

No. 667,744.

Patented Feb. 12, 1901.

F. STOLZE.  
HOT AIR ENGINE.

(Application filed Mar. 23, 1898.)

(No Model.)

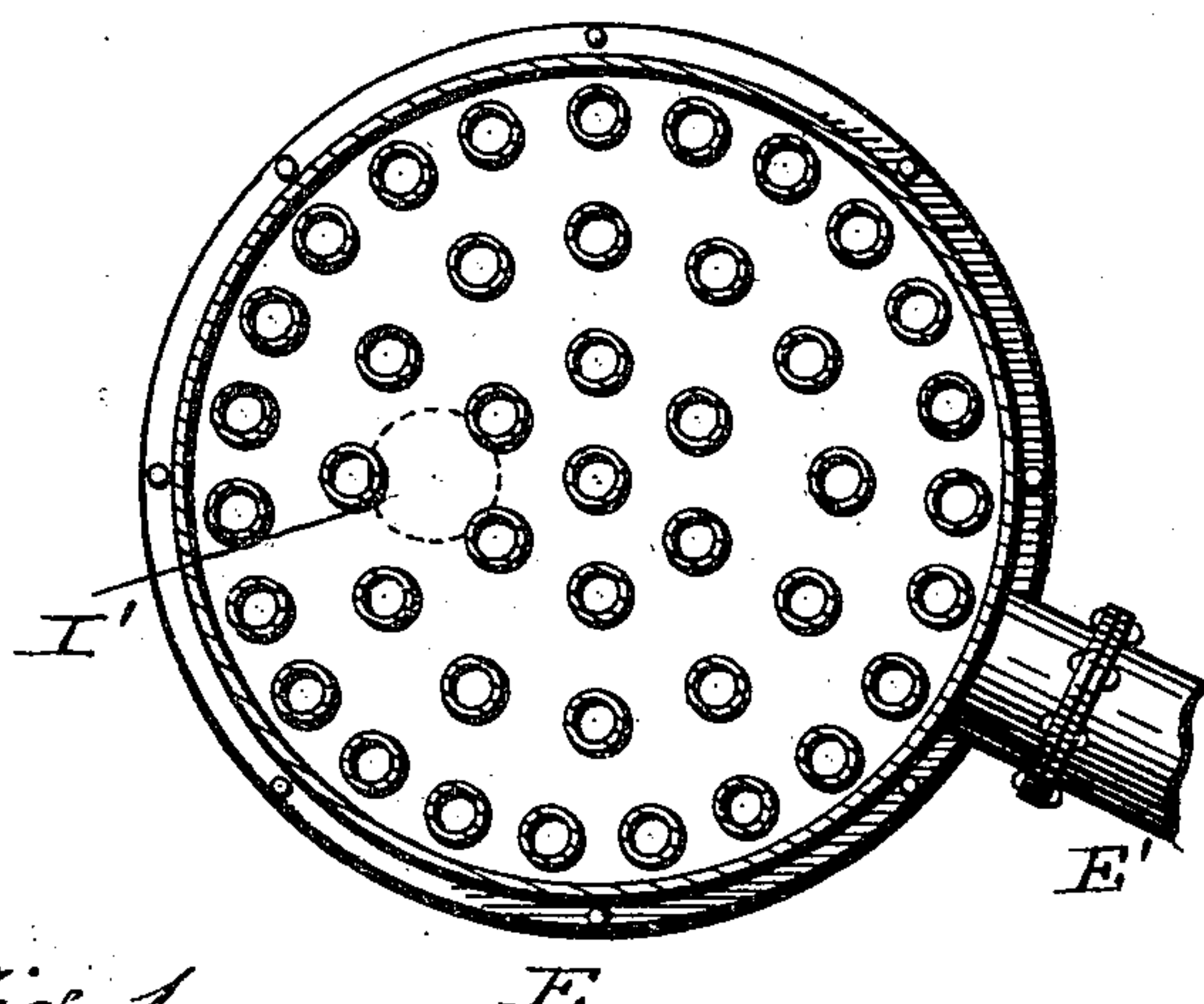


Fig. 1.

