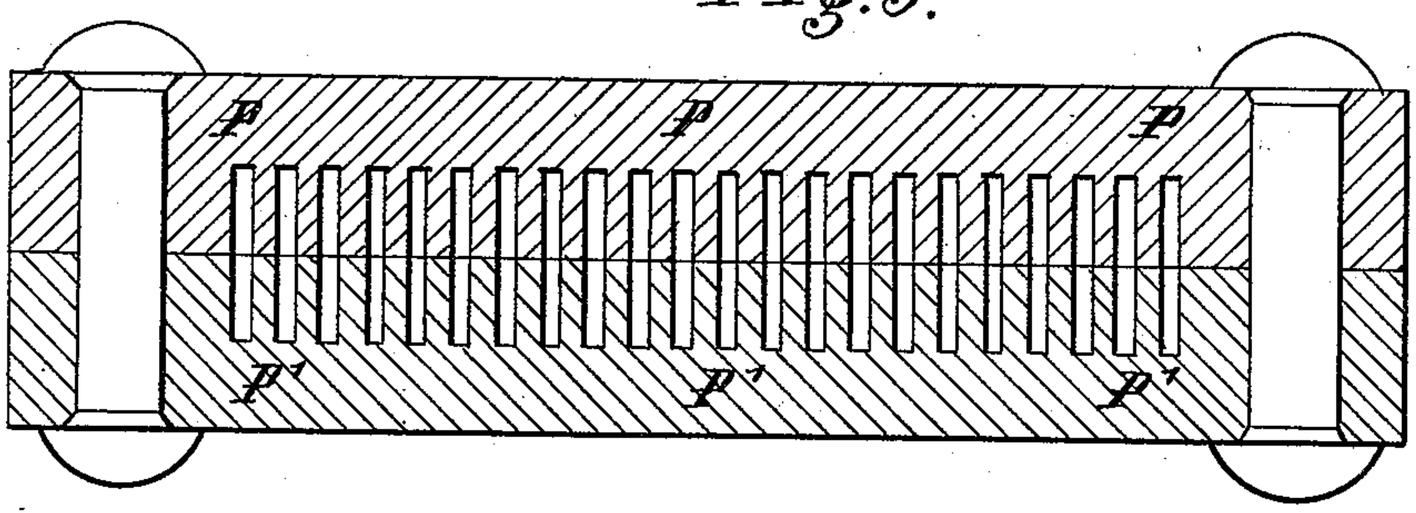


Fig. 5.



Witnesses:-
George Barry.
C. L. Sundgren

Inventor:-
Moritz Honigmann
by attorneys
Brown & Seward

UNITED STATES PATENT OFFICE.

MORITZ HONIGMANN, OF GREVENBERG, NEAR AIX-LA-CHAPELLE, GERMANY.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 477,367, dated June 21, 1892.

Application filed January 15, 1892. Serial No. 418,213. (No model.)

To all whom it may concern:

Be it known that I, MORITZ HONIGMANN, a subject of the Emperor of Germany, residing at Grevenberg, near Aix-la-Chapelle, Germany, have invented new and useful Improvements in Engines, of which the following is a specification.

The object of this improvement is to render practicable the employment of steam or other gaseous fluid in the working cylinders of engines at a very high temperature—say about 500° Celsius. For this purpose I interpose between the working cylinder and the induction and eduction valve or valves one or several of what I call "heating-bodies," constituting a regenerator, as hereinafter described and claimed.

Figure 1 of the drawings is a plan view, partly in section, of a motor, as a steam-engine or hot-air engine, which illustrates my improvement in its simplest form, having but one heating-body. Figs. 2 and 3 represent, respectively, a vertical and a horizontal section of an engine with several heating-bodies. Figs. 4 and 5 represent, respectively, a longitudinal and a transverse section of one of the heating-bodies.

C is the working cylinder of the engine; B, the piston. S is the valve for induction and eduction of the steam or other gaseous fluid, which I will term the "working gas." This valve may be of any kind known or suitable for the purpose.

P P′ are the heating-bodies, which I make by providing two plates P and P′, of iron, copper, or other metal, with very fine slits on one side and then riveting and calking them tightly together with the slits inward, so that the same form a whole, which is set in tightly between cylinder and valve. The working gas passes through the slits in the interior of this heating-body to the piston B of the engine and along the same route back to the valve S. Now as the heating-bodies are heated from the exterior by the "heating-flame" of a furnace the working gases are made very hot before entering the cylinder. A portion R of the heating-bodies P P′ is not exposed to the heating-flame, however, and the same forms an effective regenerator, in which the working gases on entering the engine are given a preparatory heating, but on leaving it are again so considerably cooled off that the temperature of the same is not too high for the movable lubricated parts of the valve.

In Figs. 1, 2, and 3 I have shown how the heating-bodies may be affixed to the engine. In the small motor, (illustrated in Fig. 1,) which has only one heating-body, the said heating-body at the same time forms the cylinder-cover. The piston B is of course, as in hot-air engines, made so long that the very high temperature cannot penetrate to its sliding surfaces. The heating-flame of the furnace F plays only around the half of the heating-body P P′, which is fastened to the cylinder, while the other half forms the regenerator R.

According to the aforesaid the engine thus works as follows: The steam under pressure or the compressed air passes through the valve S into the heating-body P P′, is given a vigorous preparatory heating in the first part R of the same, and then completely superheated in the portion touched by the heating-flame while it pushes the working piston B before it. On the back-stroke of the piston the steam or air passes back again through the slits of the plate-body and is so much cooled off again in the unheated portion of the same that it is not too hot for the working parts of the valve S.

In the examples shown in Figs. 2 and 3 the operation is the same as above described with reference to Fig. 1.

According to the aforesaid I may characterize my invention briefly by saying that for the purpose of working with highly-heated gases in steam-engines and other motors heating-bodies are interposed between the working cylinder and the induction and eduction valve, which are formed by tightly riveting and calking together two metal plates, on the inside of which fine grooves are cut for the passage for the working gases. A portion of these plate-bodies is heated, the other portion remains unheated, and in consequence forms a regenerator for the preparatory heating and the subsequent cooling off of the working gases.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination, with the cylinder and piston of an engine and a valve for the induction

and eduction of the working gas to and from said cylinder, of a heating-body and a furnace interposed between the cylinder and valve, said heating-body being composed of two metal plates arranged face to face, so that channels are formed by their grooves and being arranged partly within and partly outside of the furnace, so that a portion of it constitutes a heater and another portion constitutes a regenerator, substantially as herein set forth.

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

MORITZ HONIGMANN.

Witnesses:

JOHN HECKMANNS,

GEORGE STEPPNER.