The invention concerns a gas-turbine plant with an atomic nuclear reactor, directly heating the working medium and with a cooling conduit, provided with a cooling blower and shut-off valve for emergency reactor cooling.

Emergency cooling of the reactor is necessary in all cases, in which the gas turbine is unable to take the heat generated by the reactor.

In a known plant, in the case of emergency cooling, the two lines of the working-medium circuit between gas turbine and reactor are closed by means of valves, and a cooling conduit is provided, which has a cooler and cooling blower and connects together the parts of the lines of the working medium circuit situated on the reactor side of the valves. In the pressure part of the cooling conduit is a further valve, which in normal operation of the plant may be shut. Although the valves may be constructed as non-return valves, at least three of them are necessary, however, and one of them is situated in the hot part of the working-medium circuit leading from the reactor to the gas turbine.

The invention eliminates the disadvantages described. In a gas-turbine plant of the kind hereinafter described, for this purpose, according to the invention, the cooler of the gas-turbine plant consists of at least two parts arranged in series with respect of the through-flowing working medium. Furthermore, the cooling conduit for the reactor emergency cooling, including a cooling blower and shut-off valve, is branched off the working-medium circuit between the two parts of the cooler, and returns to the working-medium circuit at a point upstream of the reactor. Finally, in the direction of flow of the working-medium, in front of i.e. upstream, the return point of the cooling conduit, a shut-off valve is provided in the part of the working-medium circuit leading directly into the reactor.

The drawing, with reference to which the invention will be explained more fully, represents diagrammatically in simplified form an example of the embodiment of the subject of the invention.

The gas-turbine plant shown has an atomic nuclear reactor 1, a turbine 2, a compressor 3 and generator 4, driven by said turbine, a cooler 5 and a heat-exchanger 6. From the reactor 1, a working-medium circuit 7 leads via the turbine 2, heat-exchanger 6, cooler 5, compressor 3 and the other side of the heat-exchanger 6 back to the reactor 1.
shut-off valve (13) arranged in said circuit between said compressing means and said return point of the cooling conduit.

2. The combination defined in claim 1 in which at least one of said shut-off valves (11, 13) is a non-return valve.

3. A nuclear thermal power plant as defined in claim 1 which includes a heat-exchanger (6) in said circuit having a first flow path connected to pass working-medium leaving said turbine means (2) and a second flow path located upstream of said second shut-off valve (13) and connected to pass working-medium leaving said compressing means (3); a by-pass conduit (15) at opposite ends of said second path; and a third shut-off valve (14) in the by-pass conduit.

References Cited


REUBEN EPSTEIN, Primary Examiner.
NUCLEAR REACTOR GAS-TURBINE PLANT WITH EMERGENCY COOLING

Filed June 24, 1966

INVENTOR
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BY
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ATTORNEYS
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,377,800
April 16, 1968

Werner Spillmann

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 2, after "(15)" insert -- connected with said circuit --.

Signed and sealed this 3rd day of June 1969.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

Commissioner of Patents