

INTERNAL COMBUSTION ENGINES,
Multiple piston.

No. 874,369.

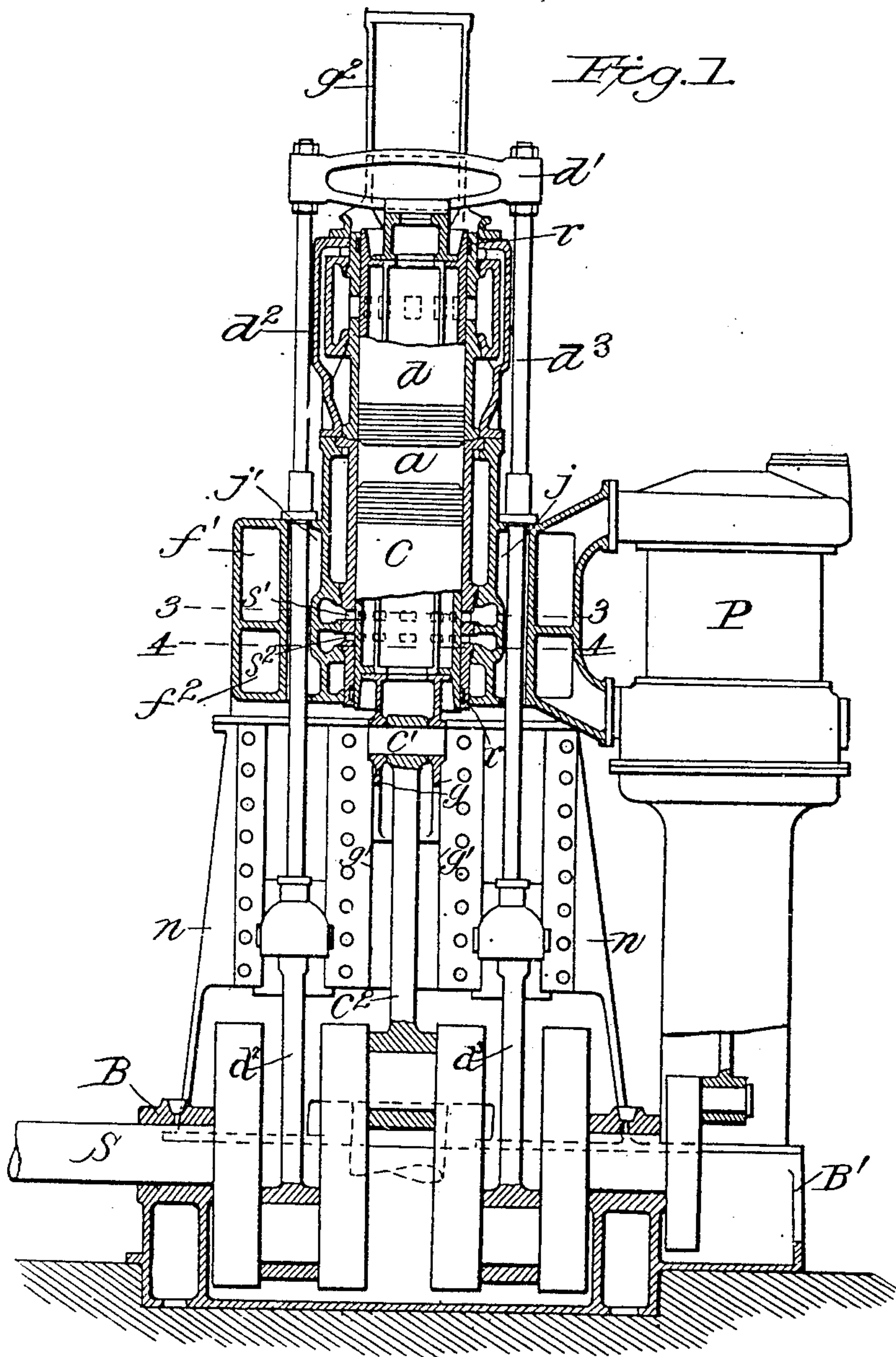
PATENTED DEC. 17, 1907.

