

No. 878,130.

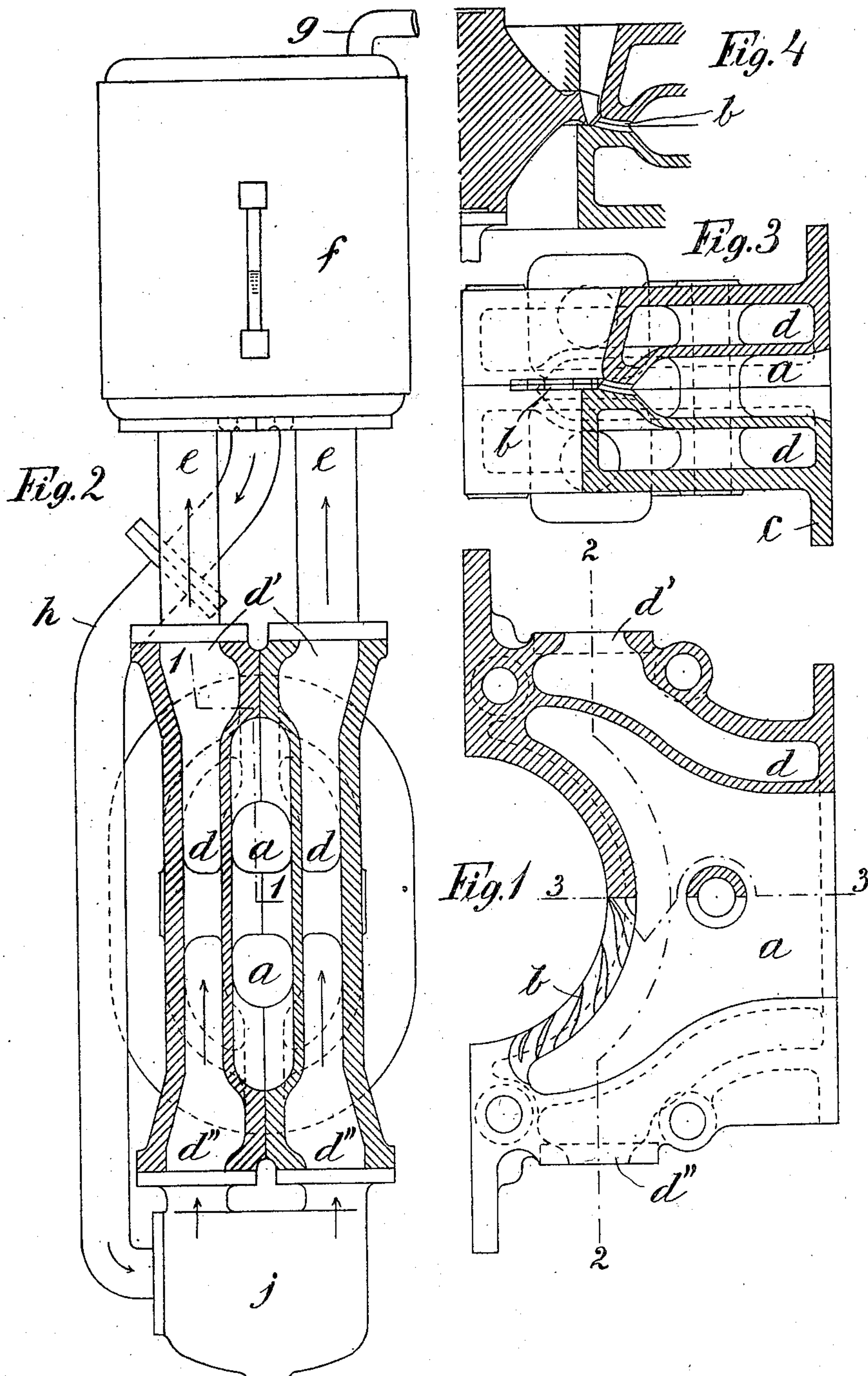
J. W. Æ. ELLING.

PATENTED FEB. 4, 1908.

MEANS FOR COOLING THE SUPPLY PASSAGE OF GAS TURBINES.

APPLICATION FILED AUG. 18, 1904.