Fig. 2.

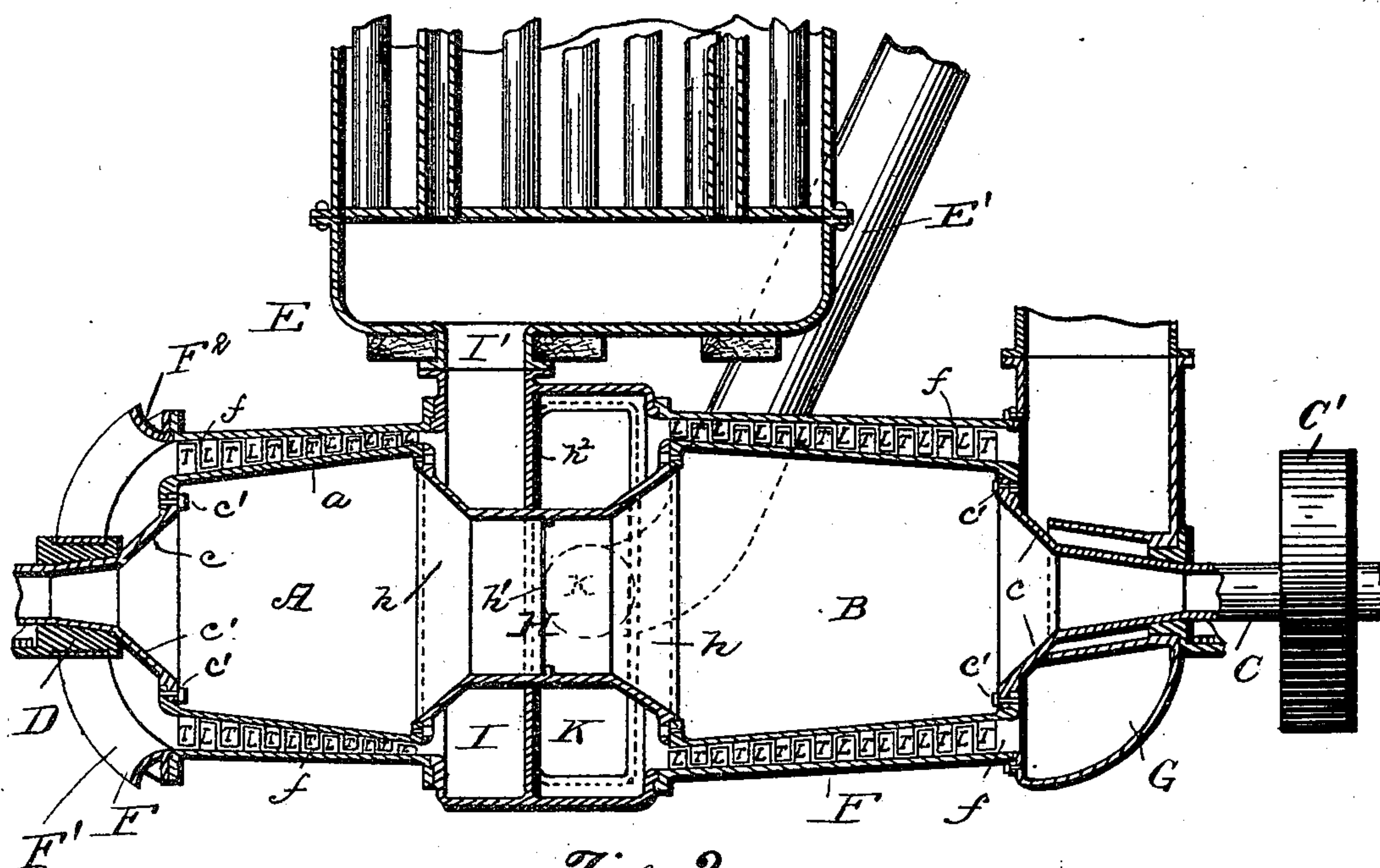