W. VON OECHELHAEUSER & C. STEINBECKER.

VERTICAL GAS ENGINE.

APPLICATION FILED JAN. 31, 1907.

3 SHEETS—SHEET 1.



Witnesses
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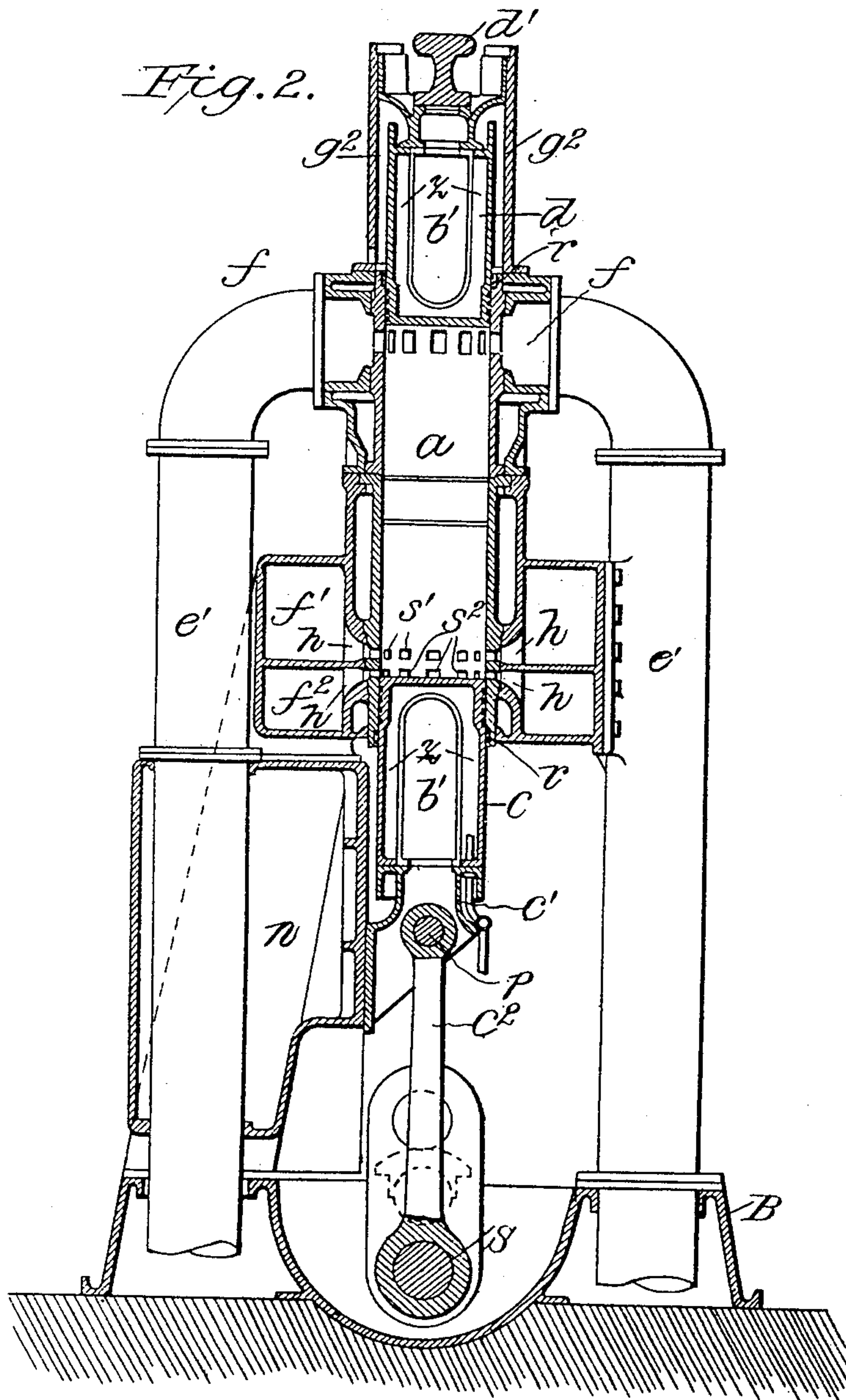
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 3.