2 SHEETS—SHEET 1.



Witnesses:
C. Heymann.
L. Waldman

Inventor:
Jens William Ægidius Elling
by P. J. Singer
His Attorney

No. 878,130.

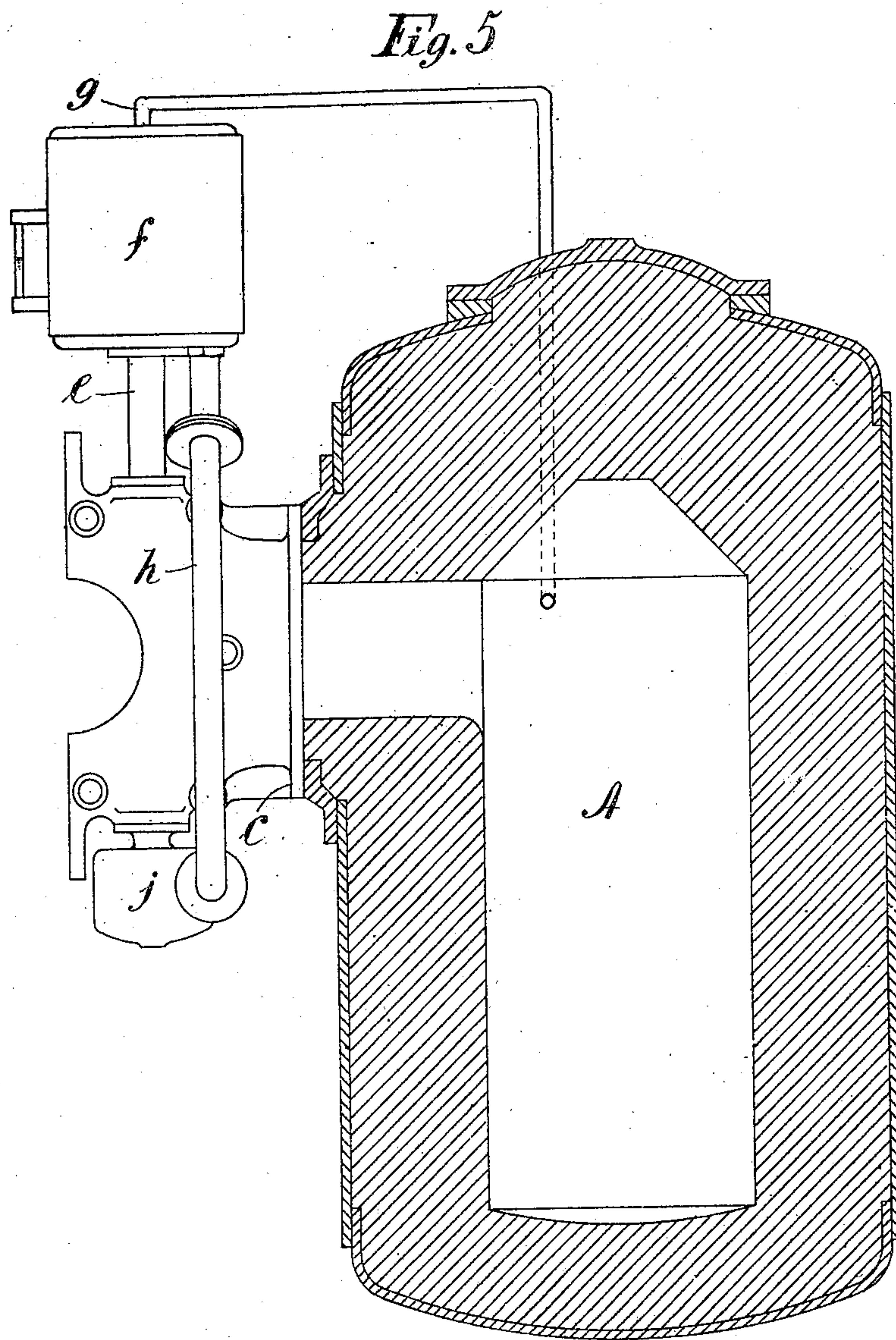
J. W. Æ. ELLING.

PATENTED FEB. 4, 1908.

MEANS FOR COOLING THE SUPPLY PASSAGE OF GAS TURBINES.