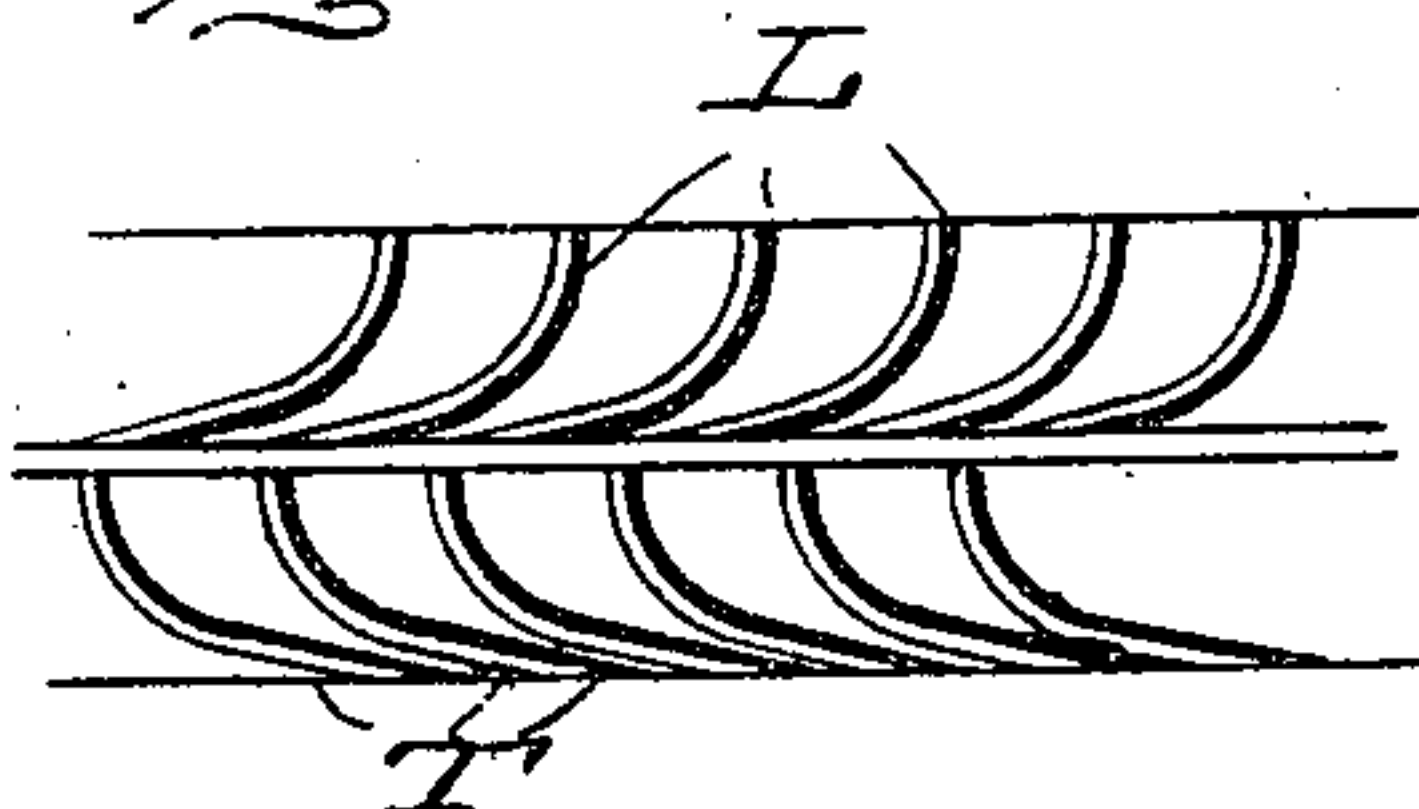