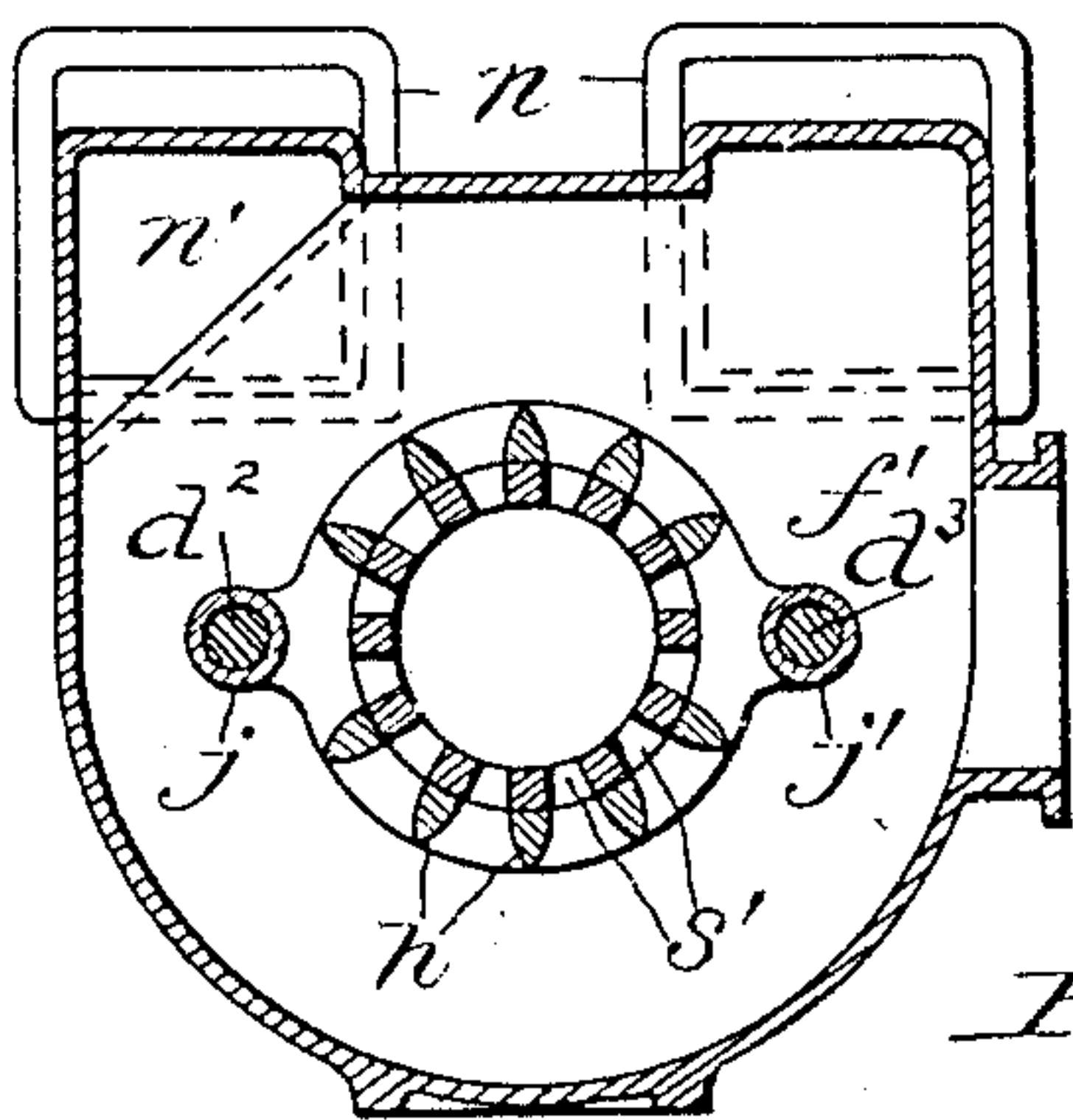


Fig. 4.