APPLICATION FILED AUG. 18, 1904.

2 SHEETS—SHEET 2.



Witnesses:-
G. Heymann.
L. Waldman

Inventor:
Jens William Aegidius Elling
by P. Singer
his Attorney

UNITED STATES PATENT OFFICE.

JENS WILLIAM ÆGIDIUS ELLING, OF CHRISTIANIA, NORWAY.

MEANS FOR COOLING THE SUPPLY-PASSAGE OF GAS-TURBINES.

No. 878,130.

Specification of Letters Patent.

Patented Feb. 4, 1908.

Application filed August 18, 1904. Serial No. 221,274.

To all whom it may concern:

Be it known that I, JENS WILLIAM ÆGIDIUS ELLING, a subject of the King of Norway, residing in the city of Christiania, in the Kingdom of Norway, have invented certain new and useful Improvements in Means for Cooling the Supply-Passage in Gas-Turbines, of which the following is a specification.

The use of combustion gases as a motive fluid for turbines has always been dependent upon effective cooling means as the heat to which the turbine is subjected is far greater than any material, practical for use in constructing the turbine, can stand. The part requiring greatest protection in this respect is the main passage or conduit connecting the furnace with the turbine, the walls thereof being continually exposed to the heat of the gases direct from the furnace, which gases are at an excessively high temperature. The problem presented in constructing a conduit or passage of this character is to provide walls thick enough to withstand internal pressure and thin enough to afford proper conductivity of heat therefrom by the cooling medium.

To this end the invention seeks to provide pressure on the exterior of the conduit wall at all times equal to the internal pressure thereon so that such a wall may be made as thin as it is structurally practical to make it to afford the greatest degree of conductivity without risk of distortion from internal pressure.

It is a further object of this invention to so control the external pressure that it will always be substantially equal to any variation of internal pressure.

With the foregoing objects in view the invention consists in jacketing the conduit or main gas supply passage and filling said jacket with a cooling medium preferably boiling water and providing a steam space, at a point above the conduit connected with the combustion chamber of the furnace, the varying or constant pressure of the combustion chamber being communicated direct to the liquid and therethrough to the conduit wall.

An embodiment of my invention is illustrated on the appended drawings.

Figure 1 represents one half of supply passage of a gas turbine partly in elevation and

partly in section on the line 1—1 in Fig. 2. Fig. 2 shows the arrangement of the supply passage combined with water reservoir and pipe connections to the cooling jacket, showing section of supply passage on the line 2—2 in Fig. 1. Fig. 3 is plan view of the supply passage showing sectional cut on the line 3—3 in Fig. 1. Fig. 4 is the same view showing part of the turbine wheel and exhaust passage for the gases in horizontal section. Fig. 5 shows the supply passage and cooling jacket connected with a furnace.

The supply passage comprises the conduit *a* for the furnace gases and the guide vanes *b*. The conduit *a* is at the end opposite the guide vanes *b* and is in direct communication with the combustion chamber *A* of the furnace. A jacket *d* for the circulation of the cooling agent is arranged to inclose the passage or conduit *a* and also surround the guide apparatus *b*. For convenience the supply passage and its jacket is made in two parts *d*, *d*, said parts being connected through pipes *e*, *e* with a reservoir *f*, which as shown is provided with a water gage. The generated steam is conducted through a pipe *g* from the said reservoir to any convenient place, for instance to the furnace for the abovementioned purpose. The circulating fluid is conducted through a pipe *h* from the reservoir *f* to the lower end of the jacket *d*, *d*.

j is a mud box interposed between the pipe *h* and the jacket *d*, *d* for the purpose of gathering mud or other impurities. The direction in which the cooling agent travels is shown by the arrows. The water level in the tank *f* may be maintained in the ordinary way by means of a feed pump.

I claim:

The combination of a gas turbine, a furnace, a gas supply conduit communicating with said gas turbine and furnace, a jacket adapted to contain a cooling medium surrounding said conduit, and means to maintain approximately the same pressure in the jacket as in the conduit, substantially as described.

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

JENS WILLIAM ÆGIDIUS ELLING.

Witnesses:

N. G. TAUDBERG,
HENRY BORDEWICH.