Fig. 3.

WITNESSES

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# UNITED STATES PATENT OFFICE.

FRANZ STOLZE, OF BERLIN, GERMANY.

## HOT-AIR ENGINE.

SPECIFICATION forming part of Letters Patent No. 667,744, dated February 12, 1901

Application filed March 23, 1898. Serial No. 674,933. (No model.)

*To all whom it may concern:*

Be it known that I, FRANZ STOLZE, doctor of philosophy, lecturer on the Friedrich-Wilhelms University, a citizen of the Kingdom of Prussia, residing at Eichen-Allee 23, Berlin, West end, Germany, have invented certain new and useful Improvements in and Relating to Hot-Air Engines, and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to hot-air motors.

It consists in a hot-air motor of the turbine type having a compression and an expansion cylinder, both concentric to one another upon a common shaft.

It also consists in various improvements in the guide vanes or blades arranged in said cylinders.

It further consists in a furnace or combustion-chamber for heating the air supplied to it from the compression-cylinder and delivering it to the expansion-cylinder for generating mechanical energy.

The invention further consists in the various details of construction and in the combination and arrangement of the parts thereof, as will now be described.

The accompanying drawings, forming a part of this specification, show, by way of example, one of the forms my invention may assume.

Figure 1 is a longitudinal section of the motor, showing also a portion of the furnace in its relation to the compression-cylinder. Fig. 2 is a transverse section through the furnace or combustion-chamber, the dotted lines showing its connection with the expansion-cylinder. Fig. 3, which is an edge view of the guide-vanes, is a detail of the blades or guide-vanes.

Referring to the drawings, A represents a compression-cylinder, and B an expansion-cylinder, mounted concentric to one another upon a hollow shaft C, journaled in bearings D, as shown, and provided with power-pulley C'. The furnace is shown at E. The cylinders A B are arranged in a substantially cylindrical housing or casing F, which is open at its end F', where it is provided with an annular flange F<sup>2</sup>. The other end is provided with a conduit G for escape of products of com-

bustion. The cylinders themselves are of conical or tapering form and comprise the peripheral plates *a*, bolted or otherwise secured to the bent portions *c* of the shaft at *c'*. Said cylinders are united by a central chamber H, flared at its ends *h h* and having centrally thereof a partition *h'*. The walls of chamber H and the partition *h'* and casing F form two annular passages I and K, the function of which will be discussed later on.

It will be seen that the compression-cylinder A is of less diameter and length than the expansion-cylinder B, and that between the peripheries of the cylinders and the casing F there are provided annular spaces *f* for the passage of the fuel medium. From the surface of casing F and the two cylinders project curved guide vanes or blades, (designated, respectively, by L and T.) The relation of these sets of guide-vanes one to the other is clearly shown in Fig. 3.

It will be apparent that as the air enters the apparatus at F' it will be compressed, imparting a rotary motion to the motor and entering the annular passage I, whence it passes to an air-tight furnace E via inlet I'. From here it passes through a conduit E' to the annular passage K through port *k*, shown dotted. The hot-air now impinges the guide-vanes L in the expansion-cylinder, and its reactionary effect is concentrated upon the next vane T of shell B, affording a maximum of mechanical energy. It is evident, of course, that I may employ any suitable common means for accelerating the draft or current of air to the compression-cylinder. It will also be apparent that by mounting the compression and expansion cylinders concentric to one another upon a common shaft I obtain the greatest possible results as regards economy of space and fuel and maximum of energy delivered.

While the invention has been described with more or less minuteness, it should in no wise be restricted to the exact construction and details shown, but rather should be limited in scope as indicated in the claim.

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

In a hot-air engine, a stationary outer shell consisting of two end sections in line and

concentric with each other, one open at its  
outer end and the other, at its outer end,  
communicating with the stack, a central con-  
nection portion secured to the inner ends of  
5 the sections and connecting them together,  
a partition in the central portion having a  
central opening, and vanes on the inner pe-  
ripheries of the end sections, in combination  
with a concentric hollow shaft journaled out-  
10 side the shell and comprising two flared sec-  
tions entering the ends of the shell and a cen-  
tral section having its opposite ends flared,  
expansion and compression chambers in line  
with each other and concentric within the

shell having their outer ends secured to the 15  
flared end sections of the shaft and at their  
inner ends to the flared ends of the central  
section of the shaft, and vanes on the outer  
peripheries of the expansion and compression  
cylinders alternating with the vanes of the 20  
shell, substantially as described.

In testimony whereof I affix my signature  
in presence of two witnesses.

FRANZ STOLZE.

Witnesses:

C. H. DAY,

HENRY HASPER.