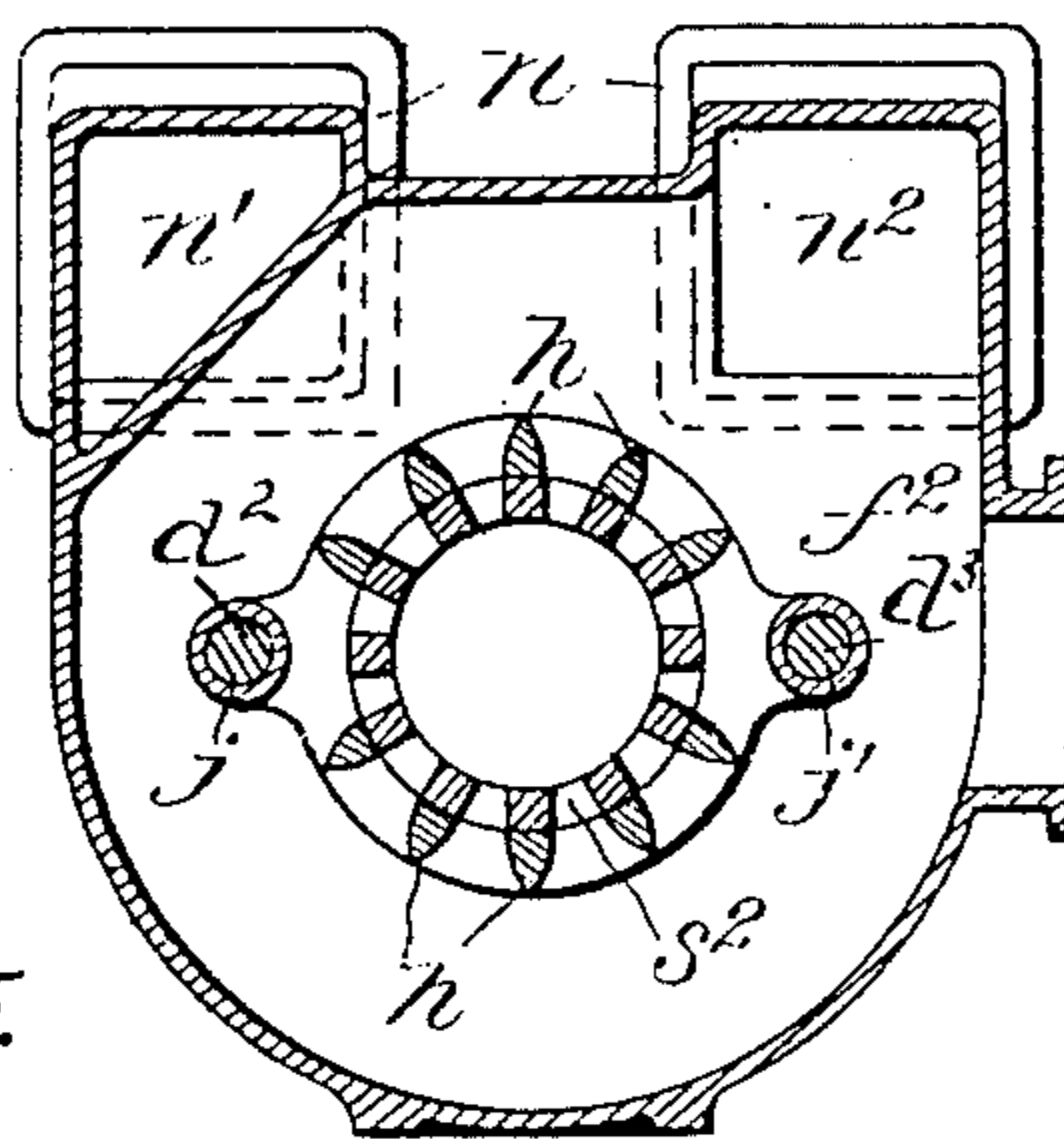


Fig. 5.

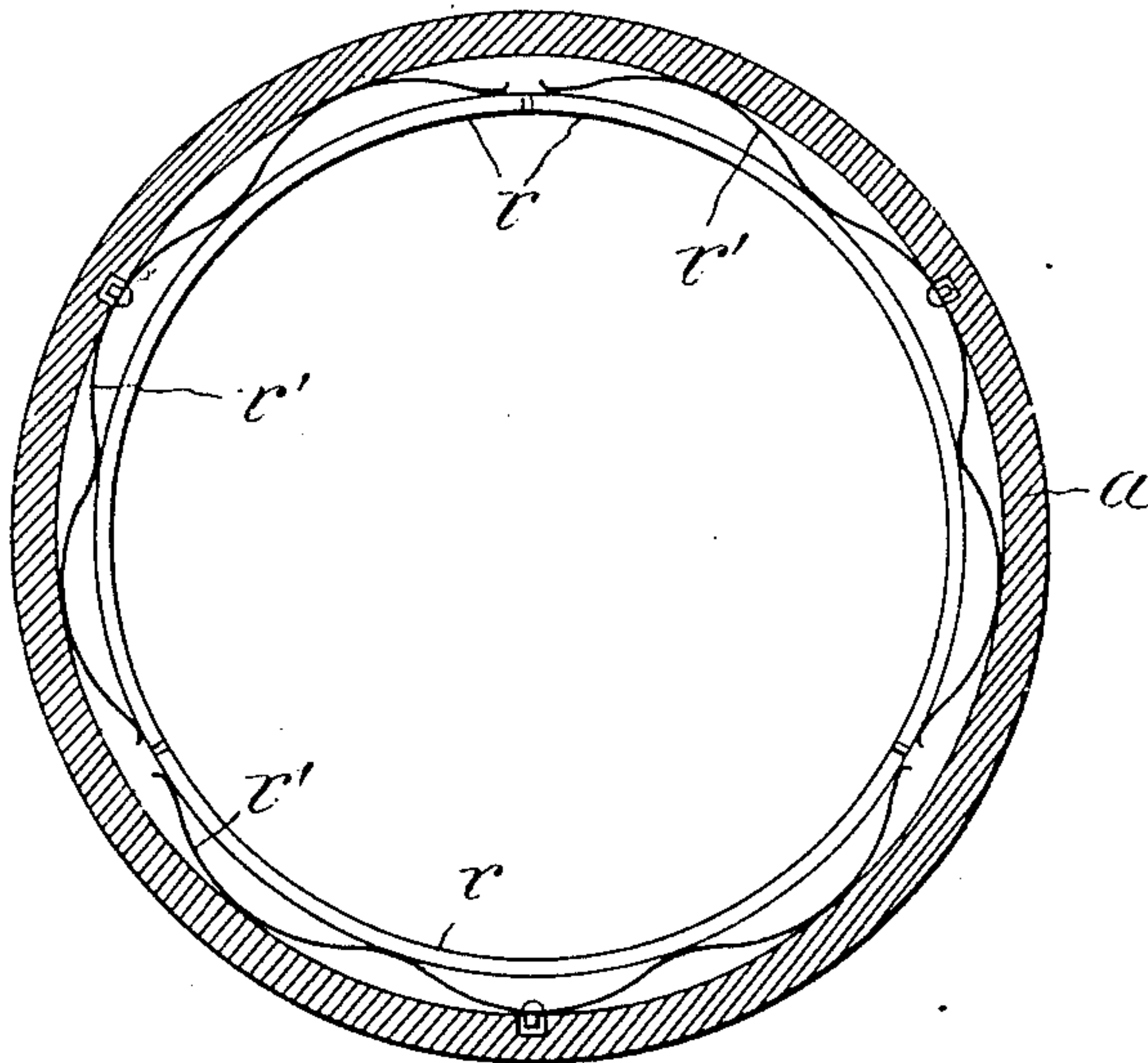


Fig. 6.

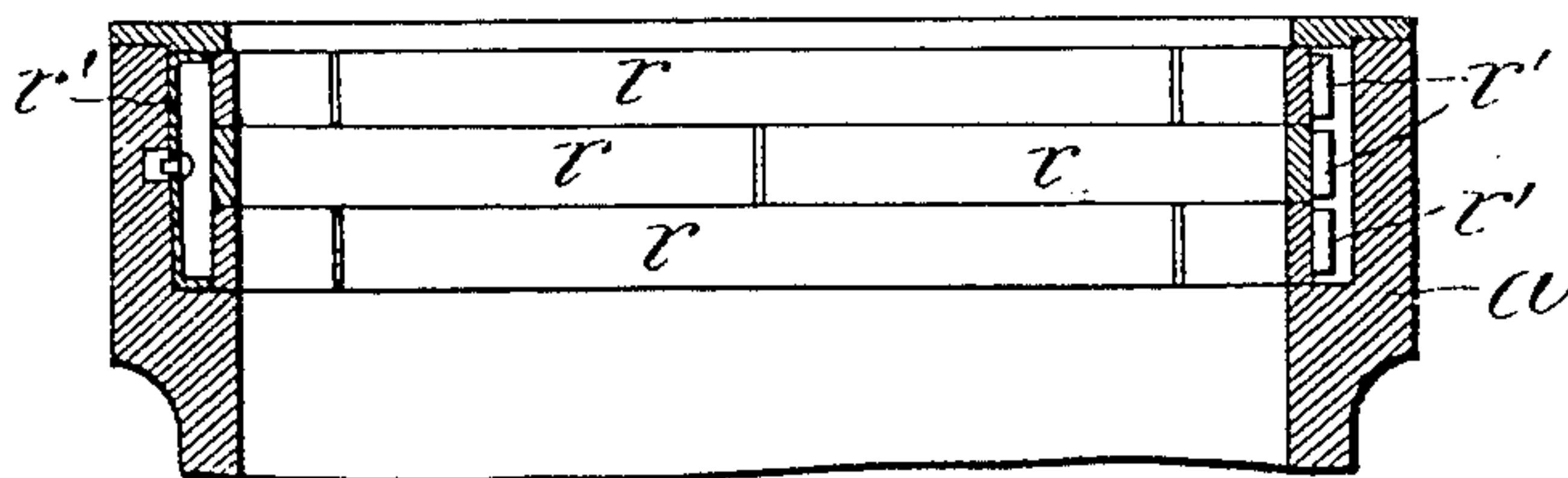
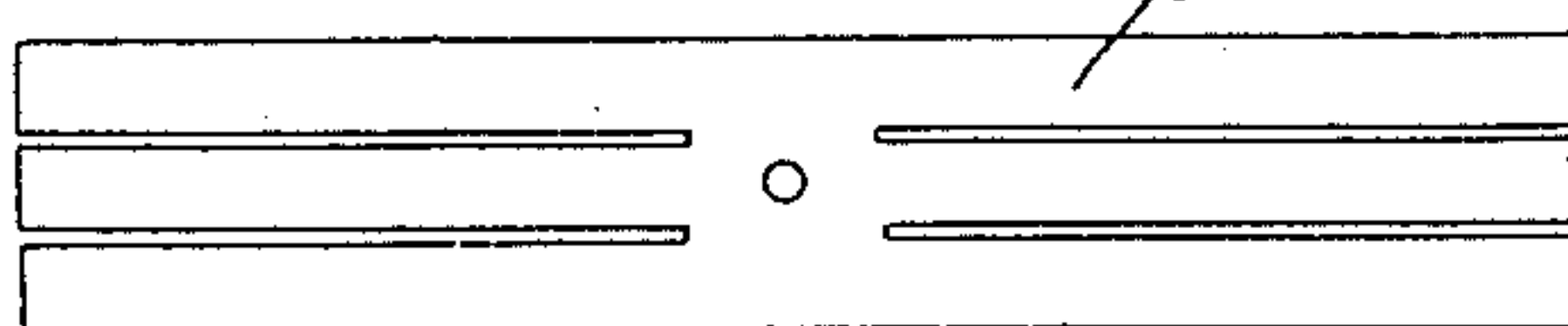


Fig. 7.



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VERTICAL GAS-ENGINE

No. 874,369.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed January 31, 1907. Serial No. 355,133.

To all whom it may concern:

Be it known that we, WILHELM VON OECHELHAEUSER, a subject of the King of Prussia, residing at 29/30 Kavalierstrasse, Dessau, Anhalt, Germany, and CARL STEINBECKER, a subject of the King of Prussia, residing at 6^a Jäschkentalerweg, Langfuhr, near Dantzic, Germany, have invented certain new and useful Improvements in Vertical Gas-Engines, of which the following is a full, clear, and exact description of the invention.

Our invention relates to improvements in vertical gas engines of the type in which there are oppositely moving pistons in the working cylinder, and the invention particularly relates to improvements in the construction of the frame, the cylinder and piston and the receiving chambers.

Some of the main objects of our invention are to provide an engine of this character with a frame whereby the stresses and strains usually exerted on the triple crank shaft will be reduced, and also to provide the receiving chambers with means for causing a more equal distribution of the air and gas as they enter the cylinder before mixture and compression.

The other objects will be obvious from the construction illustrated in the accompanying drawings and hereinafter described.

In the drawings,—Figure 1 represents a vertical section of our improved gas engine with the charging pump in elevation; Fig. 2 represents a vertical section at right angles to Fig. 1, but with the pistons in their extreme outward positions; Fig. 3 is a horizontal section on the line 3—3, through the air-receiving chamber, showing the inlet ports and connection with the air delivery space of the charging pump; Fig. 4 represents a horizontal section on the line 4—4 through the gas-receiving chamber, showing the gas inlet ports with the connection with the charging pump; Fig. 5 represents a cross section on a larger scale showing the packing rings at the ends of the working cylinder; Fig. 6 represents a longitudinal section of the same; and Fig. 7 represents a detail view of a spring.

Referring to these drawings, the supporting frame of the engine primarily consists of supporting legs n containing the extension chambers n' , n^2 from the air and gas receiving chambers f' , f^2 , and the exhaust pipes e' , e^2 leading from opposite sides of the exhaust

chamber f . This frame is supported on the base B having an extension B' at one side thereof for supporting the pump P for supplying air and gas to the engine. This extension B' of the base may also be utilized as extensions for the gas and air supply channels leading to the pump for convenient connection with the gas and air supply pipes. Supported by this frame is the usual working cylinder a having oppositely moving reciprocating pistons c , d , with their complementary cross heads, c' , d' and connecting rods c^2 , d^2 , d^3 , to the triple crank shaft S.

Instead of providing the pistons and packing rings at both ends, we omit the outer packing rings of each piston, and we provide packing rings r , r in the working cylinder, near the opposite outer ends of the cylinder, thereby obtaining the advantages of shortening the length of the working cylinder c , omitting the piston rods and reducing the total height of the engine, and accordingly improving the transmission of the force of explosion and reducing the unfavorable effect of the stresses and strains exerted on the triple crank shaft S due to the long connecting rods. Another advantage of this construction is that the pistons become visible on their outward stroke, which increases the safety of operation of the engine by allowing a perfect and constant control of the piston and its lubrication. In each of the pistons, we provide a dome shaped wall b' , b' occupying the central part which forms between itself and the walls of the piston a cooling chamber Z through which the cooling liquid is circulated in any suitable manner.

The improved connection to the cross head and guide shoe at the outer end of the lower as well as the upper piston is made by a separate piece fitting to the end of each piston. The upper part of the lower cross head c' is preferably arranged concentric to the axis of the piston for obtaining a uniform transmission of the force exerted. The lower part of the cross head c' is arranged for the reception of the cross head pin P and guide shoes g traveling in the guides g' , Fig. 1. Corresponding parts of the cross head on the upper piston are arranged in a similar manner with such modifications as are required by the special arrangements of the upper cross head d' and its guides g^2 , (Fig. 2).

The packing rings r at each end of the cylinder are preferably each cast in one piece

and turned to the inner diameter of the working cylinder. They are then cut into two, three or four pieces as occasion may require and the individual pieces are pressed against the piston by means of springs r substantially as shown in Figs. 5, 6 and 7. We prefer to construct the springs r' of sheet steel or like material suitably corrugated or bent and of a width substantially equal to the total number of packing rings provided, for the purpose of better holding the packing rings in position. In order to allow of each packing ring being arranged so as to match the joints between the various pieces of the ring and at the same time provide for a uniform action of the springs upon the same, the springs are cut correspondingly to the packing rings as indicated in Fig. 7.

In order to obtain a more uniform distribution of air and gas entering the receiving chambers f' , f^2 , we provide stiffening ribs h constructed as extensions of the bridge between the inlet ports s , s' from the receiving chambers, especially formed so as to act as inlet guides for the entering gas and air. We also provide in these chambers ferrules j , j' or the like, acting as guides through which pass the connecting rods d^2 , d^2 from the upper cross head. The connecting rods may be thereby brought closer together, and the unfavorable strain exerted on the crank shaft due to the long upper cross head is greatly reduced.

What we claim is:—

1. In a vertical gas engine, the combination of a supporting frame, a working cylinder, oppositely moving pistons therein, having cross heads and connecting rods and air and gas receiving chambers around said working cylinder, with ferrules passing through said chambers for the passage of the side connecting rods.

2. In a vertical gas engine, the combination of a supporting frame, a working cylinder, oppositely moving pistons therein, air and gas receiving chambers, and inlet ports to said cylinder with means in said chamber for guiding the air and gas through the inlet ports to the working cylinder.

3. In a vertical gas engine, the combination of a supporting frame, a working cylinder, oppositely moving pistons therein with connecting rods, and means around said cylinder forming a receiving chamber, and ferrules in said chamber for the passage of the side connecting rods.

4. In a vertical gas engine, the combination of a supporting frame, a cylinder, oppositely moving pistons therein, means forming receiving chambers around said cylinder having inlet ports to the cylinder, and means for guiding the air or gas through the inlet ports to the cylinder.

5. In a vertical gas engine, the combination of a supporting frame, a working cylinder having oppositely moving pistons therein with crossheads and connecting rods, separate pieces for immediately connecting the pistons to the cross heads, and guide shoes on said separate pieces.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses.

WILHELM VON OECHELHAEUSER.
CARL STEINBECKER.

Witnesses to the signature of W. von Oechelhaeuser:

JOHANNES HEIN,
WOLDEMAR HAUPT.

Witnesses to the signature of C. Steinbecker:

WALTER ABBE,
HUBERT HOWSON.]